IUSS
Scuola Universitaria Superiore Pavia

Bando di concorso per l'ammissione al Corso di Dottorato Nazionale in

Science and Technology for Advanced Therapies (STAT) - 41° ciclo

A.A. 2025/2026 SCADENZA BANDO 27/08/2025 ore 13:00 CEST

Modifiche e/o integrazioni al bando saranno pubblicate sul

Sito istituzionale della Scuola – sezione

Concorsi, bandi e selezioni/Bandi per Dottorato

INDICE

Art. 1 - ISTITUZIONE DEL CORSO DI DOTTORATO NAZIONALE 3

1.1 Descrizione e obiettivi del Corso di dottorato 3

1.2 Università convenzionate 4

1.3 Borse di studio messe a bando 4

Art. 2 - REQUISITI DI AMMISSIONE 5

Art. 3 - DOMANDE DI AMMISSIONE ALLA SELEZIONE 5

3.1 Procedura di ammissione 5

3.2 Documenti da allegare 7

Art. 4 - PROVE DI AMMISSIONE 10

Art. 5 – COMMISSIONE GIUDICATRICE 11

Art. 6 – GRADUATORIE E ASSEGNAZIONE DELLE BORSE DI STUDIO 11

Art. 7 - IMMATRICOLAZIONE 12

7.1 Procedura di immatricolazione 12

7.2 Adempimenti ulteriori per candidati richiedenti visto 13

7.3 Tasse di iscrizione 13

Art. 8 - BORSE DI STUDIO 14

Art. 9 - COMPATIBILITÀ E INCOMPATIBILITÀ 15

ART. 10 - TRATTAMENTO DEI DATI PERSONALI 15

Amministrazione trasparente 15

Art. 11 - NORME DI RIFERIMENTO 15

Responsabile del procedimento amministrativo 15

Art. 1 - ISTITUZIONE DEL CORSO DI DOTTORATO NAZIONALE

È indetto presso la Scuola Universitaria Superiore IUSS, con sede in Piazza della Vittoria n. 15, 27100 Pavia (di seguito denominata "la Scuola") il concorso pubblico per **l'ammissione al corso di dottorato nazionale in Science and Technology for Advanced Therapies – XLI ciclo - A.A. 2025/2026.**

La Coordinatrice del Corso di dottorato nazionale è la Prof.ssa Annalisa Bonfiglio – **annalisa.bonfiglio@iusspavia.it.**

1.1 Descrizione e obiettivi del Corso di dottorato

L'innovazione tecnologica ha rivoluzionato la medicina, migliorando le capacità diagnostiche e terapeutiche, ma aumentando al contempo la complessità delle soluzioni disponibili e i costi sanitari. Per garantire un utilizzo sicuro ed efficace delle nuove tecnologie, è fondamentale formare professionisti con competenze interdisciplinari, in grado di integrare ricerca di base, sviluppo tecnologico e applicazione clinica.

Il corso di **Dottorato Nazionale in Science and Technology for Advanced Therapies** nasce per rispondere a questa esigenza, offrendo un percorso formativo multidisciplinare che unisce aspetti scientifici, tecnologici, metodologici e regolatori. Il programma si avvale della collaborazione tra Scuola Universitaria Superiore IUSS di Pavia, Fondazione Telethon, Università di Pavia e Fondazione CNAO, creando un ambiente stimolante per affrontare le sfide delle terapie avanzate, con particolare attenzione alle malattie rare, all'oncologia, e alle biotecnologie applicate in ambito biomedicale.

Il Corso è strutturato in tre curricula distinti, concepiti per formare ricercatori altamente qualificati in ambito biomedico, con particolare attenzione a: tecnologie emergenti per la biomedicina, terapie geniche e scienze biomolecolari e biotecnologie. Il programma offre una preparazione interdisciplinare e transdisciplinare, favorendo un approccio innovativo alla ricerca e applicazione delle terapie avanzate. Il dottorato si inserisce nel contesto delle priorità nazionali delineate dal Programma Nazionale per la Ricerca (PNR) e dal Piano Nazionale di Ripresa e Resilienza (PNRR), contribuendo al progresso scientifico attraverso lo sviluppo di soluzioni biotecnologiche e biomedicali di nuova generazione. L'iniziativa mira a potenziare il sistema della ricerca italiana in settori strategici per la salute umana, rispondendo alle esigenze di innovazione del settore pubblico e privato.

Il Corso, che ha **durata triennale**, è articolato nei seguenti **tre curricula,** la cui descrizione (con i relativi SSD – Settori Scientifico- Disciplinari) è riportata nell'allegato **"Educational Programme"** facente parte integrante del presente bando:

CU1 - HADRON THERAPY AND ADVANCED BIOPHYSICAL THERAPIES: Questo percorso è dedicato allo studio delle tecnologie terapeutiche non farmacologiche, basate su un approccio biofisico e bioingegneristico alla medicina. L'attenzione è rivolta in particolare all'adroterapia e ad altre terapie innovative fondate sull'uso di tecnologie biofisiche avanzate applicate alla biomedicina. Gli studenti svilupperanno competenze nella progettazione e nello sviluppo di dispositivi terapeutici d'avanguardia, nell'ingegneria della strumentazione biomedicale e nell'analisi dei rischi e delle implicazioni cliniche associate all'uso di queste tecnologie nella cura della salute umana.

CU2 - GENE AND CELL THERAPIES: Questo percorso mira a formare ricercatori altamente specializzati nella

progettazione, nello sviluppo e nell'applicazione clinica di terapie innovative basate su tecnologie genetiche. Il curriculum offre una solida preparazione teorica in genetica, biologia molecolare e medicina di precisione, integrando anche una vasta attività sperimentale e di laboratorio. Questo approccio permette di sviluppare soluzioni terapeutiche all'avanguardia per il trattamento di malattie genetiche e altre patologie complesse, preparando i ricercatori ad affrontare le sfide scientifiche e cliniche del futuro.

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES: Questo percorso integra discipline fondamentali come biologia strutturale, chimica bioinorganica e farmaceutica, biocatalisi, microbiologia molecolare, neurofarmacologia ed ematologia molecolare. L'enfasi è posta sulla ricercar sperimentale di laboratorio, con l'obiettivo di sviluppare metodologie innovative per comprendere e migliorare aspetti cruciali della salute umana, dalle basi molecolari delle malattie alle applicazioni terapeutiche più avanzate.

1.2 Università convenzionate

Per l'attivazione del Corso di dottorato nazionale la Scuola ha formalizzato convenzioni con le seguenti Università, che saranno sedi operative del programma:

1. Università degli Studi di PAVIA
2. Università degli Studi di TORINO
3. Università degli Studi di TRENTO
4. Università del PIEMONTE ORIENTALE

Per la gestione e funzionamento del Corso, la Scuola ha altresì formalizzato convenzioni con i seguenti enti:

5. Consiglio Nazionale delle Ricerche
6. Fondazione Telethon
7. Centro Nazionale per le Terapie Oncologiche (CNAO)
8. Philogen
9. Boston Children's Hospital

1.3 Posti a bando

I posti messi a bando sono n. **36**, di cui n. 6 posti riservati a dipendenti di impresa, come riportato nell'allegato **"Research Topics"**. Il numero dei posti potrà essere aumentato qualora venissero accertate, prima dell'inizio del Corso di dottorato, ulteriori disponibilità finanziarie.

Tutte le borse di studio messe a bando prevedono obbligatoriamente lo svolgimento dell'attività su uno specifico tema di ricerca, come dettagliato nelle schede presenti nel suddetto allegato, e vincolano gli assegnatari allo svolgimento delle attività di ricerca previste nella descrizione di ciascuna borsa presso l'istituzione indicata come "host university/institute". Possono essere assegnate solo ai candidati e alle candidate che siano stati giudicati idonei dalla Commissione per l'esecuzione dello specifico tema.

La selezione dei candidati prevede anche un colloquio, durante il quale la Commissione giudicatrice verificherà il possesso delle conoscenze disciplinari di base necessarie per la frequenza del corso di dottorato e per la competenza circa gli argomenti di ricerca previsti dalla tematica associata alla/e borsa/e di dottorato indicata/e dal/la candidato/a.

Per ulteriori informazioni sul Corso di dottorato nazionale e il relativo "Educational Programme" è possibile consultare il sito del corso del dottorato https://www.iusspavia.it/it/formazione/dottorati-di-ricerca/science-and-technology-advanced-therapies o scrivere all'indirizzo phd-stat@iusspavia.it.

Art. 2 - REQUISITI DI AMMISSIONE

Possono partecipare alla selezione, senza limitazioni di età e di cittadinanza, i candidati e le candidate in possesso di almeno uno dei seguenti titoli di studio:

a) Laurea magistrale o specialistica;

b) Laurea dell'ordinamento previgente (vecchio ordinamento);

c) Titolo analogo a quelli menzionati ai punti a), b) e conseguito all'estero, riconosciuto equivalente ai suddetti titoli accademici di secondo livello, ai soli fini della partecipazione al concorso per l'ammissione al dottorato.

Sono ammessi con riserva i candidati che non possiedono i requisiti di cui sopra alla data di scadenza del presente bando. Il titolo di studio necessario per l'accesso ai corsi di dottorato dovrà essere conseguito entro la data di inizio corso**.**

Art. 3 - DOMANDE DI AMMISSIONE ALLA SELEZIONE

3.1 Procedura di ammissione

La domanda di ammissione alla selezione deve essere presentata online **entro le ore 13:00 (CEST) del giorno 27 agosto 2025.** I candidati dovranno provvedere al pagamento, entro il termine di scadenza del bando, del contributo per la partecipazione al concorso pari a **euro 30,00**, pena l'esclusione dal concorso medesimo. Il contributo concorsuale versato non sarà in nessun caso rimborsato.

Per presentare domanda di ammissione alla selezione, il candidato dovrà:

- accedere alla piattaforma PICA seguente link: https://pica.cineca.it/iuss/dottorato-stat-41/
- se già in possesso di credenziali di accesso, accedere tramite "login";
- in caso di primo accesso, cliccare su "Nuova Registrazione". La procedura chiederà di inserire i seguenti dati:
  - Nome
  - Cognome
  - Sesso
  - Data di nascita
  - Codice Fiscale (solo per cittadini italiani)
  - Stato di nascita
  - Comune di nascita
  - Telefono
  - Cellulare

Una volta effettuata la registrazione, si riceverà una mail per l'attivazione dell'account all'indirizzo e-mail indicato. Ad account attivato, il candidato potrà effettuare il login.

Per procedere alla candidatura, la procedura richiede il caricamento dei seguenti documenti:

- Curriculum Vitae
- Documento di identità ben leggibile e in corso di validità
- Research Proposal
- Letter of Purpose
- Titolo di studio posseduto (per coloro che in fase di candidatura non avessero ancora

conseguito il titolo richiesto, la procedura richiede di inserire la data presunta di conseguimento)

- Referenze
- Altri titoli valutabili (ad esempio: pubblicazioni e attestati)

Una volta caricati tutti i documenti richiesti, cliccare su “salva” e tornare alla dashboard.

Il sistema chiede quindi di verificare i dati inseriti tramite il pulsante “verifica”; solo dopo aver verificato la correttezza delle informazioni presenti, si può proseguire e finalizzare il pagamento dell’iscrizione al concorso.

Cliccare quindi su “Pagamento” e seguire le istruzioni fornite dalla piattaforma per utilizzare il sistema “PagoPA”.

Il sistema richiederà quindi la firma della domanda e l’invio della stessa.

Il corretto invio della candidatura è confermato via e-mail all’indirizzo indicato in fase di registrazione. In caso di mancata ricezione (entro le 24 ore) della conferma si prega di contattare il supporto della piattaforma PICA.

3.2 Documenti da allegare

a)	**Documento di riconoscimento con foto in corso di validità**	Scansione fronte retro Per i documenti scritti in alfabeto NON latino, è richiesta la traduzione da un ente o persona a ciò preposti o autorizzati. **In assenza della traduzione, il documento non verrà preso in considerazione.**
b)	**Curriculum Vitae**	Lingua: inglese. Format suggerito In ogni caso, deve contenere: - titoli di studio e percorso formativo - eventuali esperienze di ricerca o lavorative, anche svolte fuori dal proprio paese di origine. - eventuale elenco delle pubblicazioni - ogni altro titolo ritenuto utile dal/la candidato/a che possa qualificarel’esperienza accademica e/o professionale.

c)	**Attestazione del conseguimento del titolo di laurea magistrale o equivalente presentato ai fini dell'ammissione alla procedura,** per il quale occorre inserire i seguenti dati: 1. Università che ha rilasciato il titolo; 2. Tipologia di laurea (magistrale/ magistrale a ciclo unico/vecchio ordinamento ecc.); 3. Denominazione del corso di laurea; 4. Classe di laurea (solo per i titoli conseguiti in Italia); 5. Data di conseguimento del titolo; 6. Voto finale; 7. Lista e voto degli esami sostenuti	Lingua: Italiano, Inglese, Francese o Spagnolo. N.B: I titoli presentati in altre lingue devono necessariamente avere una traduzione ufficiale in italiano o inglese effettuata dall'Università che ha rilasciato il titolo o da un ente o persona a ciò preposti o autorizzati. **In assenza, i titoli non verranno presi in considerazione.** Tipo di attestazione, per titoli conseguiti in: 1. ***Università pubbliche italiane***: autocertificazione*, datata e firmata, del conseguimento della Laurea magistrale/vecchio ordinamento. 2. ***Università di Stati Ue/extra Ue***: il certificato, il *transcript of records* del titolo di secondo livello oppure il *Diploma Supplement,* se presente;
d)	**Attestazione del conseguimento di altri titoli posseduti. Ciascun titolo di studio universitario posseduto**, di primo e secondo livello, indicante: 1. Università che ha rilasciato il titolo; 2. Tipologia di laurea (triennale/magistrale/ magistrale a ciclo unico/vecchio ordinamento ecc.); 3. Denominazione del corso di laurea; 4. Classe di laurea (solo per i titoli conseguiti in Italia); 5. Data di conseguimento del titolo; 6. Voto finale; 7. Lista e voto degli esami sostenuti	Lingua: Italiano, Inglese, Francese o Spagnolo. N.B.:I titoli presentati in altre lingue devono necessariamente avere una traduzione ufficiale in italiano o inglese effettuata dall'Università che ha rilasciato il titolo o da un ente o persona a ciò preposti o autorizzati. **In assenza, i titoli non verranno presi in considerazione.** Tipo di attestazione, per titoli conseguiti in: ***1. Università pubbliche italiane***: autocertificazione*, datata e firmata, del conseguimento della Laurea triennale e della Laurea magistrale/vecchio ordinamento. ***2. Università di Stati Ue/extra Ue***: il certificato, il transcript of records del titolo di primo e secondo livello oppure il Diploma Supplement, se presente;

e)	*Per i candidati che, alla data di presentazione della domanda, non possiedono il titolo di studio di secondo livello:* **Attestazione relativa agli esami sostenuti e ai voti conseguiti**	Lingua: Italiano, Inglese, Francese o Spagnolo. N.B.: Le attestazioni presentate in altre lingue devono necessariamente avere una traduzione ufficiale in italiano o inglese effettuata dall'Università che ha rilasciato il titolo o da un ente o persona a ciò preposti o autorizzati. **In assenza, le attestazioni non verranno presi in considerazione.**
f)	**Research proposal**	Lingua: Inglese. La "**Research Proposal"** (min 1000 max 1500 parole - esclusa bibliografia) deve essere elaborata sul tema di una delle borse prescelte oppure su un tema coerente con gli obiettivi del curriculum cui appartiene il/i progetto/i prescelto/i. Tale proposal verrà considerato nella valutazione dell'attitudine alla ricerca del candidato. Deve essere preferenzialmente articolato in: - Abstract (max 250 parole) - Scope and Research Question (-s) - Methodology - Expected impacts È ammesso l'inserimento di max 2 figure.
g)	**Letter of purpose**	Lingua: Inglese. La "**Letter of Purpose"** (max 500 parole) deve contenere le motivazioni del/lla candidato/a e l'interesse ai temi di ricerca selezionati facendo riferimento alle competenze ed esperienze acquisite.
h)	**Referenze**	Una volta presentata la domanda, il/la candidato/a, mediante il pulsante "**Lettere di referenze**", potrà inserire i nominativi dei referee, fino ad un massimo di 2. Il sistema invierà all'indirizzo e-mail indicato per ciascun referee il link per procedere alla compilazione del modulo di referenze.

***** *In base alla vigente normativa, la Scuola non potrà accettare certificazioni rilasciate da altre Pubbliche Amministrazioni. Pertanto, i titoli posseduti dai candidati, allegati alla domanda di ammissione al concorso,*

se rilasciati da Atenei pubblici italiani, dovranno obbligatoriamente essere autocertificati.

Tutti i documenti devono essere in inglese ad eccezione di a) che può essere in lingua d'origine e quelli ai punti c), d) ed e) che possono essere prodotti in una lingua a scelta tra **Italiano, Inglese, Francese o Spagnolo**. Per titoli di studio rilasciati in una **lingua diversa** deve essere allegata la traduzione ufficiale in italiano o inglese effettuata dall'Università che ha rilasciato il titolo o da un ente o persona a ciò preposti o autorizzati.

I documenti di cui alle lettere *a)* e *c)* - o in caso di titolo non ancora conseguito *e)* -sono documenti obbligatori per l'ammissione al concorso. In assenza anche solo di uno di tali documenti la candidatura sarà esclusa dal concorso.

Art. 4 - PROVE DI AMMISSIONE

Modalità di verifica	La selezione avverrà mediante la valutazione dei titoli elencati nella sezione "titoli valutabili" e colloquio. La Commissione giudicatrice esprimerà una valutazione in centesimi, con un punteggio da 1 a 100. **1. Valutazione titoli:** la Commissione giudicatrice valuterà i titoli scientifici presentati assegnando un punteggio **massimo di 60 punti.** Saranno ammessi al colloquio i candidati che nella valutazione di cui sopra avranno conseguito un punteggio non inferiore a 40 punti. In particolare, la Commissione attribuirà i seguenti punteggi: - valutazione Curriculum Vitae e lettere di referenze (punti b, c, d e h dei titoli allegati alla domanda): massimo 25 punti - valutazione Research Proposal e Letter of Purpose (di cui ai punti f e g dei titoli allegati alla domanda): massimo 35 punti La Commissione si riserva, sulla base dei titoli presentati, la possibilità di esprimere un giudizio di non idoneità del candidato rispetto ad una o più delle borse per le quali ha manifestato interesse in sede di candidatura. **1. Colloquio:** il colloquio è espletato in inglese in modalità telematica mediante piattaforma e avrà ad oggetto una discussione sui titoli presentati, sulla Research Proposal e sulle motivazioni del candidato unitamente alla discussione di un paper scientifico di argomento attinente il CU prescelto, fornito dalla Commissione prima della prova orale. La presentazione da parte del candidato di quanto sopra può avvenire, a sua discrezione, anche mediante l'utilizzo di *slide* (max 6) in condivisione video. Per ognuno dei temi di ricerca messi al bando, la Commissione può invitare a partecipare al colloquio un esperto di comprovata competenza della materia anche appartenente al collegio dei docenti del dottorato.
	La Commissione giudicatrice valuterà il colloquio assegnando un punteggio massimo di 40 punti. Saranno esclusi dalla graduatoria di merito i/le candidati/e che nel colloquio avranno ottenuto una votazione inferiore ai 25 punti. Durante il colloquio la Commissione accerta il possesso delle conoscenze disciplinari di base necessarie per la frequenza del corso di dottorato e valuta l'idoneità del candidato rispetto a ciascuna delle Borse di studio per cui il candidato ha manifestato interesse in sede di candidatura.

Titoli valutabili	- Curriculum Vitae; - Diploma Supplement o certificato con voti del diploma di laurea magistrale; - Pubblicazioni riportate nel CV; - Research Proposal; - Letter of Purpose; - Referenze - Ogni altro titolo riportato nel CV ritenuto utile dal candidato per qualificare l'esperienza accademica e professionale
Esiti della valutazione titoli	Gli esiti della valutazione titoli saranno pubblicati entro il giorno **24 settembre 2025** all'Albo della Scuola – Sezione Bandi e concorsi.
Calendario dei colloqui	I colloqui si svolgeranno a partire dal giorno **29 settembre 2025**. Le modalità di svolgimento del colloquio saranno comunicate ai candidati interessati con preavviso.
Ausili	I candidati che avessero esigenza di specifici ausili o compensazioni possono farne richiesta in sede di candidatura.

Ai colloqui i candidati e le candidate dovranno essere collegati mediante la piattaforma indicata sia con l'audio che con il video. Il mancato collegamento dei candidati nel giorno o nell'orario stabilito per le prove, ovvero la mancata esibizione del documento di riconoscimento, sono considerati **rinuncia alla partecipazione** alla selezione.

Art. 5 – COMMISSIONE GIUDICATRICE

La Commissione giudicatrice per l'ammissione alla Corso di Dottorato è nominata dal Rettore con proprio decreto e la sua composizione è consultabile all'Albo della Scuola – Sezione Concorsi, bandi e selezioni/Bandi per Dottorato. La Commissione è articolata in Sottocommissioni, composte dai commissari di curriculum. Ogni Sottocommissione è preposta allo svolgimento dei colloqui dei candidati al curriculum e può essere integrata da un esperto di comprovata competenza della materia, anche appartenente al collegio dei docenti del dottorato, per ognuno dei temi di ricerca messi a bando.

Art. 6 – GRADUATORIE E ASSEGNAZIONE DELLE BORSE DI STUDIO

Al termine dei colloqui ed entro il **8 ottobre 2025**, sarà emanato un decreto di approvazione atti contenente la graduatoria finale formulata per curriculum, che sarà consultabile sul sito istituzionale della Scuola – Concorsi, bandi e selezioni/Bandi per Dottorato.

La graduatoria finale:

- è formulata in ordine di punteggio ottenuto dal candidato e in caso di parità

di punteggio fra due o più candidati prevale la minore età;

- riporta le idoneità ai temi di ricerca attribuite dalla commissione secondo l'ordine di preferenza espressa dal candidato in sede di candidatura.

L'assegnazione delle borse è fatta seguendo il procedimento riportato di seguito:

1. ad ogni candidato, seguendo l'ordine della graduatoria di merito, è proposta mediante comunicazione all'indirizzo di posta elettronica inserito in sede di candidatura, la prima borsa disponibile, per la quale ha ottenuto l'idoneità, secondo l'ordine di preferenza espresso in sede di candidatura;
2. il candidato è tenuto ad accettare la borsa proposta rispondendo mediante posta elettronica entro 48 ore dalla comunicazione;
3. se il candidato accetta entro il termine indicato, la borsa è assegnata ed è tolta dal conteggio delle borse disponibili;
4. se il candidato rinuncia o non risponde entro il termine indicato di 48 ore, perde il diritto ad avere la borsa proposta ed una qualsiasi altra borsa. La borsa proposta non viene quindi assegnata e rimane disponibile per i candidati successivi nell'ordine di graduatoria.

La procedura prosegue fino all'assegnazione di tutte le borse, e si concluderà entro la data di inizio del corso.

Qualora, al termine di questa procedura di scorrimento della graduatoria, risultassero delle borse non assegnate, si procederà a un nuovo procedimento di assegnazione riservato esclusivamente a tali borse attraverso una manifestazione di interesse alla quale potranno rispondere solo i/le candidati/e già nella graduatoria finale che non abbiano già espresso accettazione o rinuncia ad una delle borse. La nuova manifestazione di interesse dovrà avvenire secondo le modalità e i termini che saranno comunicati dalla Scuola ai candidati.

Art. 7 - IMMATRICOLAZIONE

7.1 Procedura di immatricolazione

La pubblicazione all'Albo della Scuola delle graduatorie ha valore di comunicazione ufficiale.

L'inizio del Corso di dottorato nazionale è fissato il **15 novembre 2025.**

I candidati vincitori di borsa di studio dovranno provvedere all'immatricolazione entro la data di comunicata, pena la perdita del diritto all'iscrizione al dottorato.

Ai fini del perfezionamento dell'iscrizione, i candidati ammessi dovranno trasmettere i documenti necessari secondo le modalità comunicate dagli uffici per l'immatricolazione, tra i quali:

a) Solo per i candidati che hanno conseguito il titolo di II livello all'estero: Dichiarazione di valore (o copia dell'avvenuta richiesta alle autorità competenti) oppure Diploma Supplement;

b) Solo per i candidati con titolo di II livello conseguito successivamente alla scadenza del bando ed entro la data di inizio del corso: certificato o autocertificazione di conseguimento del titolo di secondo livello con relativa votazione, data e luogo di ottenimento.

Per effettuare l'immatricolazione è necessario completare la relativa procedura su piattaforma Servizi **Esse3 – Area Riservata Studenti** , secondo le modalità indicate dagli uffici.

Non saranno accettate immatricolazioni o pagamenti effettuati con modalità diverse da quelle sopra indicate.

7.2 Adempimenti ulteriori per candidati richiedenti visto

Per soggiornare in Italia, gli studenti cittadini NON UE devono richiedere il visto ai fini di studio avendo cura di effettuare la registrazione all'apposita procedura tramite portale **Universitaly entro cinque (5) giorni lavorativi dalla data di accettazione della borsa**. Una volta arrivati in Italia, gli studenti sono tenuti a presentare entro otto (8) giorni, domanda di permesso di soggiorno a fini di studio presso la Questura. **L'ingresso in Italia e la presa di servizio presso l'Università ospitante per gli studenti NON UE devono avvenire entro e non oltre il giorno 31 gennaio 2026, pena la decadenza dal corso di dottorato.**

Per ulteriori informazioni consultare la pagina dedicata sul sito della Scuola IUSS.

7.3 Tassa regionale

I dottorandi sono tenuti a pagare la tassa regionale per ciascun anno accademico.
Il contributo richiesto, a carico di tutti i dottorandi, consiste nella tassa regionale per il diritto allo studio ed è comprensivo dell'imposta di bollo.

La rinuncia o l'esclusione dal corso di dottorato non danno diritto al rimborso della tassa versata.

Art. 8 - BORSE DI STUDIO

Le borse di studio hanno la durata del corso di dottorato e vengono assegnate per il 1° anno e confermate annualmente per l'ammissione agli anni successivi previa valutazione positiva da parte del Collegio dei docenti.

Le borse sono erogate con cadenza mensile posticipata (il pagamento è effettuato entro l'ultimo giorno del mese).

L'importo annuo delle borse di studio al lordo degli oneri a carico del dottorando è pari a **19.021,02 euro**. La borsa di dottorato è esente dal pagamento dell'imposta locale sui redditi e sul reddito delle persone fisiche (IRPEF) ed è soggetta al versamento dei contributi previdenziali INPS a gestione separata nella misura di due terzi a carico dell'amministrazione e di un terzo a carico del dottorando.

Le borse non possono essere cumulate con altre borse di studio a qualsiasi titolo conferite, tranne quelle concesse da istituzioni nazionali o straniere, utili ad integrare con soggiorni all'estero l'attività di ricerca dello studente.

Non può beneficiare di borsa di dottorato chi ne abbia fruito in precedenza, anche se parzialmente.

Per i periodi di permanenza all'estero, autorizzati dal Collegio dei Docenti, la borsa può essere incrementata nella misura del 50%, per un periodo di norma pari a 6 mesi e, ad ogni modo, complessivamente non superiore a 12 mesi.

Inoltre, la Scuola mette a disposizione di tutti gli allievi Ph.D. un budget annuale di importo pari al 20% della borsa, da destinare alla copertura di spese per lo svolgimento di attività di ricerca in Italia e all'estero, secondo le modalità previste dal Regolamento interno.

La Scuola provvede ad assicurare gli allievi per l'intera durata del corso per infortuni e per responsabilità civile.

Art. 9 - COMPATIBILITÀ E INCOMPATIBILITÀ

L'ammissione al corso di dottorato comporta un impegno esclusivo e a tempo pieno.

I regimi delle compatibilità e delle incompatibilità con la frequenza ai corsi di dottorato sono disciplinati dall'art. 17 del Regolamento in materia di corsi di dottorato, al quale si rinvia.

ART. 10 - TRATTAMENTO DEI DATI PERSONALI

Ai sensi della normativa della normativa in materia di protezione dei dati personali (D. Lgs. 196/2003 e ss.mm.ii nonché dell'art. 13 del Regolamento (UE) 2016/679) la Scuola, in qualità di Titolare (con sede in piazza Vittoria, 15, 27100 Pavia PV – PEC direzione@pec-iusspavia.it) informa che il trattamento dei dati personali, raccolti presso gli uffici amministrativi della Scuola, è finalizzato all'espletamento del concorso e dell'eventuale procedimento di gestione alla carriera accademica dei vincitori; avverrà nel rispetto delle condizioni di liceità previste dal Regolamento (UE) 2016/679, da parte di personale autorizzato, con l'utilizzo di procedure anche informatizzate, nei modi e nei limiti necessari per proseguire le predette finalità. I dati saranno trattati in conformità alle norme sulla conservazione della documentazione amministrativa. Il conferimento di tali dati è necessario per valutare i requisiti di partecipazione e il possesso dei titoli e la loro mancata indicazione può precludere tale valutazione, con conseguente esclusione dalla procedura. Le graduatorie daranno pubblicate secondo la normativa vigente. I dati potranno essere comunicati alle amministrazioni pubbliche direttamente interessate alla posizione giuridico-economica del candidato positivamente valutato e a tutti quei soggetti pubblici ai quali, in presenza dei relativi presupposti, la comunicazione è prevista obbligatoriamente. Gli interessati hanno il diritto di ottenere dalla Scuola, nei casi previsti, l'accesso ai dati personali e la rettifica o la cancellazione degli stessi o la limitazione del trattamento che li riguarda o di opporsi al trattamento (artt. 15 e ss. del Regolamento). L'apposita istanza è presentata al Titolare. Ulteriori informazioni sono disponibili al seguente link: https://www.iusspavia.it/it/protezione-dati-personali.

Amministrazione trasparente:

La Scuola opera nel rispetto della normativa relativa alla prevenzione della corruzione (L.190/2012) applicando le misure individuate nel Piano Integrato pubblicato nella sezione "Trasparenza" del sito istituzionale all'indirizzo: http://www.iusspavia.it.

Art. 11 - NORME DI RIFERIMENTO

Per quanto non previsto dal presente bando si rinvia al Regolamento per i Corsi di dottorato della Scuola, emanato con D.R. n. 74/2024 e al Regolamento del Corso di Dottorato Nazionale in Science and Technology for Advanced Therapies.

La presentazione della domanda di partecipazione alle selezioni attraverso la procedura di cui all' art. 3 implica l'accettazione da parte del candidato delle norme contenute nel presente bando e nel Regolamento per i Corsi di dottorato.

Responsabile del procedimento amministrativo

Dott.ssa Giovanna Spinelli, Responsabile Area Didattica, Qualità e Servizi agli allievi – Palazzo del Broletto, Piazza della Vittoria n. 15 – 27100 Pavia – tel. +39 0382375811, fax +39 0382375899, e-mail: info@iusspavia.it.

IUSS
Scuola Universitaria Superiore Pavia

***Disclaimer**: The Italian version of this document is the official and legally binding announcement document. The English version is not legally binding and is only meant to provide information.*

Call for Application National Doctoral Course in

Science and Technology for Advanced Therapies (STAT) - 41st cycle

2025/2026 academic year

DEADLINE FOR SUBMISSION 13:00 (Italian Time 27 August 2025)

Changes or additions to the call will be published on the

"Calls for applications and announcements/Calls for PhD

programmes" page of the School's official website

TABLE OF CONTENTS

Art. 1 - ESTABLISHMENT OF THE DOCTORAL COURSE IN SCIENCE AND TECHNOLOGY FOR ADVANCED THERAPIES 3

1.1 Course description and course aims/objectives 3

1.2 Affiliated locations 4

1.3 Scholarships 5

Art. 2 – ADMISSION REQUIREMENTS 5

Art. 3 - APPLICATIONS 5

3.1 Application procedure 5

3.2 Required accompanying documents 6

Art. 4 – ADMISSION PROCEDURE 9

Art. 5 – SELECTION BOARD 11

Art. 6 – RANKING AND SCHOLARSHIP ASSIGNMENT 11

Art.7 – ENROLMENT 11

7.1 Enrolment procedure 11

7.2 Additional requirements for visa applicants 12

7.3 Registration fee 12

Art.8 – SCHOLARSHIPS 12

Art. 9 – EMPLOYMENT RESTRICTIONS 13

Art. 10 – MANAGEMENT OF PERSONAL DATA 13

Transparent administration 13

Art 11 – REFERENCE RULES 13

Procedure Supervisor 13

Disclaimer 14

Art. 1 - ESTABLISHMENT OF THE DOCTORAL COURSE IN SCIENCE AND TECHNOLOGY FOR ADVANCED THERAPIES

The Scuola Universitaria Superiore IUSS, Piazza della Vittoria n. 15 – 27100 Pavia (hereafter "the School"), hereby announces a Call for Applications to enroll in the **41st cycle of the National Doctoral Course in Science and Technology for Advanced Therapies** (hereafter PhD-STAT) for the **2025/2026 academic year**.

PhD Programme Coordinator: **Professor Annalisa Bonfiglio – annalisa.bonfiglio@iusspavia.it**

1.1 Course Description and Objectives

Technological innovation has transformed medicine, enhancing diagnostic and therapeutic capabilities, but also increasing the complexity of available solutions and healthcare costs. To ensure the safe and effective use of new technologies, it is crucial to train professionals who possess interdisciplinary skills and can integrate basic research, technological development, and clinical application.

The **Doctoral Course in Science and Technology for Advanced Therapies** was created to meet this need, aiming to provide a multidisciplinary training path that combines scientific, technological, methodological, and regulatory aspects. The Scuola Universitaria Superiore IUSS di Pavia, Fondazione Telethon, University of Pavia, and Fondazione CNAO collaborate to create a stimulating environment to address the challenges of advanced therapies, with particular attention to gene and cell therapies, advanced physical therapies including Hadron therapy and biotechnologies applied in the biomedical field.

The Course is structured into three distinct curricula designed to train highly qualified researchers in biomedical fields, with emphasis on: emerging technologies for biomedicine, gene therapies, and biomolecular sciences and biotechnology. The programme provides an interdisciplinary and transdisciplinary background, encouraging an innovative approach to the research and application of advanced therapies; it fits into the context of national priorities outlined by the National Research Programme (NRP) and the National Recovery and Resilience Plan (NRRP), contributing to scientific progress by developing next-generation biotechnology and biomedical solutions. The initiative aims to strengthen the Italian research system in strategic areas for human health, responding to the innovation needs of the public and private sectors.

The Course, which has a **three-year duration**, is divided into the following three curricula, the description of which (with the relevant SSDs - Scientific Disciplinary Sectors) can be found in the attached "Educational Program" which is an integral part of this announcement:

CU1 - HADRON THERAPY AND ADVANCED BIOPHYSICAL THERAPIES: This programme focuses on the study of non-pharmacological therapeutic technologies based on a biophysical and bioengineering approach to medicine. Particular focus is given to hadron therapy and other innovative therapies based on the use of advanced biophysical technologies applied to biomedicine. Students will develop skills in designing and developing cutting-edge therapeutic devices, engineering biomedical instrumentation as well as the analysis of the risks and clinical implications associated with the use of these technologies in human health care.

CU2 - GENE AND CELL THERAPIES: This path aims to train highly specialised researchers in the design,

development and clinical application of innovative genetic technology-based therapies. The curriculum provides a solid theoretical background in genetics, molecular biology and precision medicine, alongside an extensive experimental and laboratory work. This approach enables the development of cutting-edge therapeutic solutions for the treatment of genetic and other complex diseases, preparing researchers to address the scientific and clinical challenges of the future.

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES: This programme integrates core disciplines such as structural biology, bioinorganic chemistry, pharmaceutical chemistry, biocatalysis, molecular microbiology, neuropharmacology and molecular hematology. Emphasis is placed on experimental laboratory research, with the aim of developing innovative methodologies to understand and improve crucial aspects of human health, from the molecular basis of disease to the most advanced therapeutic applications.

1.2 Affiliated bodies

For the activation of the National Doctoral Course, the School has formalized agreements with following universities, which will be host university of the program:

1. Università degli Studi di PAVIA
2. Università degli Studi di TORINO
3. Università degli Studi di TRENTO
4. Università del PIEMONTE ORIENTALE

The School has also formalised agreements with the following entities for the management and operation of the course:

5. Consiglio Nazionale delle Ricerche
6. Fondazione Telethon
7. Centro Nazionale per le Terapie Oncologiche (CNAO)
8. Philogen
9. Boston Children's Hospital

1.3 Scholarships

The attached document (Research programme) describes the **36** scholarships available, 6 of which are reserved for company employees. The number of scholarships may be increased if further funding should be available before the beginning of the PhD course. Each scholarship requires the performance of the activities on a specific research topic, as detailed in the aforementioned annex, and binds to conduct the research activity at the indicated "host university/institute". Each individual scholarship can only be assigned to those candidates who are evaluated as eligible by the Selection Board.

Interviews held during the selection process will allow the Selection Board to establish whether the candidates have the necessary knowledge and skills to be admitted to the doctoral course and to study the selected scholarship research topics. For further information on the doctoral course and its "Educational Programme", please visit https://www.iusspavia.it/en/education/doctoral-programmes/science-and-

technology-advanced-therapies or email phd-stat@iusspavia.it.

Art. 2 – ADMISSION REQUIREMENTS

Applications are welcome from all qualified candidates, regardless of age or nationality. Eligible candidates must hold the following academic qualifications:

a) Master's degree (Laurea Magistrale or Laurea Specialistica or Laurea Vecchio Ordinamento);

b) Analogous academic qualification awarded abroad that is comparable to an Italian master's degree, in terms of duration and study content, and recognized by the Selection Board as suitable for application to the course.

Applications from candidates who are still to graduate will be considered pending. **The academic qualification required for admission to the PhD programs must be obtained within the start date of the course.**

Art. 3 - APPLICATIONS

3.1 Application Procedure

Applications must be submitted exclusively online by **27 August, 2025 at 13:00 Italian time**. The application fees are **30 euro** to be paid before the deadline to avoid exclusion. The application fees cannot be reimbursed under any circumstances.

Please refer to the application procedure described below.

- Go to the following link: https://pica.cineca.it/iuss/dottorato-stat-41/
- Log in if you have already registered;
- If you are logging in for the first time, click on "New Registration" and enter the following data:
  - Name
  - Surname
  - Gender
  - Date of birth
  - Fiscal Code (for Italian citizen only)
  - State of birth
  - Place of birth
  - Phone number

Once you have completed registration your login credentials will be sent to the email address provided. You will be able to log in once you receive an email confirming registration.

In order to apply, you have to upload the following documents:

- Curriculum Vitae
- Valid ID (clearly visible)
- Research Proposal
- Letter of Purpose

- Academic qualification (for those candidates who have not yet obtained the required qualification the procedure will required the estimated date of graduation)
- References
- Other qualifications (for example: publications and certificates)

Once all the required documents have been uploaded, click "save" and return to the dashboard.

You will be asked to verify – through the "verify" button – the data you entered; only after verifying that the information present is correct, you can continue and finalize the registration payment.

You have to click on "payment" and follow the instructions provided by the platform in order to use the "PagoPA" system. You have to sign the application and submit it.

Successful submission of the application will be confirmed to the email address provided in the registration details. If you have not yet received a confirmation email after 24 hours please contact the help desk of PICA platform.

3.2 Required Accompanying Documents

a)	**A scan of a valid form of photographic ID**	Please scan both sides of the document. If the ID document is not written in Latin characters, you must provide a certified Italian translation. **Please note that if you do not provide a certified translation your ID document will not accepted**.
b)	**Curriculum Vitae**	Language: English Suggested template In any case, it must include: - academic qualifications and training path; - research and/or work experience, including experience outside their country of origin (if any); - list of publications (if any); - other relevant qualifications/documents that provide information on the applicant's academic and professional experience.
c)	**Proof of university degree awards needed for the admission, for which the following information must be entered:** 1. University; 2. Degree type;	Language: Italian, English, French, Spanish. For academic documents in all other languages applicants must provide an official translation provided by the university issuing the degree or by an authorized body or translator. **Without a certified translation the documents will not be**

	3. Full name of the degree; 4. Major; 5. Date of graduation (or expected date); 6. Final mark/grade; 7. List of exams undertaken and the associated grade awarded.	**accepted**. Type of certificate for degrees awarded in: 1. **Italian public universities:** self-declaration* of master's degree award, signed and dated; **2. EU and non-EU member state universities**: where available, certificates, transcripts of records master's degree or diploma supplement, if available.
d)	**Proof of other academic qualifications, including the following information:** 1. University; 2. Degree type; 3. Full name of the degree; 4. Major; 5. Date of graduation (or expected date); 6. Final mark/grade; 7. List of exams undertaken, the associated grade awarded.	Language: Italian, English, French or Spanish. For all other languages, applicants must provide an official translation provided by the university issuing the degree or by an authorized body or translator. **Without a certified translation the documents will not be accepted**. Type of certificate for degrees awarded in: 1. **Italian public universities:** self-declaration* of bachelor's or master's degree award, signed and dated; 2. **EU and non-EU member state universities**: where available, certificates, transcripts of records of bachelor's or master's degree or diploma supplement, if available.
e)	*For applicants due to be awarded their master's degree:* **Proof of exams taken and grades awarded.**	Language: Italian, English, French or Spanish. For all other languages, applicants must provide an official translation provided by the university issuing the degree or by an authorized body or translator. **Without a certified translation the documents will not be accepted**.
f)	**Research Proposal**	Language: English The **Research Proposal** (min 1000- max 1500 words, excluding bibliography) should be written on one of the selected research topics or consistent with the objectives of the curriculum to which the selected project-s belong(s). This proposal will be taken into account when evaluating the candidate's aptitude for research. It should preferably be articulated as follows:

		- Abstract (max 250 words); - Scope of research and question-s; - Methodology; - Expected impacts A maximum of 2 figures may be included.
g)	**Letter of Purpose**	Language: English The **Letter of Purpose** (max 500 words) must include your motivations ad interest for conducting the selected research topic-s based on relevant skills and experience.
f)	**Reference**	Once the application has been submitted, the candidate can enter the names of **up to two referees** via the 'Reference letters' button. The system will then send a link to each referee's email address, allowing them to proceed with filling in the reference form.

***** *Current regulations do not recognize certificates issued by other Public Administrations. Qualifications included in the application must be self-certified if issued by Italian public universities.*

With the exception of a), which can be in the original language, and c) and d), and e) which can be in Italian, English, French or Spanish, **all documents must be in English**. For documents issued in a different language, an official translation (into Italian or English, by the issuing university or by an authorized body) must be provided.

All documents referred to in *a)* and *c)* - or, for applicants due to be awarded their master's degree, in *e)* - are strictly required. Failing to submit any of the said documents during application will result in the candidate's exclusion from admission.

Art. 4 – ADMISSION PROCEDURE

Evaluation	Selection will be based on an assessment of the qualifications listed in the "Qualification Assessment" section followed by an interview. The Selection Board will award a score from 1 to 100. **1. Qualification Assessment:** The Selection Board will assess the applicants' scientific qualifications and allocate an overall score up to a maximum of **60** points. Applicants who receive a score of at least **40** will be invited to attend an interview. The Selection Board will award scores based on: - CV, academic qualifications and references (Required documents *b, c, d, h*): up to a maximum of 25 points; - Research Proposal and Letter of Purpose (Required documents *f* and *g*): up to a maximum of 35 points. At this stage candidates may already be determined non-eligible for one or more of the selected scholarships. **Interview:** interviews will be conducted in English through platform and will focus on the applicant's scientific background, Research Proposal, as well as the candidate's motivations. It will also include a discussion of a scientific paper on a topic relevant to the chosen CU, which will be provided by the Selection Board before the interview. At their discretion, candidates may also present the above using the screen sharing option within Teams (maximum of 6 slides). The Selection Board can invite a proven expert for each research topic to participate in the interview. This expert could be a member of the Academic Board. The Selection Board will determine a score for the interview up to a maximum of **40** points. A minimum of 25 points is required to continue the process. During the interview, the Selection Board will verify that the candidate has the necessary knowledge and skills for attending the doctoral course and will proceed to evaluate the eligibility of the candidate for the research topics selected.

Qualifications Assessment	- Curriculum Vitae; - Diploma supplement or transcripts of master's degree grades or levels; - List of publications (if any) as stated on CV; - Research Proposal; - Letter of Purpose; - References - Any other relevant qualifications listed on the CV that provide evidence of academic and professional experience.
Assessment Results	The results of the qualification assessment will be published on the IUSS website – on the "Call for Applications" page, by **24 September 2025**.
Interview Schedule	The interviews will be conducted starting from **29 September 2025.** Candidates will be given reasonable notice of the date and timing of the interview.
Special needs	People with disabilities can apply for special equipment and/or other aids during the application process.

Candidates must be connected on the indicated platform via both audio and video. Failing to connect at the time and date of the interview or lacking ID proof will be regarded as withdrawal from the application process.

Art. 5 – SELECTION BOARD

The Selection Board for admission to PhD programmes is appointed by the Rector of the university. The list of the Board Members is published on the School website – "Call for Applications" page. The Selection Board is divided into subcommittees, corresponding to the different curricula. The subcommittees will be responsible for arranging and conducting the relevant interviews and can be joined by experts, for each of the research topics. The experts may also be part of the Academic Board.

Art. 6 – RANKING AND ASSIGNMENT OF SCHOLARSHIPS

Following the interviews, the final ranking for each curriculum will be published on the School's website – "Call for Applications" page by **8 October 2025.**

The final ranking:

- Will be in decreasing order of scores (in the event of a tie, the youngest candidate will be given precedence);
- Will confirm the candidate's eligibility to study the research topics of their choice or additional research topics based on the assessment of the Selection Board.

The scholarships will be assigned according to the following procedure:

1. Each candidate will be notified by email and offered a scholarship in observance of the final ranking and of their order of preference as formally declared at the application stage;
2. Candidates must confirm acceptance by replying to the email within 48 hours;
3. Once scholarships are assigned, they are no longer obtainable by other candidates;
4. Candidates who reject the scholarship or fail to confirm before the deadline will forfeit the right to the scholarship offered and to any further scholarship. The place will be offered to the next eligible candidate.

This procedure will continue until all scholarships are assigned, up until the beginning of the PhD course.

If any scholarships remain unallocated at the end of the above-mentioned procedure of scrolling down the ranking list, a new allocation procedure will be carried out exclusively for these scholarships. This will take the form of an expression of interest, to which only candidates who are already on the final ranking list and have not yet accepted or declined a scholarship may respond. The new expression of interest will take place according to terms and conditions communicated by the School to candidates.

Art.7 – ENROLMENT

7.1 Enrolment Procedure

Publication of the rankings on the School's online Official Register (Albo Ufficiale) shall be considered as official notification. The Doctoral Course Programme will start on **15 November 2025.**

Successful candidates will be notified of the final date for enrolment – failure to enrol by that date will result in their exclusion from the doctoral course.

The following is a summary of the documents to be submitted to the enrolment office:

a) for candidates who obtained their master's degree abroad a Declaration of Local Value (or a copy

of the application to the competent authority) or a Diploma Supplement is required;

b) for candidates awarded their master's degree ("laurea magistrale") after the deadline for applications to the course but no later than 14 November 2025, a degree certificate or self-declaration of the qualification including grades, date and place of degree awarded must be sent by email to phd-stat@iusspavia.it.

In order to enroll candidates need to complete procedure on Service Esse3 – Reserved Area; more information will be provided you by the secretariat.

Any different form of payment and enrollment from those specified in this document are not accepted.

For any student the actual entrance in Italy and the arrival to the host University must occurred before the **31st of January 2026** to avoid exclusion from the PhD course.

7.2 Additional Requirements for Visa Applicants

Non-EU students entering Italy should apply for a specific study visa using the online procedure on the Universitaly portal **within 5 days since the acceptance of the scholarship**. Students must apply to the local Police Department ("Questura") within eight (8) days of arriving in Italy for a residence permit for study purposes.

For further information, please visit IUSS website.

7.3 Registration Fee

PhD students must pay the registration fee for each academic year. The registration fee includes the regional study tax and the stamp duty.

In case of withdrawal from the doctoral course candidates cannot be reimbursed the registration fee.

Art.8 – SCHOLARSHIPS

The scholarships have the duration of the PhD Course and are awarded for the 1st Year and confirmed on a yearly basis for admission to the subsequent year subject to the decision by the Teaching Board of the individual programmes.

The scholarships are paid monthly in arrears, by the last day of each month.

The annual amount of the scholarship is **€ 19.021,02**, including National Social Security Contributions (INPS). This amount is exempt from the IRPEF tax and it is subject to the payment of National Social Security contribution (INPS "gestione separata"), of which two thirds are paid by the administration and one third by the PhD student.

The scholarships may not be cumulated with other scholarships granted for any reason, with the exception of those granted by national or foreign institutions to enhance the student's research activity with periods of stay abroad.

The scholarship cannot be awarded to those who have already benefited, even partially, from a doctoral scholarship in the past.

The scholarship may be increased by 50% for an average period of 6 months stay abroad and, in any case, until a maximum period of 12 months.
The School will also make an annual budget, amounting to not less than 20% of the scholarship, available to all PhD students pursuant to article 9 of Italian Ministerial Decree 226/2021 to cover research activity-related expenses in Italy and abroad, as provided for by internal rules.
The School shall insure the students against accidents and civil liability for the entire duration of the Programme.

Art. 9 – LIMITATIONS ON OTHER EMPLOYMENT

Admission to the PhD course implies a full-time commitment and no other type of employment is allowed. However, art. 17 of the "Regolamento in materia di corsi di dottorato" allows the student to occasionally work within strict guidelines for other entities while enrolled in the course. Please refer to the Regulations for more details.

Art. 10 – MANAGEMENT OF PERSONAL DATA

The School, as Controller (piazza Vittoria, 15, 27100 Pavia PV – PEC direzione@pec-iusspavia.it), in full conformance with Legislative Decree n. 196/2003 and with any subsequent updates, and with article 13 of the EU General Data Protection Regulation n. 679/2016, collects and processes personal data in order to manage the application for participation in the doctoral competition.

Data will be kept and may be used after the completion of the selection procedure for operational, administrative, accounting and/or other purposes related to the management of institutional activities and legal obligations, as well as for informing the successful applicants of any opportunities. Any data subjects wishing to exercise their statutory rights as per articles 15-22 of Reg. UE/2016/679 may do so by writing an email to the Controller.

Further information on the management of personal data by the School can be found at: https://www.iusspavia.it/en/privacy.

Transparent Administration

The School operates in compliance with Law no. 190/2012 (Provisions for the prevention and repression of corruption and illegality in public administration), applying the measures identified in the "Piano Integrato" that can be found in the "Trasparenza" section (in Italian) on the School's web site at: https://trasparenza.iusspavia.it.

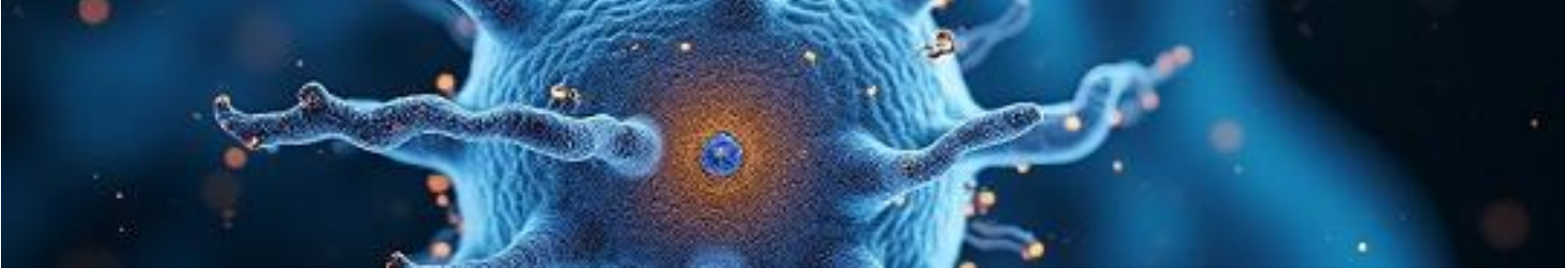
Art 11 – REFERENCE RULES

For any items or information not included in this announcement, please refer to the "Regulations for Doctoral Courses" issued by the D.R. n. 74/2024 and the "Regulation for the PhD in Science and Technology for Advanced Therapies".

Submission of an application using the procedure described in art. 3 implies acceptance of the regulations contained in this announcement and of those that apply to PhD courses.

Procedure Supervisor

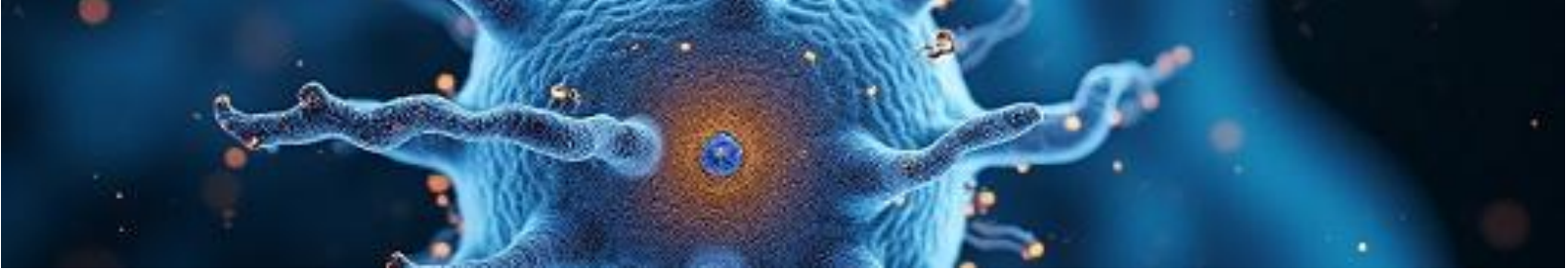
Giovanna Spinelli, Head of Education Unit – Palazzo del Broletto, Piazza della Vittoria n. 15 – 27100 Pavia – tel +39 0382375811, fax +39 0382375899, e-mail: info@iusspavia.it.



RESEARCH PROGRAMME

41° cycle - PhD in Science and Technology for Advanced Therapies

a.y. 2025-2026



List of Research Topics

CU 1

Optimization of Dose Distribution and LETd in Upright Carbon Ion Radiotherapy

Radiobiological Insights into Hypoxia-Driven Resistance in Hadron Therapy

Artificial Intelligence Approaches for Automated Segmentation of Brain Imaging

Conformable sensors for analytic applications in precision diagnostics

CU 2

Epitope Editing to Generate an Immunotherapy Stealth Hematopoiesis

3D Genome Dynamics of RNA Factory Assembly in Human Cardiomyocyte Programming

Mechanisms controlling nuclear integrity and gene expression

Uncovering and targeting drivers of T cell dysfunction for enhanced cancer immunotherapy

Identification and optimization of novel genome editing tools

Validation of a translational systemic AAV-based gene therapy for Wolfram syndrome

Decoding CAR-T Therapy: The Role of cfDNA and EVs in Predicting Success and Toxicity

Unveiling Endothelial Mechanisms to Advance Hemophilia A Therapies

Directing the timing of maturation across neuron types derived from human pluripotent stem cells

Development of a selection strategy to boost the efficacy and safety of genome editing in HSPCs

Next generation versatile and effective AAV-mediated large gene delivery

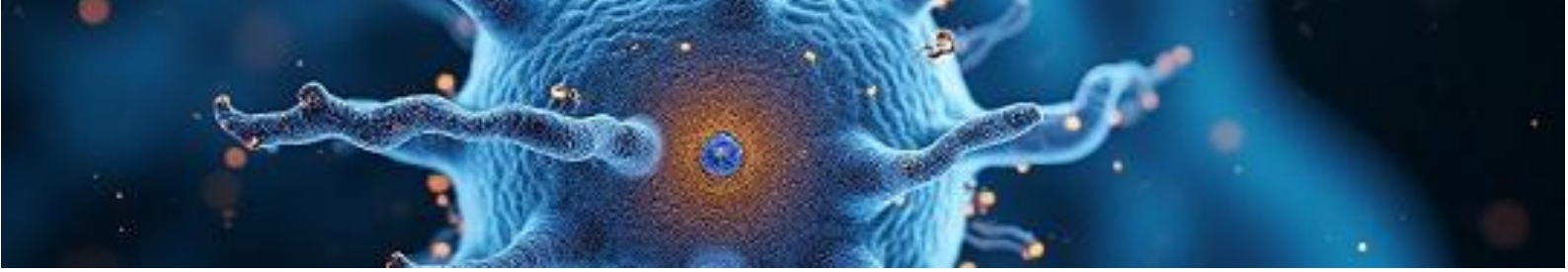
Novel Targeted Gene Editing and Delivery Technologies for Engineering Human Hematopoietic Stem Cells

Unlocking in vivo gene therapy in hematopoietic stem cells

Expanding AAV gene therapy by editing

Engineering chromatin dynamics to fine-tune enhancer-promoter interactions in neurodevelopment

HSPCs gene editing based enrichment strategies for the treatment of inborn metabolic disorders



CU 3

Molecular Mechanisms of Coenzyme Q biosynthesis

Molecular Mechanisms of Coenzyme Q biosynthesis

Development of new anti-cancer drugs based on high-affinity, highly selective ligands

Neuronal network dynamics in health and disease

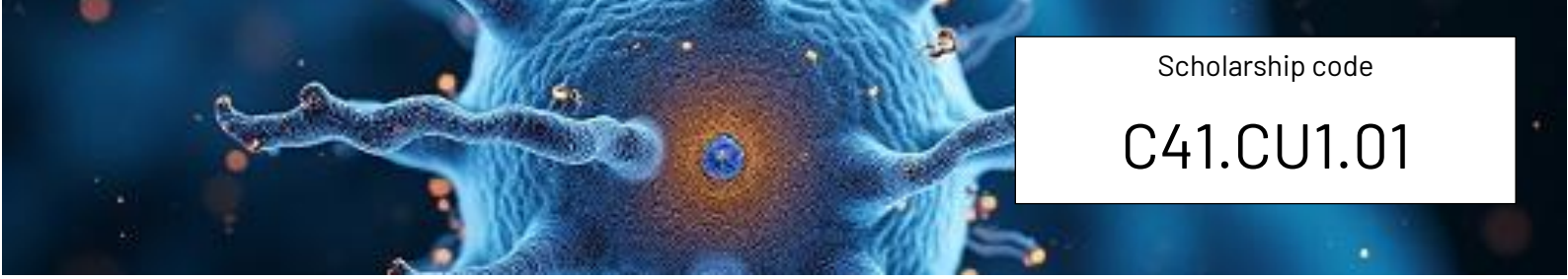
Development and optimization of industrial processes for the production of therapeutic proteins

Targeting Autism in lysosomal storage Disorders: from bed to bench side

Epidemiological studies in birth cohorts and in vitro/vivo models for non-communicable diseases

Vaccines for Cancer & Infection using mRNA Tech, ExtraVesicles, and Microbiota-Driven Innate Memory

Macromolecules of Biotechnological and Pharmaceutical Interest



Scholarship code

C41.CU1.01

CU1 - HADRON THERAPY AND ADVANCED BIOPHYSICAL THERAPIES

Optimization of Dose Distribution and LETd in Upright Carbon Ion Radiotherapy

Reference Person: Mario Ciocca

(mario.ciocca@cnao.it)

Host University/Institute: Fondazione CNAO

Dipartimento Medico, Unità di fisica medica

Location: Pavia, Italy

Research Keywords: Medical physics

Dosimetry of scanning ion beams

Treatment planning in particle beam radiotherapy

Reference ERCs: PE2_6 Nuclear, hadron and heavy ion physics

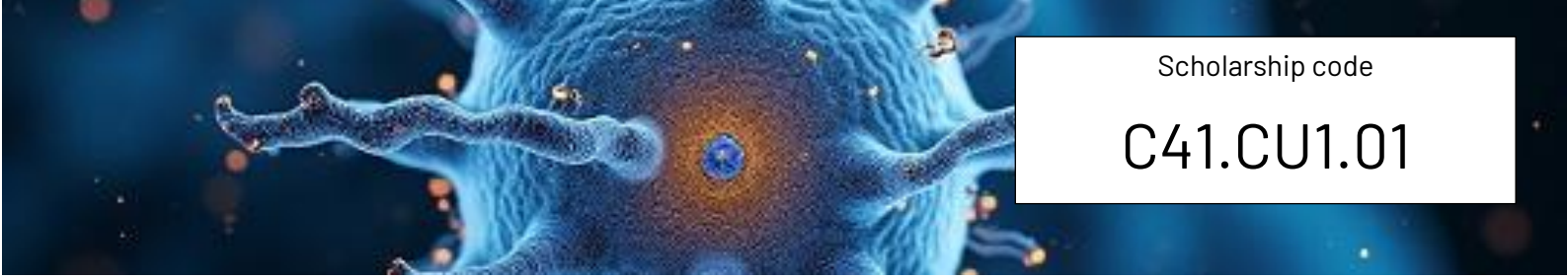
LS7_2 Medical technologies and tools (including genetic tools and biomarkers) for prevention, diagnosis, monitoring and treatment of diseases

Available positions: 1

Description of the research topic

Carbon ion therapy offers significant advantages over conventional radiation modalities due to its favorable physical and biological properties. In particular, carbon ions exhibit a sharp Bragg peak, minimal lateral scattering, and an increased relative biological effectiveness (RBE). However, these benefits come with added complexity in terms of treatment planning, especially regarding LETd (dose-weighted Linear Energy Transfer) distributions and plan robustness.

For particle therapy—and in particular for heavy ions—upright patient positioning has recently emerged as a powerful strategy to enhance treatment planning capabilities. This approach enables the generation of optimized plans that resemble those achievable with gantry-based geometries, while drastically reducing the technological and infrastructural footprint typically required for rotating beamlines. At the same time, upright positioning



Scholarship code

C41.CU1.01

supports further improvement in the quality of dose distributions, treatment robustness, and LETd control (Fredriksson, Med Phys 2023).

This project aims to investigate the potential of upright carbon ion therapy for the treatment of head & neck and abdominal tumors, two anatomical districts characterized by complex geometry and proximity to critical organs-at-risk. The first objective is to explore how different beam delivery modalities—specifically, fixed-beam configurations versus static arc-beam strategies enabled by upright positioning—affect the trade-off between dose conformity, plan robustness, and LETd distribution. In-silico optimization and analysis will be performed on a cohort of patients, with a focus on head and neck and pancreas cancer patients, with the goal of identifying planning strategies that achieve an optimal biological and physical balance.

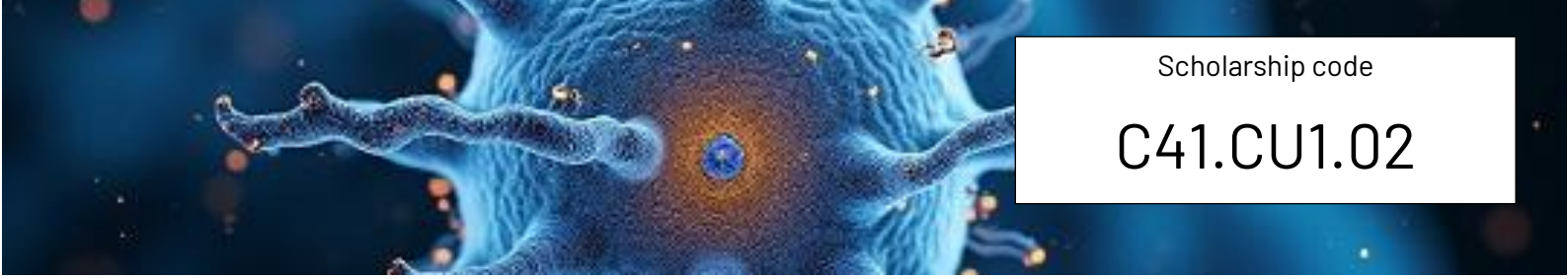
The second part of the project will focus on the clinical feasibility and technical validation of the optimized plans. Following the installation of the upright treatment chair at CNAO, the candidate will evaluate plan deliverability and perform end-to-end testing using both geometric and anthropomorphic phantoms. This phase will provide crucial data on the practical implementation of biologically optimized upright treatments and lay the groundwork for future clinical translation.

Research team and environment

The Unit of Medical Physics at Fondazione CNAO includes 9 physicists experts in Medical Physics (MPE), one post-doc senior researcher expert in FLUKA Monte Carlo simulation, plus several physicists in training and doctorate students. The Unit has in charge the tasks of dosimetry, treatment planning and quality control of scanning high-energy ion beams (protons and carbon ions), as well as CT and MRI scanners. Research activities are mainly focused on robust and LET-based ion plan optimization, radiobiological modelling for RBE estimation in hadrontherapy, 4-D dosimetry, advanced treatment tecniques like as upright patient positioning, BNCT, new ion species for hadrontherapy like as helium ions. See also: https://fondazionecnao.it/

Suggested skills for this research topic

Preferably, Master Degree in Physics and Master's Thesis in medical physics applied to hadrontherapy. Profinciency in English.



Scholarship code

C41.CU1.02

CU1 - HADRON THERAPY AND ADVANCED BIOPHYSICAL THERAPIES

Radiobiological Insights into Hypoxia-Driven Resistance in Hadron Therapy

Reference Person: Angelica Facoetti

(angelica.facoetti@cnao.it)

Host University/Institute: Fondazione CNAO

Dipartimento Ricerca e Sviluppo

Location: Pavia, Italy

Research Keywords: Hypoxia

Radioresistance

Hadrontherapy

Reference ERCs: LS4_12 Cancer

LS3_3 Cell behaviour, including control of cell shape, cell migration

Available positions: 1

Description of the research topic

Hadron therapy, encompassing both protons and heavier ions such as carbon and helium, has emerged as a powerful modality for cancer treatment, offering precise dose localization and enhanced relative biological effectiveness (RBE) compared to conventional photon radiotherapy. However, despite the physical and biological advantages of hadron therapy, tumour hypoxia remains a major barrier to treatment efficacy, contributing to radioresistance and promoting tumour progression through complex biological mechanisms.

Hypoxia is a common feature of solid tumours and is associated with significant changes in cellular behaviour, including altered DNA repair, metabolic rewiring, stem cell enrichment, and increased invasion and metastatic potential. While high-LET radiation is less dependent on oxygen for inducing lethal DNA damage, hypoxic tumour regions may still exhibit reduced sensitivity due to adaptive responses and selection of resistant phenotypes. The interplay between oxygen availability and hadron-induced cellular damage is not yet fully understood,

particularly in the context of fractionated treatment and dynamic tumour microenvironments.

This PhD project aims to dissect the biological mechanisms of hypoxia-induced resistance in the context of hadron therapy, exploring how oxygen deficiency influences cellular response, damage repair, and long-term tumour behaviour following exposure to different irradiation modalities such as protons and carbon ions.

This project aims to explore how hypoxia influences tumour cell response to different irradiation types, examining both short and long-terms effects. By comparing cellular behaviours in normoxic and hypoxic conditions across different models, the study will investigate beam-specific biological responses and identify potential biomarkers for resistance, with the goal of informing more personalized and effective hadron therapy strategies. In addition, this project will evaluate the development and feasibility of using sensors in cell cultures to correlate metabolic signals with hypoxia.

This research will contribute to a deeper understanding of how hypoxia shapes the biological response to hadron therapy and will help identify novel therapeutic targets. Ultimately, the project aims to support the development of personalized approaches to hadron therapy, especially for tumours in which hypoxia is a major driver of treatment failure.

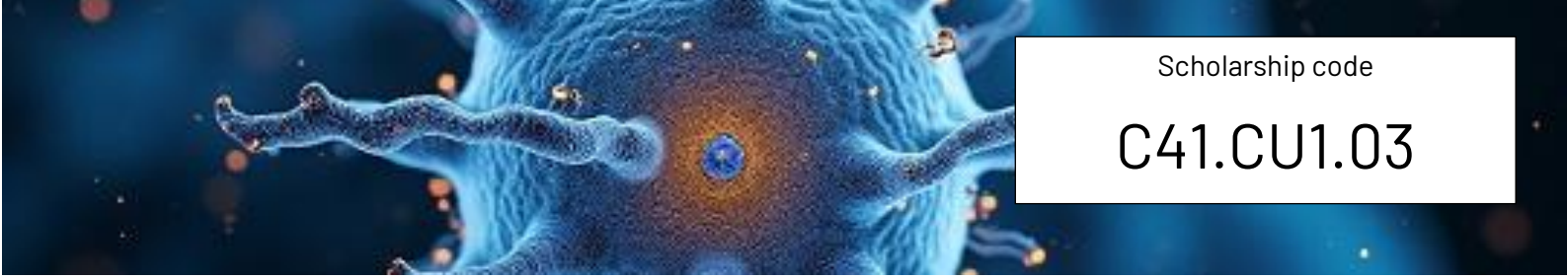
Research team and environment

The research will be conducted within the Radiobiology Laboratory of CNAO (National Center for Oncological Hadrontherapy) in Pavia, Italy. The laboratory is part of a multidisciplinary research environment focused on studying the biological effects of particle therapy, particularly proton and carbon ion beams, which are used clinically at CNAO for the treatment of radioresistant tumors.

The Radiobiology team includes researchers with expertise in cellular biology, radiation biology, and biophysics. The lab is equipped for in vitro experiments, including cell culture , molecular assays, and imaging techniques. The research activity benefits from close collaboration with clinicians, physicists, and engineers, fostering a translational approach that bridges basic research and clinical application.

Suggested skills for this research topic

A solid background in cell biology is recommended. Familiarity with radiobiology concepts, including mechanisms of radiation-induced cell death and hypoxia-related resistance, is essential. Experience with 2D and 3D (spheroids) in vitro assays (e.g., clonogenic survival, immunofluorescence, MTT assay, vitality, migration/invasion assays) and basic laboratory techniques will be valuable. Knowledge of particle therapy (e.g., protons, carbon or helium ions) and radiation physics is highly recommended, as is the ability to analyze and interpret experimental data using software tools such as ImageJ, GraphPad Prism.



Scholarship code

C41.CU1.03

CU1 - HADRON THERAPY AND ADVANCED BIOPHYSICAL THERAPIES

Artificial Intelligence Approaches for Automated Segmentation of Brain Imaging

Reference Person:	Christian Salvatore
	(christian.salvatore@iusspavia.it)
Host University/Institute:	IUSS Pavia
	Scienze, Tecnologie e Società
Location:	Pavia, Italy

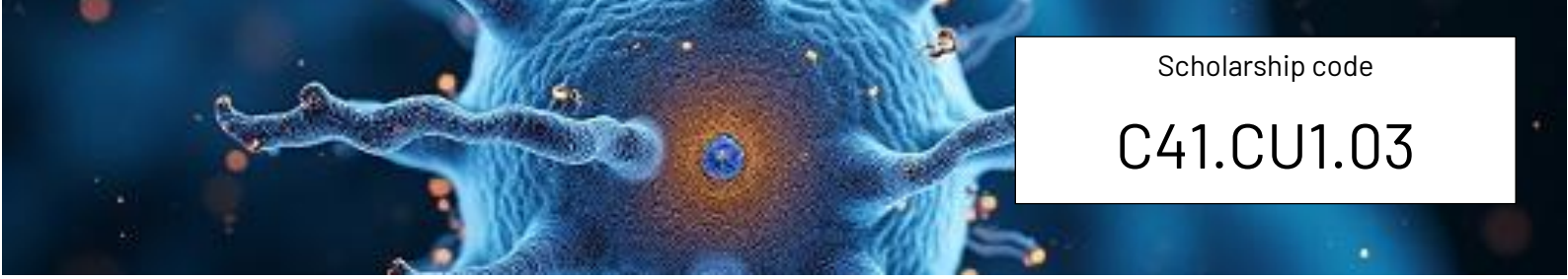
Research Keywords:	Imaging
	Machine learning
	Brain
Reference ERCs:	PE6_11 Machine learning, statistical data processing and applications using signal processing (e.g. speech, image, video)
	LS5_17 Imaging in neuroscience
	PE6_7 Artificial intelligence, intelligent systems, natural language processing

Available positions:	1

Description of the research topic

The goal of this research is to develop and evaluate AI-based approaches for the automated segmentation of brain imaging data, with applications in both clinical diagnostics and neuroscientific research.

This project will focus on the design, implementation, and validation of detection and segmentation models capable of delineating anatomical regions or pathological structures from various brain imaging modalities, e.g., MRI, CT, or PET. Key challenges include handling heterogeneity in image quality and ensuring robustness across populations and imaging centers.



Scholarship code

C41.CU1.03

The research will integrate advanced neural architectures (e.g., U-Net and its variants, YOLO etc.), training strategies incorporating anatomical priors, and uncertainty estimation methods to assess model confidence and guide clinical usage.

A further emphasis will be placed on explainability and interpretability, crucial for the adoption of AI tools in healthcare contexts.

Beyond methodological innovation, the project aims to evaluate the proposed models on real-world datasets and benchmark their performance against existing tools.

Ultimately, the project aspires to contribute to the development of AI systems that support clinicians in delivering faster, more accurate, and personalized care.

Research team and environment

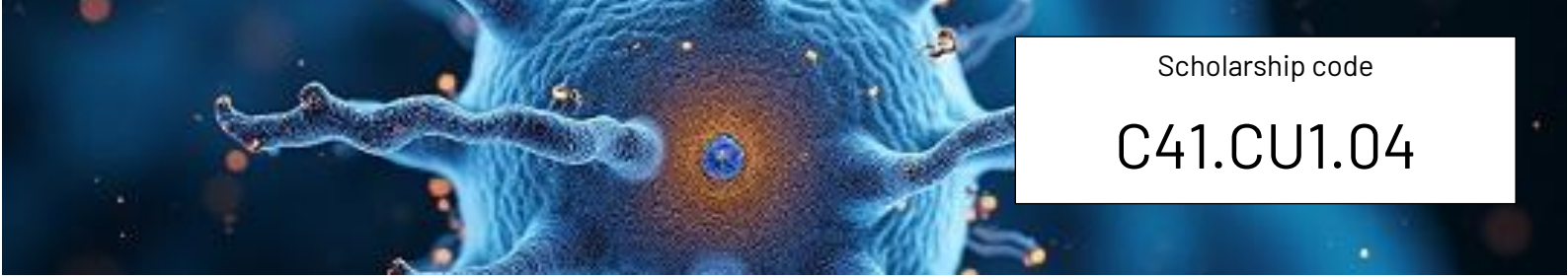
The research will be conducted at IUSS Pavia, specifically within the Artificial Intelligence Research Group - Ailice Labs (ailice.ai), an interdisciplinary environment focused on advancing AI applied to healthcare and neuroscience. The team is composed of university professors, researchers and PhD students, combines expertise in machine learning, computational imaging, neuroAI, and clinical data analysis, fostering cross-disciplinary innovation. Ailice Labs collaborates with hospitals and academic institutions, such as the IUSS spinoff DeepTrace Technologies, to ensure translational impact.

Suggested skills for this research topic

The ideal candidate should have completed an academic degree in Computer Science, Computer Engineering, Biomedical Engineering, Physics, or related disciplines.

Good-to-strong programming skills in Python is essential. Prior knowledge in medical image analysis, machine learning, or neuroimaging, as well as experience with machine-learning algorithms and common deep-learning frameworks is highly desirable. Familiarity with tools such as FSL or SPM is a plus.

The candidate should demonstrate problem-solving abilities, independence, and a collaborative attitude within interdisciplinary environments.



Scholarship code

C41.CU1.04

CU1 - HADRON THERAPY AND ADVANCED BIOPHYSICAL THERAPIES

Conformable sensors for analytic applications in precision diagnostics

Reference Person:	Annalisa Bonfiglio
	(annalisa.bonfiglio@iusspavia.it)
Host University/Institute:	IUSS Pavia
	Classe di Scienze Tecnologie e Società
Location:	Pavia, Italy

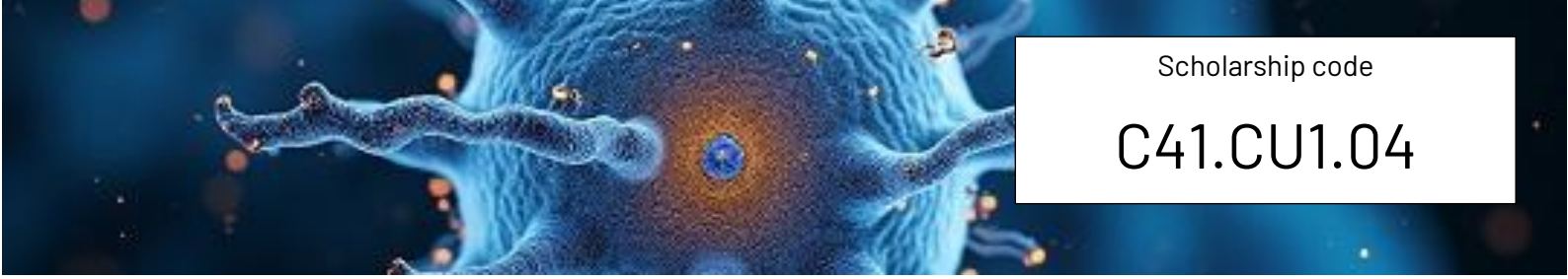
Research Keywords:	(Bio)sensors
	Wearable devices
	Conformable monitoring systems
Reference ERCs:	PE7_4 (Micro- and nano-) systems engineering
	PE7_11 Components and systems for applications (in e.g. medicine, biology, environment)
	PE4_8 Electrochemistry, electrodialysis, microfluidics, sensors

Available positions: 1

Description of the research topic

Precision medicine aims to tailor diagnostic and therapeutic strategies to the unique characteristics of each patient. In this context, conformable sensors—soft, flexible, and skin- or tissue-adaptive devices—represent a transformative technological frontier. These systems can seamlessly interface with the human body, spanning a very large dimensional range (from single cells to the whole body) enabling the continuous, non-invasive, and high-resolution monitoring of physiological and biochemical parameters over time.

This PhD research project will focus on the design, fabrication, and validation of conformable sensors for applications in precision medicine, with a particular emphasis on devices capable of multiplexed, real-time data acquisition. The work will include the development of biocompatible materials and microfabrication techniques for wearable or implantable platforms, integration with wireless and low-power communication systems,



Scholarship code

C41.CU1.04

and the implementation of data analytics pipelines to convert raw signals into clinically meaningful insights.

Potential target biomarkers include metabolites (e.g., glucose, lactate), electrolytes (e.g., sodium, potassium), and vital signs (e.g., temperature, hydration, ECG), depending on the intended clinical use. Use cases may range from early diagnosis and therapeutic monitoring in chronic diseases (e.g., diabetes, cardiovascular disorders) to real-time feedback in digital health systems.

The research will involve interdisciplinary collaboration across bioengineering, materials science, microelectronics, and clinical domains. The ultimate goal is to contribute to the next generation of diagnostic tools that are personalized, predictive, and preventive, aligned with the core principles of precision medicine.

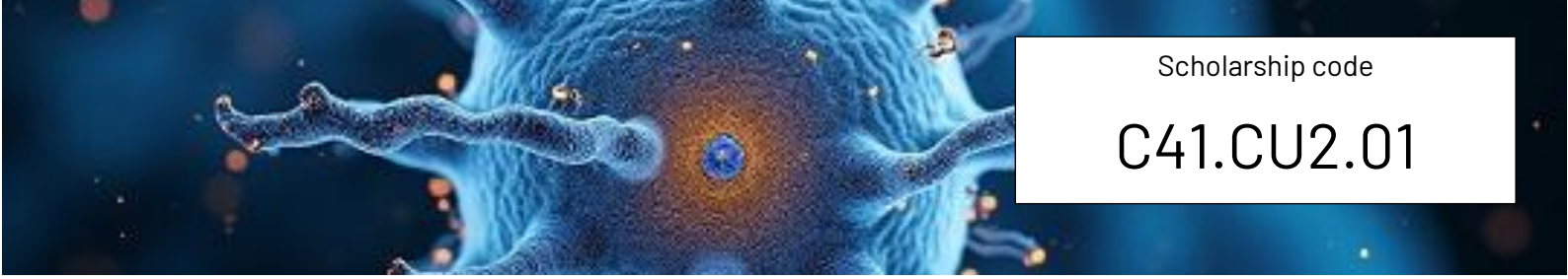
Research team and environment

Our team has more than 20 yrs of experience organic bioelectronics, an interdisciplinary field that combines organic electronic materials—such as conjugated polymers and small molecules—with biological systems to enable electronic sensing, stimulation, and signal transduction at the biotic–abiotic interface. These materials are soft, flexible, and often biocompatible, making them ideal for interfacing with tissues, cells, and biomolecules. Organic bioelectronics enables novel applications in biosensing, neural recording, drug delivery, and tissue engineering by translating biological signals (e.g., ionic, chemical) into electronic ones and vice versa, with high sensitivity and specificity.

For more infos, please refer to https://www.iusspavia.it/en/research/laboratories/flexible-bioelectronics-and-wearable-devices-lab-flow-lab

Suggested skills for this research topic

Preferred background in physics, electronic engineering, biomedical engineering, chemistry, material science. Lab experience in fabrication and characterization of electronic devices and/or material science is also appreciated.



Scholarship code

C41.CU2.01

CU2 - GENE AND CELL THERAPIES

Epitope Editing to Generate an Immunotherapy Stealth Hematopoiesis

Reference Person: Pietro Genovese

(pietro_genovese@dfci.harvard.edu)

Host University/Institute: Boston Children's Hospital

Gene Therapy Program

Location: Boston, MA, United States

Research Keywords: Gene editing

Cancer adoptive Immunotherapy

Hematology

Reference ERCs: LS2_2 Gene editing

LS4_11 Haematopoiesis and blood diseases

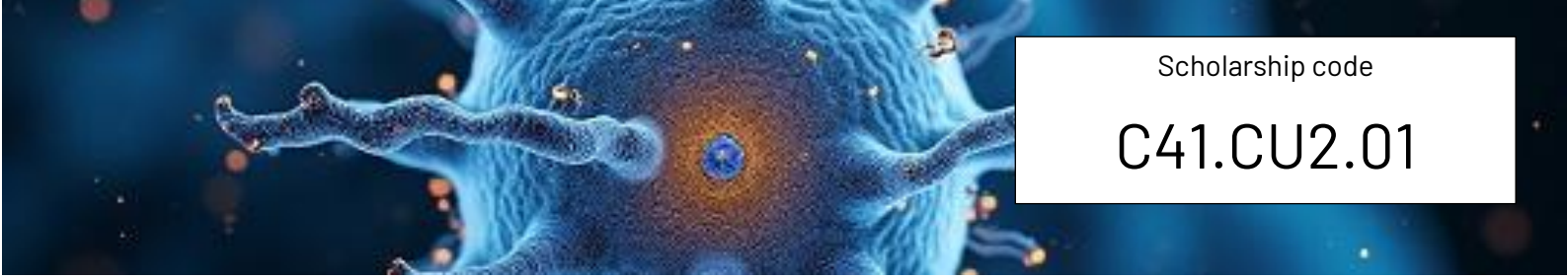
LS7_5 Applied gene, cell and immune therapies

Available positions: 1 (reserved for Boston Children's Hospital's employees)

Description of the research topic

Acute myeloid leukemia (AML) remains a formidable clinical challenge, with relapse and therapy resistance undermining long-term outcomes in over half of patients, despite hematopoietic stem/progenitor cell (HSPC) transplantation. Current immunotherapies—such as monoclonal antibodies and CAR-T cells—face a major obstacle in AML: most potential targets are shared with healthy hematopoietic cells, resulting in unacceptable toxicity.

This research proposes a novel paradigm called epitope editing, aimed at creating an "immunotherapy stealth" hematopoiesis. The strategy involves introducing minimal, precise amino acid substitutions into the extracellular domains of key cytokine receptors (FLT3, KIT, and CD123) expressed on HSPCs. These modifications abrogate antibody binding without impairing receptor function, enabling healthy HSPCs to resist immunotherapy while maintaining physiological hematopoiesis.



Scholarship code

C41.CU2.01

The PhD project focuses on optimizing base-editing technologies—specifically adenine base editors delivered via mRNA electroporation—to multiplex these edits efficiently and safely in $CD34^+$ HSPCs. Candidate cells will be assessed for editing efficiency, immunotherapy resistance, and hematopoietic potential both in vitro and via xenotransplantation in immunodeficient mice.

This approach may unlock sustained, high-intensity immunotherapies post-HSCT by shielding healthy cells from off-target toxicity. If successful, it offers a platform applicable across a range of hematologic malignancies, reshaping the therapeutic landscape for high-risk AML and beyond.

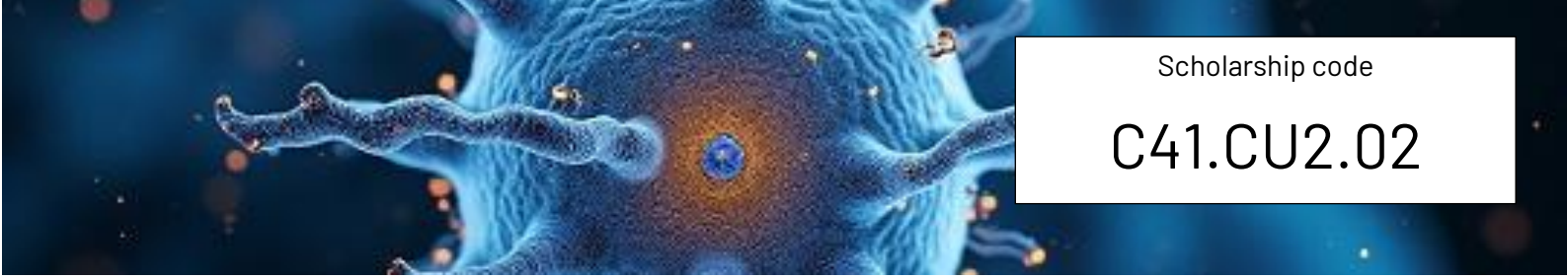
Research team and environment

The work will be conducted in the Genovese Lab, a team of young and eclectic scientists interested in exploiting gene-engineering tools to study biological functions and solve problems with a direct impact on human health. The Genovese Lab exploits a variety of cutting-edge gene editing technologies (CRISPR/Cas, TALEN, ZFN, base editors, and epigenetic transcriptional regulators) to develop new therapeutic strategies for inherited and oncologic diseases. We couple advanced molecular and cell biology approaches, such as viral vector design, chimeric antigen receptors (CAR), next-generation sequencing, and ex vivo manipulation of stem cells and primary lymphocytes, with suitable preclinical models of disease to develop novel therapeutics based on precision medicine.

Genovese Lab website: https://labs.dana-farber.org/genoveselab

Suggested skills for this research topic

We seek a driven, team-oriented PhD candidate with an M.Sc., M.D., or residency in life sciences, strong in immunology and cancer biology. The ideal candidate will be enthusiastic about molecular biology techniques, including tumor models and human sample analysis. Essential skills include multitasking, organization, communication, and expertise in tumor biology, immunology, and flow cytometry. Preferred experience includes gene editing, cloning, protein engineering, NGS, and a strong publication record. English fluency is required.



Scholarship code

C41.CU2.02

CU2 - GENE AND CELL THERAPIES

3D Genome Dynamics of RNA Factory Assembly in Human Cardiomyocyte Programming

Reference Person: Alessandro Bertero

(alessandro.bertero@unito.it)

Host University/Institute: Università degli studi di Torino

Dipartimento di Biotecnologie Molecolari e Scienze per la Salute

Location: Turin, Italy

Research Keywords: 3D genomics

Human induced pluripotent stem cells

Cardiac development and regeneration

Reference ERCs: LS1_3 DNA and RNA biology

LS3_13 Stem cells

LS4_10 The cardiovascular system and cardiovascular diseases

Available positions: 1

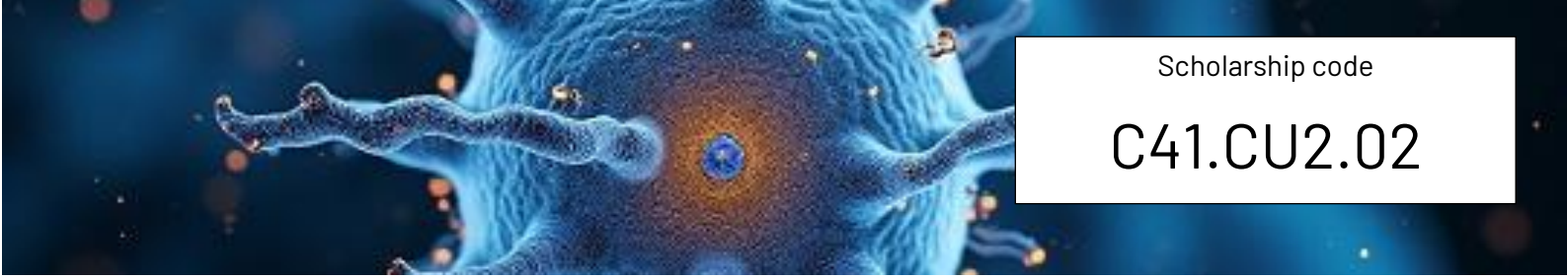
Project: TRANS-3, ERC Starting Grant, Agreement n. 101076026

Description of the research topic

How is the choreography of gene expression orchestrated during human development? Beyond DNA sequence, 3D genome architecture organizes enhancers, genes, and noncoding elements into functional nuclear neighborhoods. Among these, RNA factories—membraneless compartments that coordinate transcription, splicing, and RNA processing—are emerging as master regulators of cell identity. Yet, how they assemble, and which factors control their formation, remains largely unknown.

This PhD project will investigate the formation and function of RNA factories during the differentiation of human iPSCs into cardiomyocytes, with a focus on transcription factors that link chromatin architecture and RNA metabolism.

Anchored in the ERC-funded TRANS-3 project, we propose that GATA4—a pioneer factor essential for heart development and frequently mutated in congenital heart disease (CHD)—



Scholarship code

C41.CU2.02

acts as an organizer of inter-chromosomal RNA hubs by bridging regulatory DNA and RNA. The project will also examine MEF2C, TBX5, and other core factors involved in cardiac reprogramming.

To dissect these processes, the candidate will apply a cutting-edge toolbox including:

- ChIP-seq and RNA immunoprecipitation (RIP) to profile chromatin and RNA-binding sites (Bertero et al., Nature 2018, PMID: 29489750; Genes Dev 2015, PMID: 25805847)
- Hi-C to define 3D genome topology (Bertero et al., Nat Commun 2019, PMID: 30948719)
- Trans-C, a computational method to map inter-chromosomal contacts (Hristov et al., Genome Res 2024, PMID 39322282)
- o-MAP, an RNA-guided proximity labeling approach for identifying nuclear microenvironments (Kania et al., bioRxiv 2024, PMID 39574693)
- iPS2-seq, a high-throughput single-cell screening strategy (Balmas et al., SSRN 2024; https://dx.doi.org/10.2139/ssrn.4854180)

Using genome-edited iPSC lines, the project will examine how disease-linked mutations affect spatial genome regulation and RNA factory dynamics.

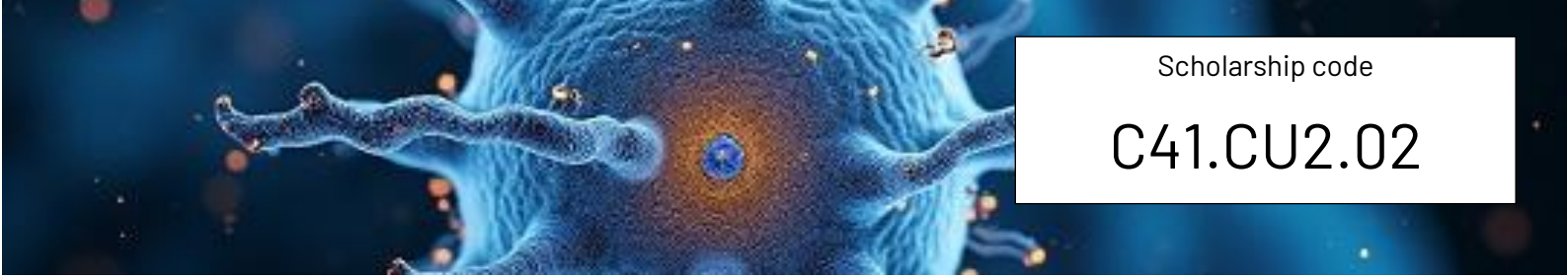
In addition to shedding light on CHD mechanisms, this work will guide improved protocols to program iPSCs into mature cardiomyocytes—a key step for effective cell therapies (Pawlowski et al., Stem Cell Rep 2017, PMID: 28344001).

This project is ideal for curious and motivated students excited by RNA biology, genome architecture, and stem cell technologies, and eager to bridge basic discovery with future therapeutic applications.

Research team and environment

The Genome Architecting Lab at the University of Turin investigates how 3D chromatin structure shapes heart development and disease, and leverages this knowledge to engineer stem cell programming for regenerative medicine. We are funded by an ERC Starting Grant, which will cover the PhD project in full, and our PI, Prof. Alessandro Bertero, is a recipient of the Armenise-Harvard Career Development Award and FEBS Excellence Award. The group includes 12+ scientists with multidisciplinary backgrounds in stem cell biology, single-cell genomics, imaging, genome editing, and bioengineering. We are based at the Molecular Biotechnology Center (MBC), an international research hub in the city center, equipped with advanced core facilities and award-winning modern lab spaces. We offer a collaborative, stimulating environment and support training, conference travel, and other formative opportunities. Torino offers excellent quality of life with accessible living costs.

More at: www.berterolab.com

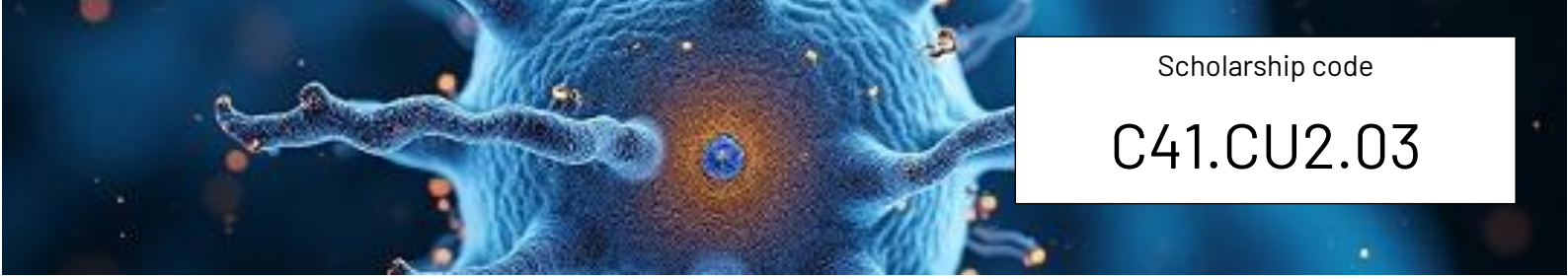


Scholarship code

C41.CU2.02

Suggested skills for this research topic

We are looking for highly motivated candidates with training in molecular biology, biotechnology, or related fields. Prior experience in wet lab research beyond thesis work is strongly preferred. Ideal applicants will have knowledge in one or more of the following areas: 3D chromatin biology, pluripotent stem cells, or cardiovascular development. The ability to work both at the bench and to write basic data analysis code is essential; the candidate will collaborate with professional bioinformaticians to frame biologically grounded, computationally tractable questions. Scientific publications, poster/oral presentations, and a record of project ownership are strong assets. Fluency in English and a desire to become an independent, critical-thinking researcher are key. We value candidates who are adaptable yet organized, team-oriented, intellectually curious, and resilient. Please note that stem cell work may occasionally require flexible hours.



Scholarship code

C41.CU2.03

CU2 - GENE AND CELL THERAPIES

Mechanisms controlling nuclear integrity and gene expression

Reference Person:	Marco Foiani
	(marco.foiani@cnr.it)
Host University/Institute:	Consiglio Nazionale delle Ricerche
	Istituto di Genetica Molecolare (IGM)
Location:	Pavia, Italy

Research Keywords:	Genome instability
	Gene expression
	Cell metabolism
Reference ERCs:	LS1_3 DNA and RNA biology
	LS2_1 Genetics
	LS3_7 Mechanobiology of cells, tissues and organs

Available positions: 1

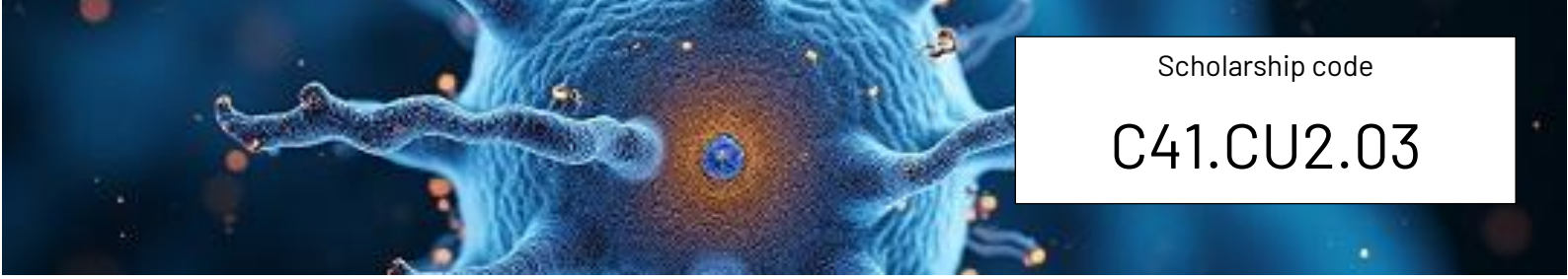
Description of the research topic

The mission of the Institute of Molecular Genetics-CNR is to study the mechanisms involved in genome replication and stability evolving, over the years, to frame the study of genome integrity in the broader context of the structure/function relationship that binds the integrity of the nucleus, gene expression and in a wider sense cellular metabolism. The quality of publications documented the excellence of research carried out in the Institute.

The proposed research will focus on a comprehensive view of the complex network of interactions contributing to the maintenance of genome stability in eukaryotes. The main topics will include:

(i) Mechanical regulation of genome integrity programs and its implication in cancer, neurological disorders and aging.

(ii) Role of epigenetics programs, acting via chromatin organization, in cell- and tissue-specific programs and their contribution to human diseases.



Scholarship code

C41.CU2.03

(iii) Multy-disciplinary approaches to study the interplay between genome organization and cell mechanics in regulating cell-state homeostasis in cancer and in genetic diseases.

(iv) Emerging crosstalk between non-coding RNAs, chromatin and transcription/pre-mRNA splicing and DNA repair pathways in the context of genome stability.

(v) Development of innovative therapeutic approaches for cancer and genetic and neurological diseases.

Research team and environment

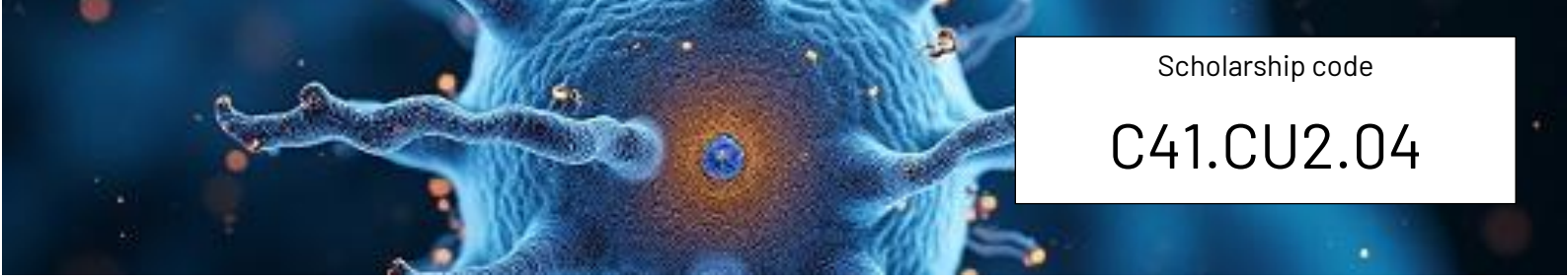
The candidate will be placed in a stimulating and welcoming research group, active for years in the field of studies on genomic instability and related molecular mechanisms. The group is highly qualified and productive and constitutes an extremely favorable environment for the inclusion of young researchers. The project will be conducted in a top-level institute equipped with all the necessary instrumentation to apply the most modern methodological approaches. The size of the institute, not too big but not too small, ensures a friendly and supportive environment together inserted in a highly competitive scientific context.

Suggested skills for this research topic

Academic background: the ideal applicant should hold a Master Degree in one of the following disciplines: molecular biology, genetics, biotechnology or medicine.

Technical expertise: a background in nucleic acids metabolism, protein analysis, basis of biostatistics and bioinformatics and bacterial and mammalian cell culturing would be appreciated. Soft skills: ability to work in a research team and to communicate to the scientific community.

A good level of spoken and written English is also required.



Scholarship code

C41.CU2.04

CU2 - GENE AND CELL THERAPIES

Uncovering and targeting drivers of T cell dysfunction for enhanced cancer immunotherapy

Reference Person: Angelo Lombardo

(lombardo.angelo@hsr.it)

Host University/Institute: Fondazione Telethon

San Raffaele Telethon Institute for Gene Therapy (SR-Tiget)

Location: Milan, Italy

Research Keywords: Cancer immunotherapy

Target discovery

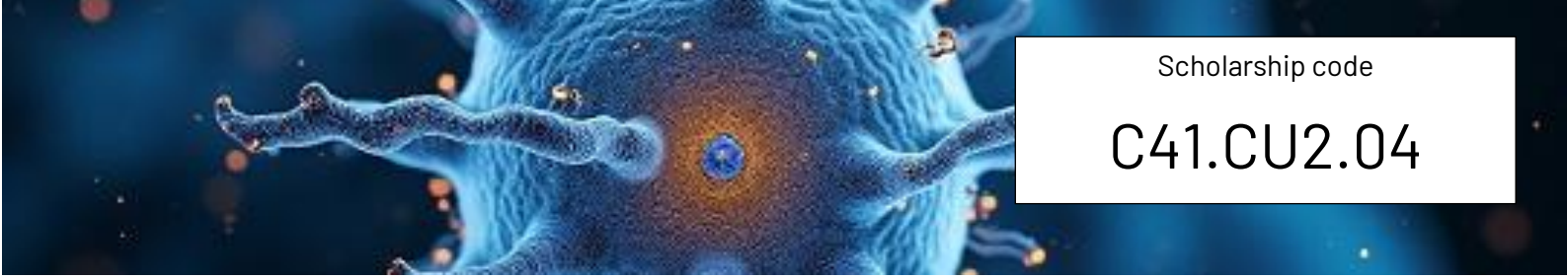
T cell engineering

Reference ERCs: LS7_5 Applied gene, cell and immune therapies

Available positions: 1

Description of the research topic

T cell-based immunotherapies have emerged as a powerful strategy in cancer treatment by harnessing the immune system's capacity to recognize and eliminate tumor cells. Approaches such as chimeric antigen receptor T cells and T cell receptor-engineered lymphocytes have demonstrated remarkable clinical success, particularly in hematologic malignancies. However, their efficacy against solid tumors remains significantly limited, primarily due to immunosuppressive mechanisms within the tumor microenvironment. Among these, adenosine and transforming growth factor-beta are key immunosuppressive mediators that impair T cell proliferation, activation, and persistence, ultimately contributing to tumor immune evasion. Importantly, these inhibitory conditions can be recapitulated in vitro, providing a controlled platform to investigate the molecular pathways underlying T cell dysfunction. Identifying factors that enable T cells to resist such immunosuppression could inform the development of novel strategies to enhance the efficacy of T cell-based therapies. This project aims to design and implement functional screens leveraging genome and/or epigenome editing to identify coding and non-coding genes that promote T cell persistence and function under immunosuppressive conditions.



Scholarship code

C41.CU2.04

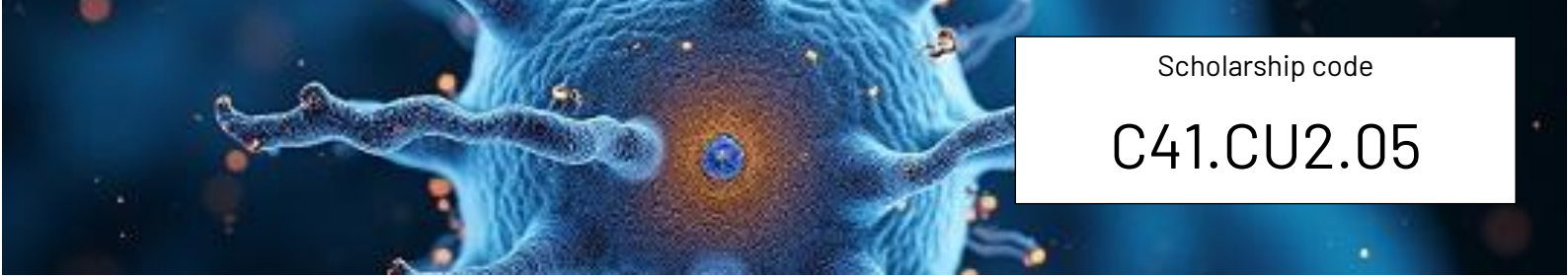
The findings are expected to reveal novel actionable targets to improve the performance of T cell-based immunotherapies.

Research team and environment

The research team, led by Prof. Angelo Lombardo at SR-Tiget (Milan, IT), operates within a world-renowned institute for gene and cell therapy. In this context, we develop and apply innovative gene and epigenetic editing strategies for therapeutic purposes. Specifically, our group pioneered targeted gene correction in clinically relevant cells and established a platform for efficient and durable gene silencing using engineered epigenetic repressors (Amabile, Cell 2016; Cappelluti, Nature 2024). We are leveraging this approach to treat diseases where gene silencing can be beneficial, engineer immune cells for cancer immunotherapy, and investigate the stability and specificity of silencing across cell types and developmental stages. Our research relies on protein engineering, advanced gene delivery systems, disease-relevant models, and genome-scale loss-of-function screens, and is conducted in a highly collaborative environment that fosters innovation, translation, and training.

Suggested skills for this research topic

The ideal candidate should have a background in molecular and cellular biology, with a strong interest in immunology and cancer research. Experiences in T cell biology, flow cytometry, and genome or epigenome editing are desirable. Basic knowledge of bioinformatics tools and the ability to analyze high-throughput data will be considered a strong asset. The candidate should be highly motivated, detail-oriented, and capable of working both independently and as part of a multidisciplinary team. Strong communication skills, proficiency in spoken and written English, and a proactive attitude toward learning and problem-solving are essential.



Scholarship code

C41.CU2.05

CU2 - GENE AND CELL THERAPIES

Identification and optimization of novel genome editing tools

Reference Person: Anna Cereseto

(anna.cereseto@unitn.it)

Host University/Institute: Università di Trento

Dipartimento di Biologia Cellulare, Computazionale e Integrata (CIBIO)

Location: Trento, Italy

Research Keywords: Genome editing

RNA guided nucleases

Directed evolution

Reference ERCs: LS2_2 Gene editing

Available positions: 1

Project: FIS, MUR-FIS00002542
CUP: E53C23001540001

Description of the research topic

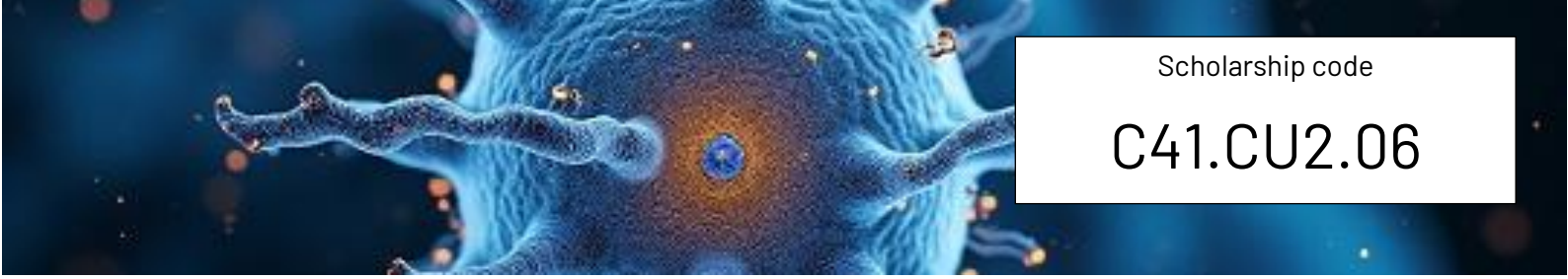
The aim of the project is the identification of novel genome editing tool starting from a very large metagenomic databank. We will focus on RNA guided nucleases (RGN) with reduced molecular size to increase compatibility for in vivo delivery (LNP and AAV vectors). The RGN will be optimized for editing activity through AI tools and directed evolution using a lab platform (EPICA). Finally the RGN (eventually adapted to epigenome editors) will be tested for specific genomic loci editing with clinical relevance for gene therapy development.

Research team and environment

https://www.cibio.unitn.it/79/laboratories

Suggested skills for this research topic

Expertise in molecular biology. English proficient user (C).



Scholarship code

C41.CU2.06

CU2 - GENE AND CELL THERAPIES

Validation of a translational systemic AAV-based gene therapy for Wolfram syndrome

Reference Person: Vania Broccoli

(vania.broccoli@cnr.it)

Host University/Institute: Consiglio Nazionale delle Ricerche

Istituto di Neuroscienze

Location: Milan, Italy

Research Keywords: Gene therapy

Neurological disease

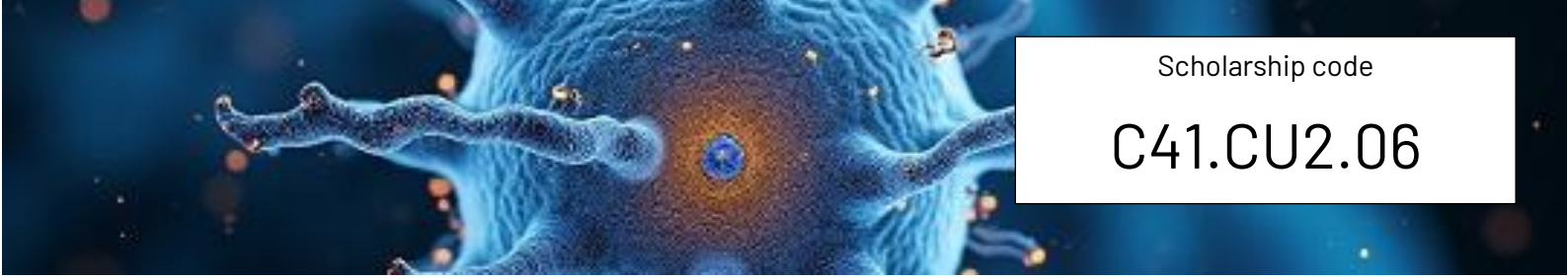
Reference ERCs: LS7_5 Applied gene, cell and immune therapies

LS7_2 Medical technologies and tools (including genetic tools and biomarkers) for prevention, diagnosis, monitoring and treatment of diseases

Available positions: 1

Description of the research topic

Wolfram syndrome 1 (WS1) is a rare genetic disorder caused by mutations in the WFS1 gene leading to a spectrum of clinical dysfunctions, in particular infantile diabetes, visual loss and neurodegeneration . Currently, no therapeutic options are available to arrest or delay the progression of these pathological manifestations. WS1 is caused by mutations in the WFS1 gene, which encodes for Wolframin, a multi-transmembrane protein resident in the endoplasmic reticulum. We have previously showed that Wfs1-deficient mice develop progressive neuronal loss both in the retina and bran with progressive demise of pancreatic beta-cells. We have also established an AAV system for the regulated expression of Wfs1 to establish a gene replacement therapy with translational potential. The project will define the vector design, AAV capsid and delivery strategies to achieve high and simultaneous gene expression in multiple affected tissues and organs after systemic delivery. Treated Wfs1-mutant mice will be evaluated for gene-transfer efficiency, cell functional recovery, neurodegeneration protection and symptomatic rescue. This project will build the foundation for establishing the first gene-based therapeutic strategy for treating the severe pathological conditions in WS1.



Scholarship code

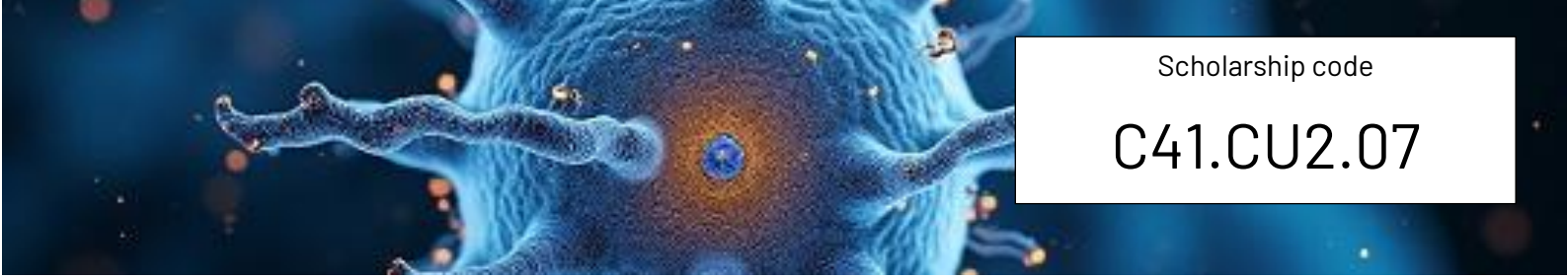
C41.CU2.06

Research team and environment

Broccoli's Laboratory offers an interdisciplinary environment with a variety of interests in developing translational gene-based precision therapies for incurable diseases. Deep expertise in genome editing, disease mouse models, patient stem cell biology and vectorology are available in the lab. Collaborative initiatives and dynamic environment are nurtured in order to promote innovative and creative approaches for defining and testing novel therapeutic strategies.

Suggested skills for this research topic

High interest in gene-based translational approaches to treat neurological diseases. previous experience in neuroscience will be a plus.



Scholarship code

C41.CU2.07

CU2 - GENE AND CELL THERAPIES

Decoding CAR-T Therapy: The Role of cfDNA and EVs in Predicting Success and Toxicity

Reference Person:	Daniela Cesana
	(cesana.daniela@hsr.it)
Host University/Institute:	Fondazione Telethon
	San Raffaele Telethon Institute for Gene Therapy (SR-TIGET)
Location:	Milan, Italy

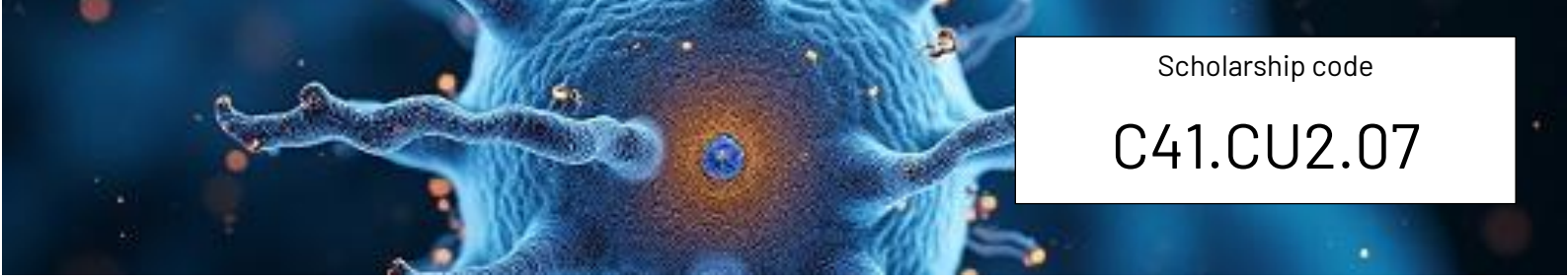
Research Keywords:	CAR-T therapy
	Efficacy and toxicity
	Predictive models
Reference ERCs:	LS7_5 Applied gene, cell and immune therapies
	LS7_2 Medical technologies and tools (including genetic tools and biomarkers) for prevention, diagnosis, monitoring and treatment of diseases

Available positions: 1

Description of the research topic

Chimeric Antigen Receptor (CAR) T-cell therapy has transformed the landscape of hematological malignancy treatment, delivering impressive clinical results. Yet, therapeutic outcomes remain highly variable, shaped by both the inherent characteristics of the engineered T-cell product and patient-specific factors, which can influence both the infusion and post-treatment stages. In this evolving context, liquid biopsies are emerging as a powerful, non-invasive tool for monitoring the dynamic biological changes in patients. Among the key components of liquid biopsies, cell-free DNA (cfDNA) and extracellular vesicles (EVs) provide a valuable snapshot of tissue-specific alterations, offering insights that go beyond traditional diagnostics.

cfDNA is released into the bloodstream by dying cells, carrying with it epigenetic and genetic signatures that can be traced back to the originating tissue or cellular source. Through DNA methylation profiling, it is possible to unearth hidden signals of tissue damage



Scholarship code

C41.CU2.07

and immune activity over time. Meanwhile, EVs, lipid-based particles secreted by a wide variety of cells under both physiological and pathological conditions, play an essential role in intercellular communication. They transport diverse cargo, influencing numerous biological processes not just locally, but also at distant sites within the body.

This thesis project aims to explore the diagnostic and predictive power of cfDNA and EVs in patients undergoing CAR-T cell therapy for hematological and solid cancers. Utilizing state-of-the-art molecular techniques, the candidate will investigate both the methylation landscape and vector integration profiles in cfDNA collected from treated patients over time, to assess the dynamics of CAR-T cell activity and the levels of tissue damage induced by disease progression and therapy. Additionally, the project will delve into the diagnostic and therapeutic potential of EVs.

We expect to uncover distinct patterns of cfDNA and EV release that correlate with CAR-T cell engraftment, persistence, treatment efficacy, and adverse events. Ultimately, this work will pave the way for establishing cfDNA and EVs as dynamic biomarkers to predict both therapeutic success and potential toxicity in CAR-T therapy, providing new insights into the biological mechanisms that dictate the outcome of this groundbreaking immunotherapy.

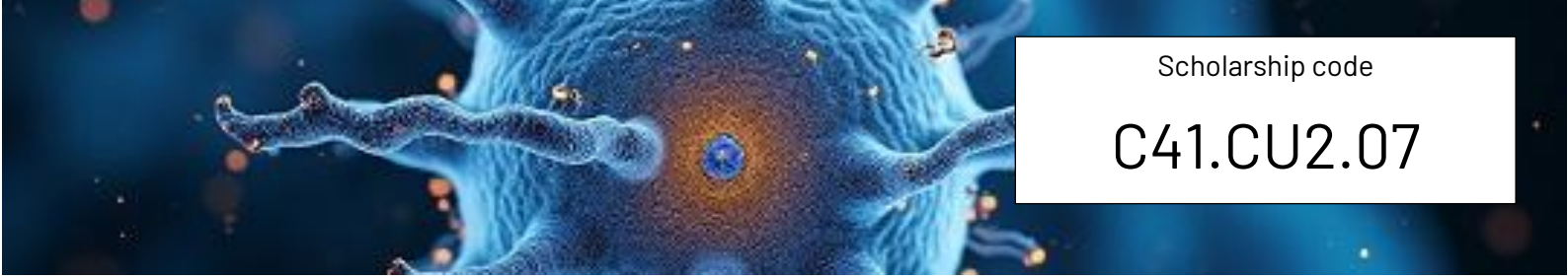
Research team and environment

My unit consists of 1 PhD student in Computer Science and Engineering, 1 fellow, 1 senior technician, and 1 Master student in Bionformatics. The candidate will have the opportunity to work in a leading scientific institute where gene therapy approaches are directly applied in clinical practice. This environment offers a unique chance to assess the translational relevance of scientific hypotheses in cohorts of GT-treated patients. The project benefits from exclusive resources, including patented technologies, optimized techniques for genomic DNA integration site retrieval, and well-established bioinformatics platforms for data analysis. The candidate will also work alongside world-renowned experts in GT, CAR-T immunotherapies, clonal tracking, and bioinformatics, providing an exceptional collaborative research environment.

https://research.hsr.it/en/institutes/san-raffaele-telethon-institute-for-gene-therapy/safety-of-gene-therapy-and-insertional-mutagenesis/daniela-cesana.html

Suggested skills for this research topic

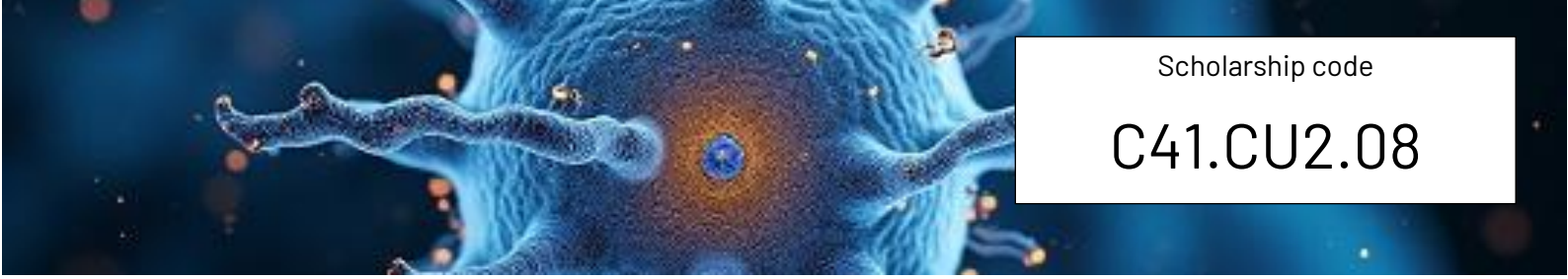
The candidate should have a good background in molecular biology techniques and gene therapy, with the ability to handle tasks such as library preparation and sequencing. The ideal candidate will be familiar with or open to learning advanced techniques such as DNA and cfDNA extraction, PCR, real-time PCR, digital PCR, cloning, and bacterial cultures. Familiarity with cell culture, vector production, immune-staining, and fluorescence cell sorting, will be advantageous. The candidate should also be a strong team player, capable of collaborating closely with bioinformaticians and must have an aptitude for learning state-



Scholarship code

C41.CU2.07

of-the-art data analysis techniques. Good communication skills are essential, and the candidate must be proficient in English, as he/she will be expected to present the progress of the project both within the Institute and at international scientific meetings.



Scholarship code

C41.CU2.08

CU2 - GENE AND CELL THERAPIES

Unveiling Endothelial Mechanisms to Advance Hemophilia A Therapies

Reference Person: Antonia Follenzi

(antonia.follenzi@med.uniupo.it)

Host University/Institute: Università del Piemonte Orientale

Dipartimento di Scienze della Salute

Location: Novara, Italy

Research Keywords: Hemophilia A

Endothelial dysfunction

Coagulation FVIII

Reference ERCs: LS7_5 Applied gene, cell and immune therapies

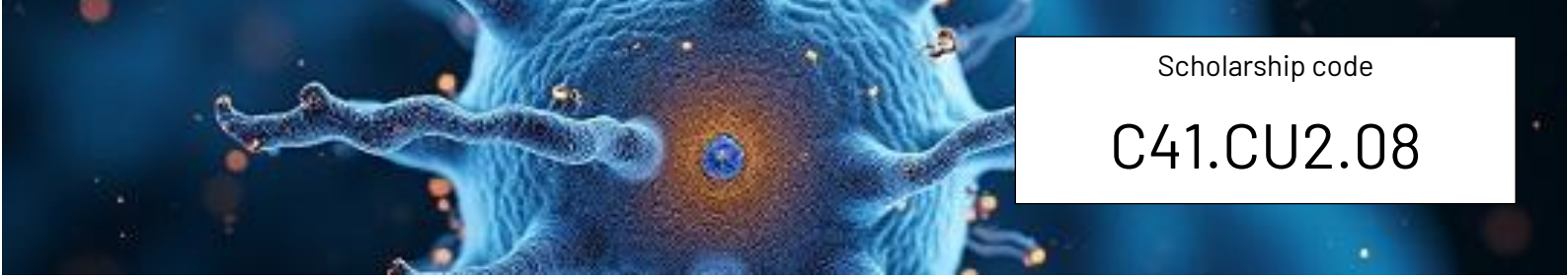
LS7_4 Regenerative medicine

LS7_2 Medical technologies and tools (including genetic tools and biomarkers) for prevention, diagnosis, monitoring and treatment of diseases

Available positions: 1

Description of the research topic

Hemophilia A (HA) is an inherited bleeding disorder caused by the absence or dysfunction of coagulation factor VIII (FVIII). The clinical hallmark of HA is prolonged bleeding, which may occur spontaneously or following injury, trauma, or surgery. In addition to bleeding episodes, HA is associated with broader complications such as cardiovascular disease, hemarthrosis, and intracranial hemorrhages (ICHs). It is well established that FVIII is primarily secreted by endothelial cells (ECs). This fact is critical in understanding how FVIII deficiency may affect EC function and, more broadly, vascular homeostasis. Hemostasis and angiogenesis are tightly linked physiological processes; while extensively studied independently, coagulation factors (CFs) have long been viewed solely as components of the clotting cascade. However, emerging evidence suggests that CFs, including FVIII, play important roles in modulating endothelial behavior. Our previous findings demonstrated



Scholarship code

C41.CU2.08

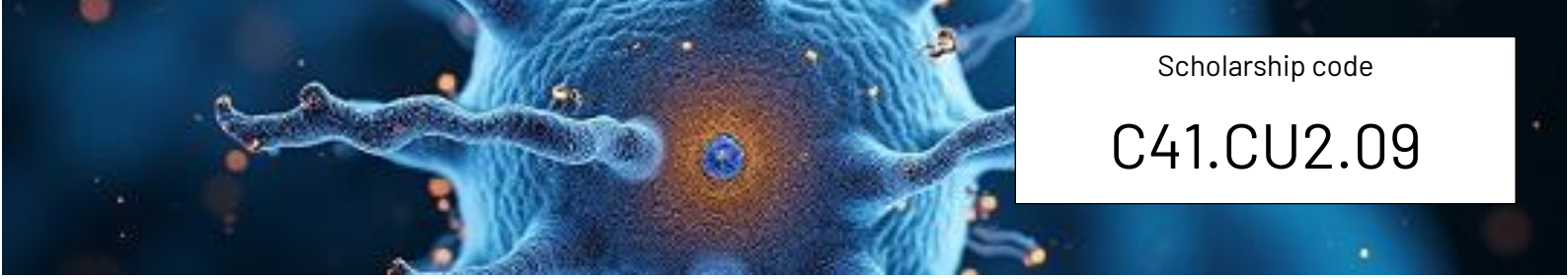
that FVIII is essential for healthy EC function. In HA-derived ECs, we observed impaired angiogenesis, reduced migration, and compromised barrier integrity—all of which were rescued upon FVIII supplementation. Moreover, FVIII was found to activate key intracellular signaling pathways and influence the extracellular matrix (ECM), highlighting its broader regulatory functions. In this project, we aim to dissect the mechanistic role of FVIII in maintaining vascular integrity. Using advanced molecular techniques, we will analyze gene and protein expression profiles affected by FVIII absence and identify the cell surface receptors mediating its effects. Additionally, we will develop a 3D endothelial cell model to study how FVIII modulates ECM interactions and affects cellular mechanical responses to the microenvironment. Ultimately, this research will elucidate novel mechanisms by which FVIII supports vascular health, offering insights that could guide the development of next-generation therapies for Hemophilia A.

Research team and environment

The Histology Lab, led by Prof. Antonia Follenzi, includes senior collaborators (Prof. Merlin, Borsotti and Olgasi), 2 assistant professors, 5 postdocs, 7 PhD students, several Master's students in Medical Biotechnology, and 2 lab technicians. Research focuses on gene and cell therapy for Hemophilia A, the extracoagulative roles of FVIII, Nanomedicine strategies for targeted cancer treatment, and Generation and analysis of induced pluripotent stem cells (iPSCs) from patients with Amyotrophic Lateral Sclerosis (ALS) to investigate disease mechanisms. The School of Medicine at the University of Eastern Piedmont (UPO) includes two departments—Health Sciences and Translational Medicine—working with the university hospitals in Novara and Alessandria. Additionally, the Center for Autoimmune and Allergic Diseases (CAAD) strengthens UPO's position in the biomedical sciences by offering cutting-edge infrastructure, core facilities, and specialized services to support research and innovation.

Suggested skills for this research topic

The ideal candidate for our project should hold a Master degree in Biology or Medical Biotechnology, with a solid foundation in cell and molecular biology. Prior laboratory experience is appreciated, and familiarity with key experimental techniques is desirable. We are looking for a curious, motivated, and proactive individual who is enthusiastic about learning new methodologies and collaborating within an international research team. Strong communication skills and proficiency in English are essential, as English is the working language of the lab. Knowledge of computer science or data analysis tools is considered a strong plus.



Scholarship code

C41.CU2.09

CU2 - GENE AND CELL THERAPIES

Directing the timing of maturation across neuron types derived from human pluripotent stem cells

Reference Person:	Gabriele Ciceri
	(gabriele.ciceri@gmail.com)
Host University/Institute:	Fondazione Telethon
	San Raffaele Telethon Institute for Gene Therapy (SR-Tiget)
Location:	Milan, Italy

Research Keywords:	Developmental timing
	Neuronal maturation
	Human pluripotent stem cells differentiation
Reference ERCs:	LS3_13 Stem cells
	LS5_1 Neuronal cells
	LS3_9 Cell differentiation, formation of tissues and organs

Available positions: 1

Description of the research topic

The assembly of brain networks relies on the execution of basic developmental steps in space and time. Basic steps are broadly conserved, yet brain development displays variations in speed and duration across species, regions and cell types. It takes almost two decades to build a mature cerebral cortex in humans. In contrast, neurons in other regions develop much faster. Such dramatic temporal differences are thought to underly the emergence of complex brain properties and alterations of neuronal maturation timing are linked to brain disorders.

How temporal information is encoded in the developing brain is unclear, despite its crucial role for coordinating the growth and acquisition of mature function. it turns out that the timing of development is largely driven by cell-intrinsic programs, like “clocks” that are retained in vitro during the differentiation of human pluripotent stem cell (hPSC). Our

research has recently identified an epigenetic clock that prolong the time to reach maturity and can be manipulated to speed up neuronal maturation.

The proposed project will investigate mechanisms underlying “slow” and “fast” maturation and dissect how their modulation enables the coordinated maturation of distinct neuron types. We will leverage our unique expertise in cutting-edge hPSC differentiations into several region-specific neuron types. This system enables to precisely map and contrast maturation rates across cell type, to perturb candidate pathways and engineer cells in order to accelerate, delay or revert the maturation process. The final goal is to establish a transformative stem cell-based platform to control maturation timing on demand for disease modeling applications.

The project will tackle a fundamental, yet unexplored frontiers in stem cell biology and will combine advanced technologies of hPSC-based differentiation, cellular/genetic engineering, molecular profiling and assays of neuronal functionality.

Ciceri et. al. An epigenetic barrier sets the timing of human neuronal maturation. Nature, 2024

Ciceri G & Studer L. Epigenetic control and manipulation of neuronal maturation timing. Curr Opin Genet Dev, 2024

Why human brain cells grow so slowly. Nature Video :

https://www.youtube.com/watch?v=llJkc6tulus

https://www.the-scientist.com/human-neurons-play-the-waiting-game-71900

Mechanisms guiding the slow pace of maturation in human neurons uncovered. Nature, 2024

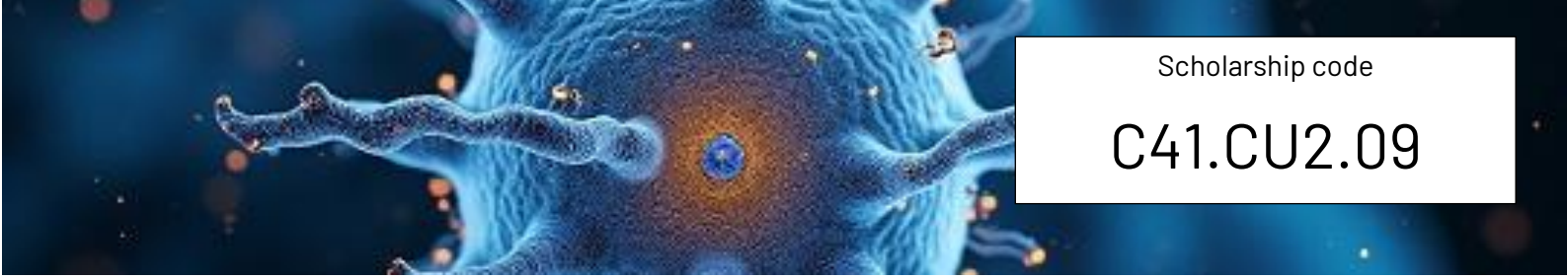
https://neuronline.sfn.org/training/module-2-neuronal-differentiation

Research team and environment

The project will be carried out at San Raffaele Telethon Institute for Gene Therapy (SR-Tiget), which has pioneered discoveries in cell/gene engineering and fosters research on emerging concepts in stem cell biology, tissue engineering and cellular aging. SR-Tiget is part of San Raffaele Hospital, a vibrant biomedical campus which host multidisciplinary research, including experimental neuroscience, and state-of-the-art scientific infrastructure.

The PI, Gabriele Ciceri, has a strong track-record in neuroscience and stem cell biology and international PhD and postdoc research experience with world leaders. The newly established and rapidly growing team is supported by prestigious international award from the Harvard-Armenise foundation, in addition to Telethon Foundation.

https://scholar.google.com/citations?user=3bHGsMEAAAAJ&hl=en&oi=ao



Scholarship code

C41.CU2.09

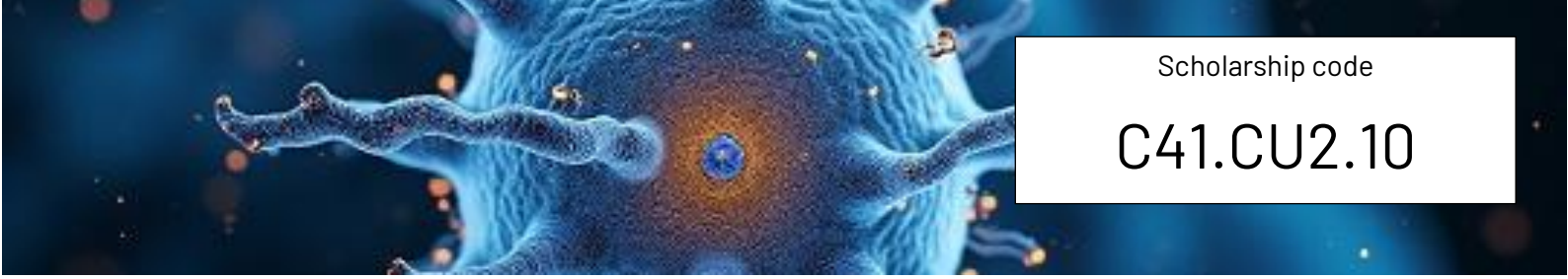
Orcid 0000-0002-8481-9771

https://x.com/gabriele_ciceri

https://research.hsr.it/en/institutes/san-raffaele-telethon-institute-for-gene-therapy.html

Suggested skills for this research topic

We are looking for highly motivated and creative doctoral students to work on a new concept at the intersection of stem cell biology, neuroscience, and gene/cell engineering: "what drives timing during brain maturation". International and national candidates holding a master's degree in life science or equivalent are welcome to apply. Candidates are expected to have great communication and writing skills in English. Genuine interest in the topic, strong initiative and organization, teamwork and planning skills are very positively valued. Previous knowledge in developmental biology and neuroscience as well as documented experience in standard molecular biology and cell culture techniques or bioengineering are preferable.



Scholarship code

C41.CU2.10

CU2 - GENE AND CELL THERAPIES

Development of a selection strategy to boost the efficacy and safety of genome editing in HSPCs

Reference Person: Anna Villa

(villa.anna@hsr.it)

Host University/Institute: Fondazione Telethon

San Raffaele Telethon Institute for Gene Therapy (SR-Tiget)

Location: Milan, Italy

Research Keywords: Genome Editing

Stem Cell

Genome Integrity

Reference ERCs: LS7_4 Regenerative medicine

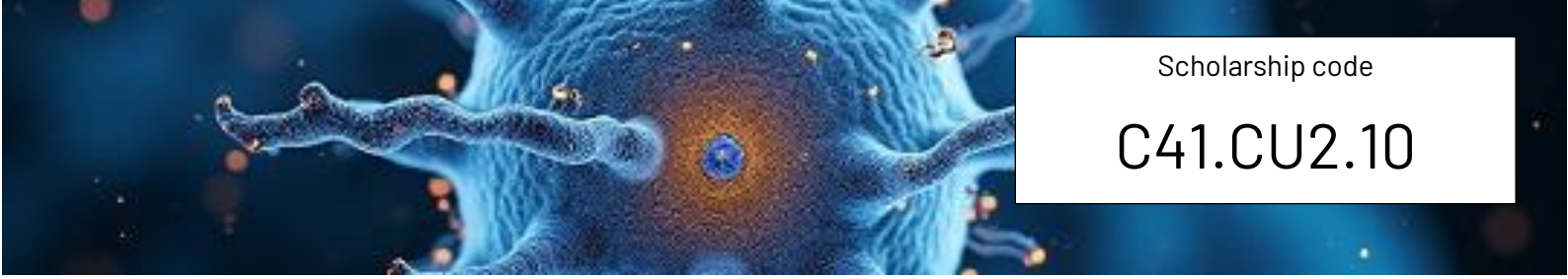
LS7_5 Applied gene, cell and immune therapies

LS7_2 Medical technologies and tools (including genetic tools and biomarkers) for prevention, diagnosis, monitoring and treatment of diseases

Available positions: 1

Description of the research topic

CRISPR-Cas9 gene editing has the potential to revolutionize gene therapy by the avoidance of dysregulated corrective transgene expression. We have recently applied homology directed repair (HDR) mediated GE to treat a severe form of primary immunodeficiency caused by defects in Recombination Activating Gene 1 (RAG1), a tightly regulated molecule of the VDJ recombination, the process responsible for T and B cell receptor rearrangement. We designed a strategy to potentially cure most of the mutations causing the broad spectrum of RAG1 clinical manifestations by precise and targeted correction of the genetic defect (Castiello et al, Science Trans Med 2024). In this project we propose to refine our RAG1 gene correction strategy by applying novel selection strategy to enrich the proportion of HDR-edited cells. We will test novel vector based on the Selection by Means of Artificial Transactivators (SMArT-2) platform, combining a codon optimized RAG1 sequence (coRAG1)



Scholarship code

C41.CU2.10

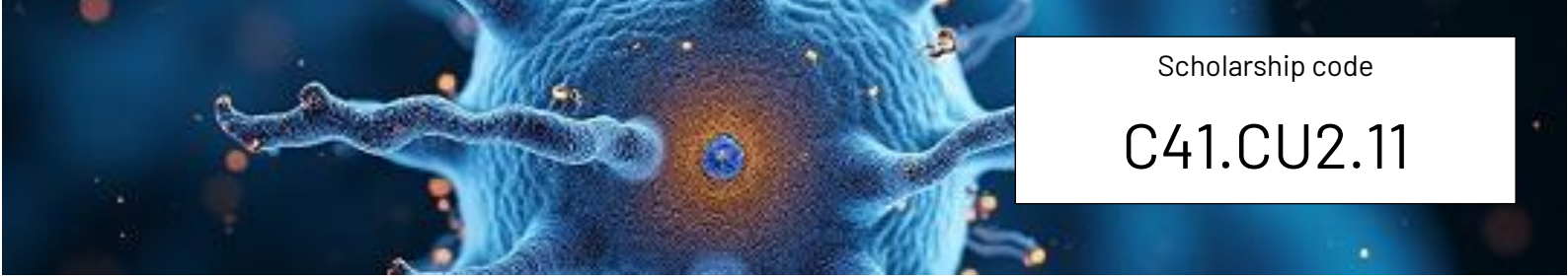
with a P2A and a GFP selector cassette. These novel platforms will be tested in surrogate cellular models to assess RAG1 expression during cell cycle regulation and then applied to human CD34 cells. Ex vivo and in vivo studies will be performed to test stemness, in vitro and in vivo fitness and engraftment capacity. Artificial thymic organoid (ATO) will be exploited to complement in vivo studies and analyze T cell differentiation from gene edited CD34+ cells. Single cell transcriptomic and proteomics will be conducted in CD34 cells edited in different selector platforms. Finally, safety studies with conventional and novel techniques will be performed to study genome integrity upon selection in various applied strategies.

Research team and environment

Our team is focused on the pathophysiology and development of novel cellular therapies to cure severe combined immunodeficiencies and inherited bone defects (https://research.hsr.it/en/institutes/san-raffaele-telethon-institute-for-gene-therapy/pathogenesis-and-treatment-of-immune-and-bone-diseases.html). We have conducted extensive studies to define pathophysiology of immune dysregulation in inherited immune defects and in parallel developed innovative cell therapy. Our team is part of San Raffaele Telethon Institute for Research (SR-Tiget), a very exciting Institute globally recognized for its pioneering work in the research and clinical application. Training courses on flow-cytometry, confocal microscopy, animal handling, statistics and GLP studies are available to students and staff. Attendance to seminar and national/international meetings is promoted. Weekly lab and clinical meetings favour discussion within team and with other teams on research activities.

Suggested skills for this research topic

The candidates should hold a Life Science degree. Highly motivated candidates with good skills in molecular and cellular biology are encouraged to apply. Experience in animal model management is a plus. The candidates should have ability to work in team; research planning and organization, and communication skills are required. The successful candidate is expected to be ambitious, hardworking, well-organized, team-oriented, and able to work independently. Good verbal and written English communication skills are essential.



Scholarship code

C41.CU2.11

CU2 - GENE AND CELL THERAPIES

Next generation versatile and effective AAV-mediated large gene delivery

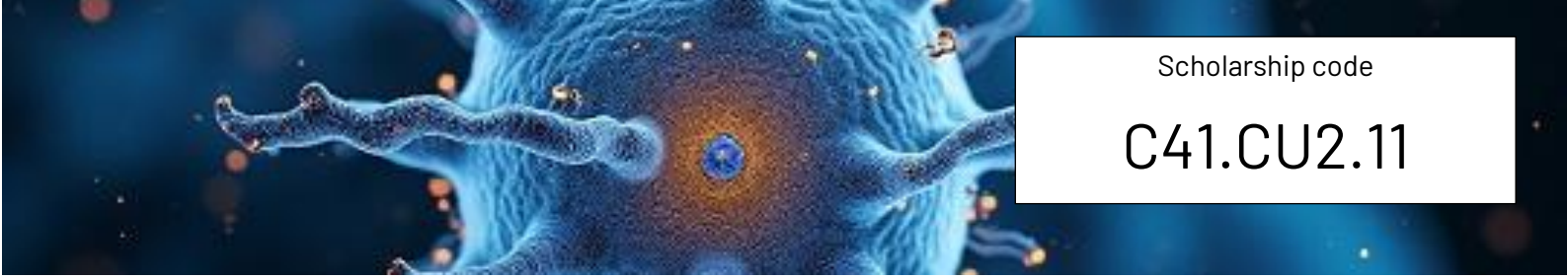
Reference Person:	Ivana Trapani
	(trapani@tigem.it)
Host University/Institute:	Fondazione Telethon
	Telethon Institute of Genetics and Medicine (TIGEM)
Location:	Pozzuoli (NA), Italy
Research Keywords:	AAV
Reference ERCs:	LS7_5 Applied gene, cell and immune therapies
Available positions:	1
Project:	NextGeneTx , HORIZON-ERC, ERC-2024-STG, N. 101164722

Description of the research topic

The research project focuses on overcoming one of the most critical limitations of in vivo gene therapy using adeno-associated virus (AAV) vectors: their restricted cargo capacity, which is less than 5 kilobases. This limitation currently prevents AAV-based therapies from being applied to a wide range of inherited diseases caused by mutations in large genes. To address this challenge, the project will build on a recently developed AAV-based platform that exploits inteins—short protein elements capable of mediating protein splicing in a traceless manner — focusing on increasing both the efficiency and the safety of the approach.

Research team and environment

The PhD project will be carried out at TIGEM (Telethon Institute of Genetics and Medicine), a leading research center in the field of human genetics and gene therapy, located in Pozzuoli (Naples), Italy. The student will join the research group led by Dr. Ivana Trapani. The lab offers a multidisciplinary and collaborative environment, with access to state-of-the-art facilities for molecular biology, in vivo studies, and advanced imaging. TIGEM fosters scientific training through seminars, journal clubs, and international collaborations. More



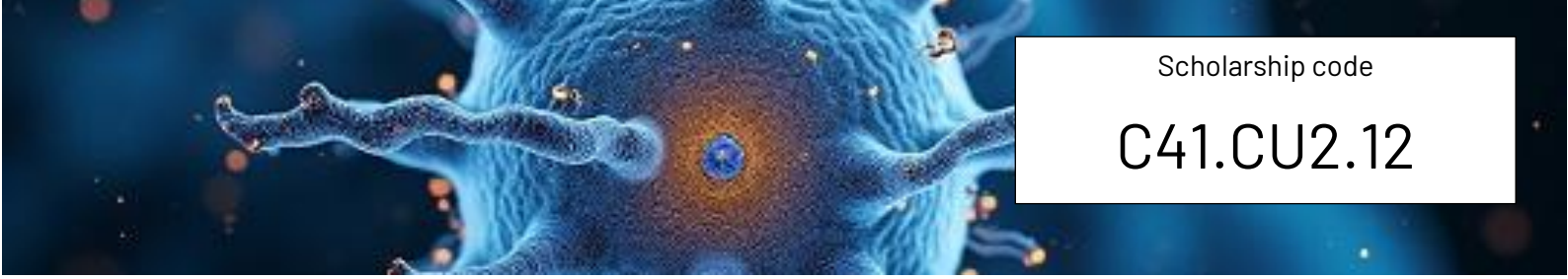
Scholarship code

C41.CU2.11

information on TIGEM and the Trapani lab can be found at: https://www.tigem.it/research/research-faculty/trapani

Suggested skills for this research topic

- Excellent skills in molecular biology and cloning.
- Strong experience in gene therapy or genome editing is highly desirable.
- Experience in retinal research is a plus but not mandatory.
- English proficiency
- A proactive, collaborative, and independent mindset.



Scholarship code

C41.CU2.12

CU2 - GENE AND CELL THERAPIES

Novel Targeted Gene Editing and Delivery Technologies for Engineering Human Hematopoietic Stem Cells

Reference Person: Luigi Naldini

(naldini.luigi@hsr.it)

Host University/Institute: Fondazione Telethon

San Raffaele Telethon Institute for Gene Therapy (SR-Tiget)

Location: Milan, Italy

Research Keywords: Gene editing

Gene delivery

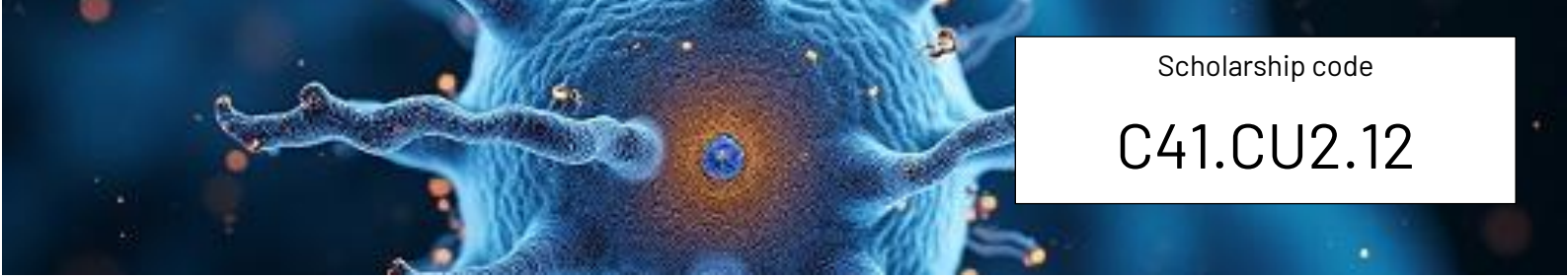
Hematopoietic stem cells

Reference ERCs: LS7_5 Applied gene, cell and immune therapies

Available positions: 1

Description of the research topic

Ex vivo therapeutic gene addition into hematopoietic stem and progenitor cells (HSPCs) by means of lentiviral vectors has proven to be an effective strategy to treat a wide variety of genetic disorders. However, the multi-copy and semi-random genome-wide integration of the vector in the target cell genome may still pose concerns of residual genotoxicity and hamper faithful reconstitution of expression of the integrated transgene. To overcome these issues, targeted integration approaches based on programmable nucleases and homology-directed repair (HDR) have been developed, enabling site-specific insertion of therapeutic sequences in HSPCs, enabling in situ gene correction and safe harbour landing. Yet, these methods still face major hurdles, such as genotoxicity from DNA double-strand breaks (DSBs) and the cytotoxicity of current editing system delivery (e.g., electroporation). This project aims to develop innovative strategies for (i) targeted integration of gene-sized payloads, and (ii) non-toxic delivery of the editing machinery to HSPCs. To achieve the first goal, the candidate will explore: i) shifting the integration profile of viral vectors from semi-random to site-specific; ii) improving the specificity, efficiency, and tolerability of retrotransposon- and prime editing-based systems in human HSPCs. Readouts will include integration site mapping (LAM-PCR, targeted sequencing), quantification of targeted



events, transgene expression, and functional assays (e.g., CFU, multilineage differentiation). If editing reaches double-digit efficiencies in vitro, xenotransplantation studies in immunodeficient mice will be conducted to benchmark performance against HDR-based strategies. To achieve the second goal, the candidate will leverage recent advances from the hosting lab to test lipid nanoparticles (LNPs) for ex vivo delivery of editing tools and DNA templates to HSPCs. DNA template design will be optimized to enhance nuclear delivery. In parallel, functionalization of LNPs with lipid-conjugated ligands to target specific HSPC subsets will be explored, aiming to reduce reagent use and enable future in vivo applications. Readouts will include editing efficiency, cell viability, delivery assessment (fluorescent cargo), and functional output (e.g., engraftment in immunodeficient mice). Altogether, this project aims to develop safer, more precise genome editing strategies in HSPCs, advancing toward clinically relevant therapeutic applications.

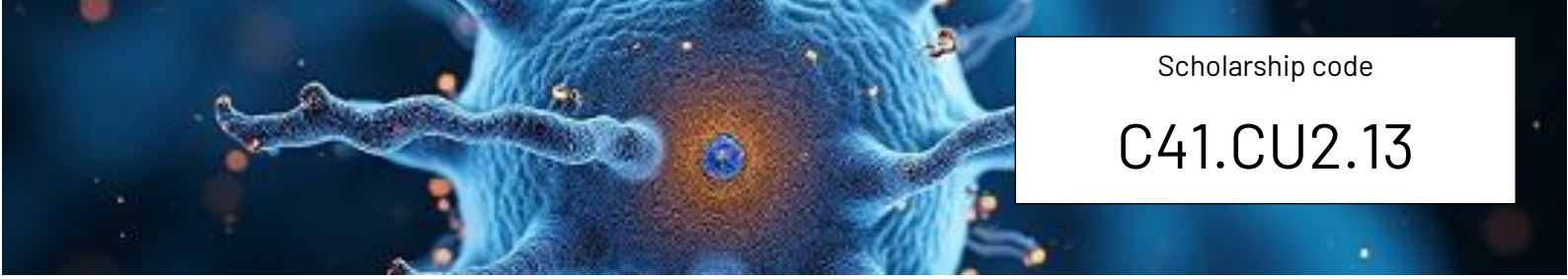
Research team and environment

SR-Tiget represents a multi-disciplinary environment, blending scientific expertise in developing innovative gene and cell therapies, access to preclinical models to evaluate efficacy and safety, and competence in conducting early-phase clinical trials. This bench-to-bedside capacity fosters alliances with industrial partners and start-up companies, crucial for securing resources to address regulatory hurdles and manufacturing needs to bring therapies to registration and make them available to patients. Our unit, Novel Gene Therapy Strategies, focuses on improving methods for therapeutic genetic manipulation of hematopoietic stem cells and exploring novel approaches. Current main goals include: clinical translation of gene editing of hematopoietic cells, enhancing HDR-mediated gene editing, exploring novel applications of emerging editing systems, and developing non-genotoxic conditioning.

https://research.hsr.it/en/institutes/san-raffaele-telethon-institute-for-gene-therapy.html

Suggested skills for this research topic

Candidates should exhibit enthusiasm and interest for the fields of gene therapy and gene editing. Good knowledge of molecular and cellular biology is required, with particular focus on the mechanisms of gene transfer and gene integration, cellular DNA repair pathways, and hematopoietic stem cells biology. Previous work experience in hematopoietic stem cells engineering is particularly welcome. Skill requirements encompass bench molecular biology, expertise in flow cytometric assays and analysis, expertise in primary cells culture and cell lines culture, previous work with in vivo murine models and, preferably, with immuno-compromised hematochimeric murine models of hematopoiesis, data analysis, data generation and data presentation.



Scholarship code

C41.CU2.13

CU2 - GENE AND CELL THERAPIES

Unlocking in vivo gene therapy in hematopoietic stem cells

Reference Person: Michela Milani

(milani.michela@hsr.it)

Host University/Institute: Fondazione Telethon

San Raffaele Telethon Institute for Gene Therapy (SR-Tiget)

Location: Milan, Italy

Research Keywords: In vivo gene therapy

Lentiviral vector engineering

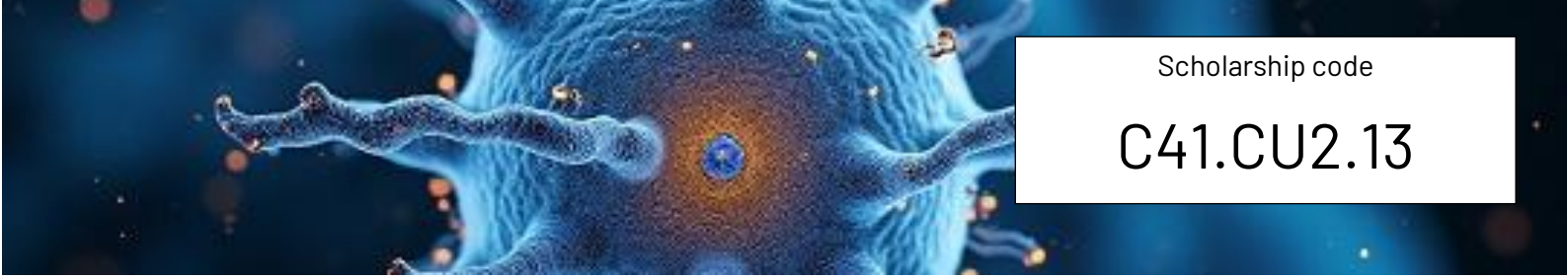
Hematopoietic stem and progenitor cells

Reference ERCs: LS7_4 Regenerative medicine

Available positions: 1

Description of the research topic

Lentiviral vector (LV) mediated ex vivo gene therapy in hematopoietic stem and progenitor cells (HSPCs) fulfilled the promise of a cure for different genetic diseases. However, ex vivo manipulation of HSPC, collection of a proper number of cells, and the risks associated with patient conditioning and transplant still pose challenges to broad access to HSPC gene therapy. The overarching goal of this project is to overcome these hurdles by implementing an in vivo gene therapy approach. As a paradigmatic disease model to investigate the feasibility of this approach, we chose Fanconi anemia (FA), a rare genetic disorder belonging to the DNA repair deficiency syndromes. In FA, the HSC compartment is directly affected, posing additional constraints for ex vivo culture, collection of HSPCs, and patient conditioning. For these reasons, FA is an ideal candidate for in vivo LV-mediated gene transfer. To investigate the feasibility of this approach, we studied HSPC biodistribution in newborn, 2-week-old, or adult mice. We discovered a unique window of opportunity in the formers due to early post-natal persistence of the hepatic fetal hematopoietic niche and extensive trafficking of HSC to the bone marrow (BM). Indeed, we successfully targeted bona fide HSC by intravenous (i.v.) administration of GFP-expressing LV to newborn mice. We obtained stable, life-long GFP expression in up to 8% of all blood lineages, paralleled by a comparable expression in HSPCs harvested from the BM, which could engraft long-term in



Scholarship code

C41.CU2.13

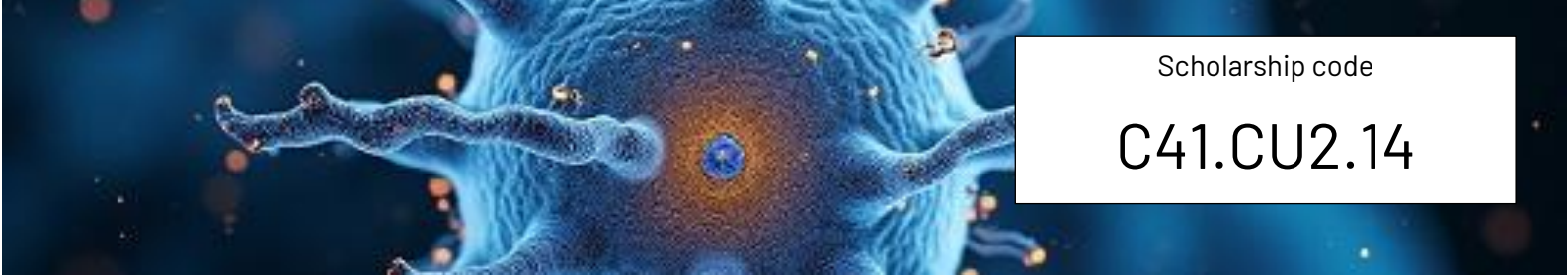
busulfan-conditioned mice. We also increased gene transfer efficiency by up to 15% by applying a G-CSF/Plerixafor mobilization regimen, modeling the clinical use, and extending the possibility of effectively targeting HSPCs in vivo to juvenile mice. Based on this preliminary data, the general objective of this project is to generate Universal Switchable-LV retargeted toward HSPCs to obtain stable and efficient in vivo gene transfer in the FA mouse model. Moreover, the specificity of these vectors may be easily redirected toward the antigen of interest by changing the binding moiety. We will test these engineered LV in vitro on primary human cells and in vivo in newborn FA mice or humanized mice. All together, these data will provide the basis for possible clinical translation of this approach for FA and will be seminal to pave the way to expand further the plethora of genetic diseases that would benefit from in vivo gene therapy.

Research team and environment

SR-Tiget has the mission to perform cutting-edge research on gene and cell therapy and to translate its results into therapeutic advances for genetic diseases. Over the years, SR-Tiget has made pioneering contributions to the gene and cell therapy field with relevant discoveries in vector design, gene transfer and gene editing strategies, and stem cell biology. Our team has a strong experience in lentiviral vector engineering and in vivo gene therapy approaches, combined with the long-standing expertise in HSPC biology present at SR-Tiget. In addition, we are collaborating with key experts in the relevant fields. We have access to a state-of-the-art cytometry facility, a specific-pathogen-free animal facility, a biosafety level 2 culture room for the production and handling of LV, a process-development lab for the production of purified batches of LV, and a Vector integration core for LV integration site analysis.

Suggested skills for this research topic

We are looking for a highly motivated Ph.D. student to join our Team. The ideal candidate has an academic background in molecular biology and molecular medicine. He/she should have experience in basic molecular biology techniques, such as nucleic acid purification, quantification, and PCR, and in cell culture. Previous experience in flow cytometry and/or mouse handling is a plus. Proficient knowledge of English is mandatory. We are looking for a dedicated, passionate candidate, able to work independently and in a team when needed.



Scholarship code

C41.CU2.14

CU2 - GENE AND CELL THERAPIES

Expanding AAV gene therapy by editing

Reference Person: Alberto Auricchio

(auricchio@tigem.it)

Host University/Institute: Fondazione Telethon

Telethon Institute of Genetics and Medicine (TIGEM)

Location: Pozzuoli (NA), Italy

Research Keywords: Gene therapy

Reference ERCs: LS7_5 Applied gene, cell and immune therapies

Available positions: 1

Description of the research topic

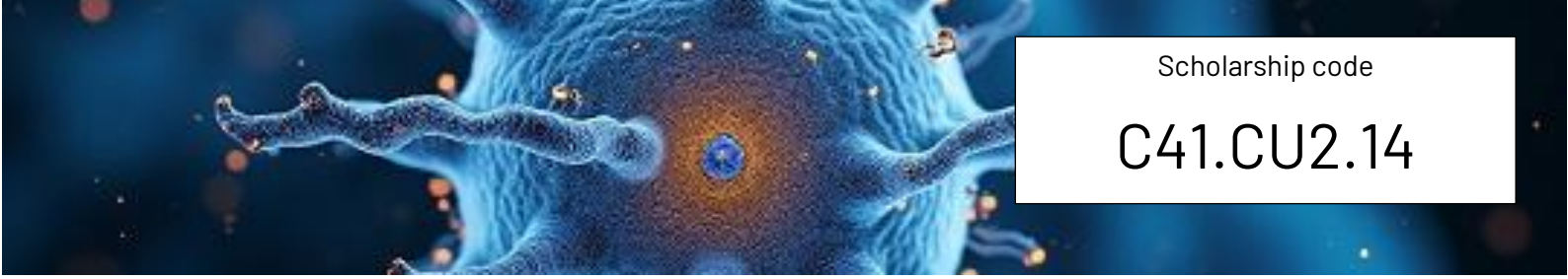
Gene therapy is entering a new era, with AAV-based treatments showing great promise for genetic diseases. However, challenges remain—especially in achieving safe, long-lasting effects in growing tissues and addressing dominant mutations that traditional gene replacement can't fix.

The project aims to overcome these challenges by developing precise tools to insert therapeutic DNA exactly where it's needed in the genome. It explores two innovative strategies: one using engineered Cas proteins to guide accurate DNA repair, and another avoiding DNA cutting by employing novel integration systems like transposases or bacterial proteins.

These approaches are being tested in models of retinal and liver diseases, with the goal of creating therapies that are safer, more effective, and more durable. The project also focuses on non-viral delivery methods to reduce risks further.

Research team and environment

The PhD project will be carried out at TIGEM (Telethon Institute of Genetics and Medicine), a leading research center in the field of human genetics and gene therapy, located in Pozzuoli (Naples), Italy. The student will join the research group led by Prof Alberto Auricchio. The lab offers a multidisciplinary and collaborative environment, with access to state-of-the-art facilities for molecular biology, in vivo studies, and advanced imaging. TIGEM fosters



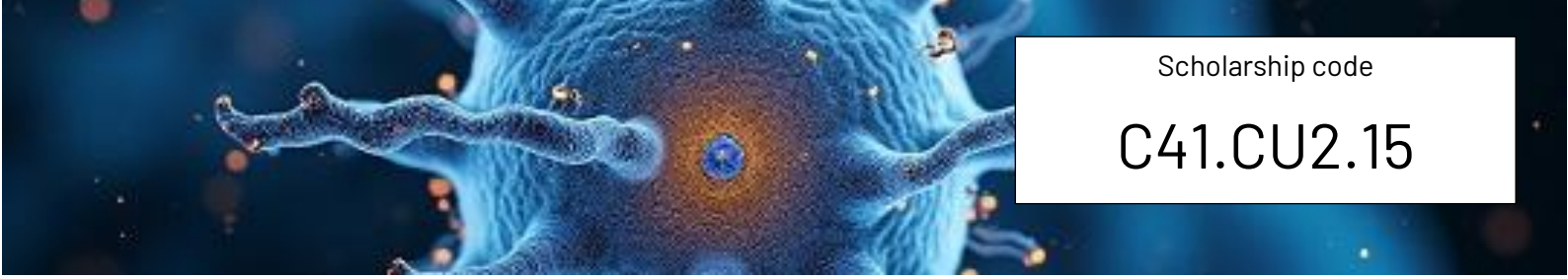
Scholarship code

C41.CU2.14

scientific training through seminars, journal clubs, and international collaborations. More information on TIGEM and the Auricchio lab can be found at: https://www.tigem.it/research/research-faculty/auricchio

Suggested skills for this research topic

The ideal PhD candidate should have a strong academic background in molecular biology, genetics, biotechnology, or a closely related field. They should demonstrate foundational laboratory skills such as molecular cloning, cell culture, and basic genomic techniques like PCR and sequencing. While prior experience with genome editing tools such as CRISPR-Cas or transposases is advantageous, it is not mandatory, as comprehensive training will be provided. The candidate must be highly motivated, curious, and capable of working both independently and collaboratively within a multidisciplinary team. Strong analytical thinking, problem-solving abilities, and clear scientific communication skills are essential. Proficiency in English is required for effective communication and documentation.



Scholarship code

C41.CU2.15

CU2 - GENE AND CELL THERAPIES

Engineering chromatin dynamics to fine-tune enhancer-promoter interactions in neurodevelopment

Reference Person: Michele Gabriele

(gabriele.michele@hsr.it)

Host University/Institute: Fondazione Telethon

San Raffaele Telethon Institute for Gene Therapy (SR-Tiget)

Location: Milan, Italy

Research Keywords: Chromatin dynamics

Enhancer-promoter interactions

Genome engineering

Reference ERCs: LS2_4 Gene regulation

LS2_3 Epigenetics

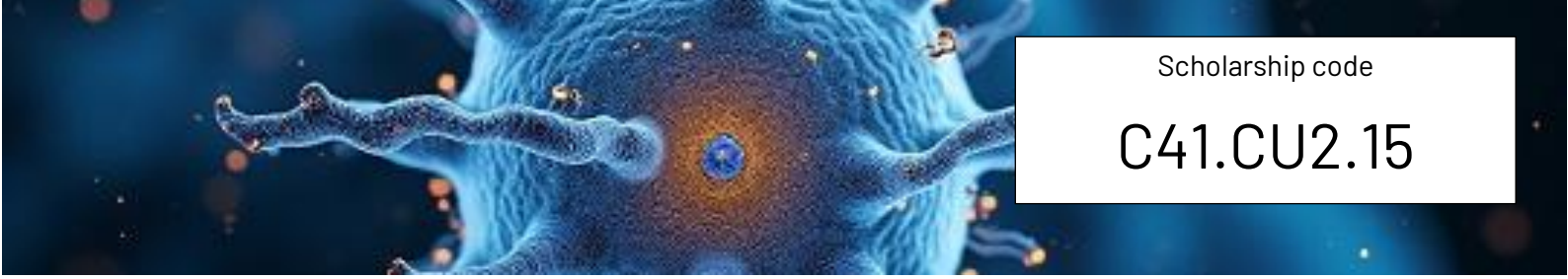
LS2_11 Bioinformatics and computational biology

Available positions: 1

Description of the research topic

Mutations in transcriptional enhancers and their regulators are a primary cause of neurodevelopmental disorders and many tumors. Despite the importance of enhancers, we still do not fully understand their mechanism, nor do we fully understand the molecular mechanisms by which mutations in DNA non-coding regulatory elements and chromatin regulators, such as chromatin loopers or histone modifiers, affect gene expression regulation. Therefore, identifying these molecular mechanisms and understanding the causal relationship between chromatin dynamics and gene expression will open the way to new therapeutic approaches based on targeting enhancer-promoter interactions (EPIs) and/or gene therapy.

To fill these knowledge gaps and develop a strategy to engineer EPIs, the candidate will employ a multidisciplinary approach that encompasses super-resolution live-cell imaging, 3D genome architecture, single-cell approaches, and genome editing to engineer the



Scholarship code

C41.CU2.15

frequency and duration of chromatin contacts, with the aim of tuning EPIs whose dysregulation is linked to pathologies. Specifically, the candidate will engineer endogenous regulatory loci of the genome to observe EPIs and nascent transcription in real time in living cells during neuronal differentiation. This approach allows the measurement of the 3D distance, frequency, and duration of long-range interactions between regulatory elements and the consequences on nascent transcription, thereby identifying the biophysical mechanisms of EPIs. This experimental platform will be used to engineer dysregulated EPIs with synthetic chromatin loopers to manipulate the dynamics of regulatory elements with the aim of fine-tuning gene expression.

In this multidisciplinary project, the candidate will acquire competences in pluripotent stem cell culture and neuronal differentiation, gene editing with CRISPR/Cas9, molecular cloning, execution and library preparation of 3D genome architecture, epigenomics and single-cell next-generation sequencing assays and their data analysis, use of super-resolution live-cell imaging, and application of biophysical approaches to study chromatin dynamics in living cells.

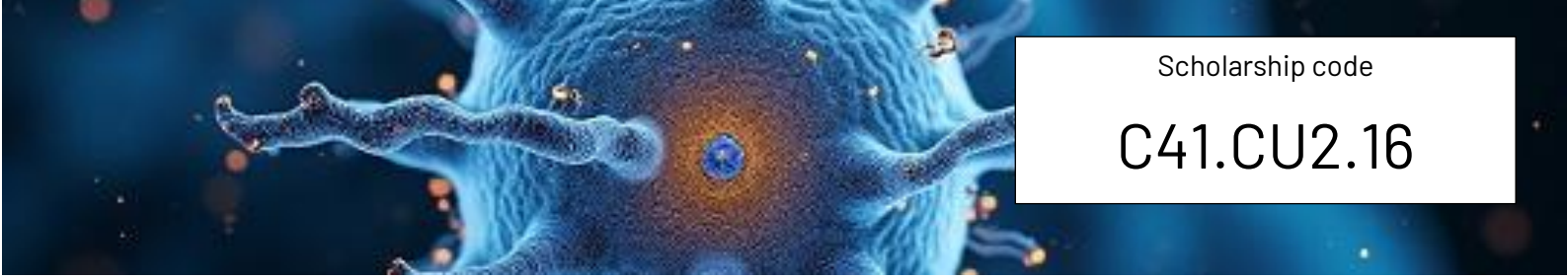
Research team and environment

The new laboratory "3D genome dynamics in differentiation and pathology" led by Gabriele Michele was recently opened at the SR-Tiget (https://www.gabrielelab.com/research). The candidate will have the opportunity to join an emerging group and contribute to establishing its lab environment. The current small size of the laboratory provides the candidate with the opportunity to collaborate and be trained directly with Dr. Gabriele, who recently returned to Italy after completing his postdoctoral work at MIT. The lab has access to all the core facilities and services of the San Raffaele Telethon Institute of Gene Therapy.

https://research.hsr.it/en/institutes/san-raffaele-telethon-institute-for-gene-therapy.html

Suggested skills for this research topic

Previous experience with the mentioned methodologies is appreciated, but not required. Suggested familiarity with NGS methods and experience with Python, Jupyter, and bash scripting is recommended. The candidate should be passionate about multidisciplinary approaches and curious about learning how to apply biophysics to molecular and cellular biology. A positive attitude towards collaborating with others and interacting with colleagues from different disciplines is required. Proficiency in English is a requirement.



Scholarship code

C41.CU2.16

CU2 - GENE AND CELL THERAPIES

HSPCs gene editing based enrichment strategies for the treatment of inborn metabolic disorders

Reference Person: Daniele Canarutto

(canarutto.daniele@hsr.it)

Host University/Institute: Fondazione Telethon

San Raffaele Telethon Institute for Gene Therapy (SR-Tiget)

Location: Milan, Italy

Research Keywords: Homology directed repair

HSPCs gene therapy

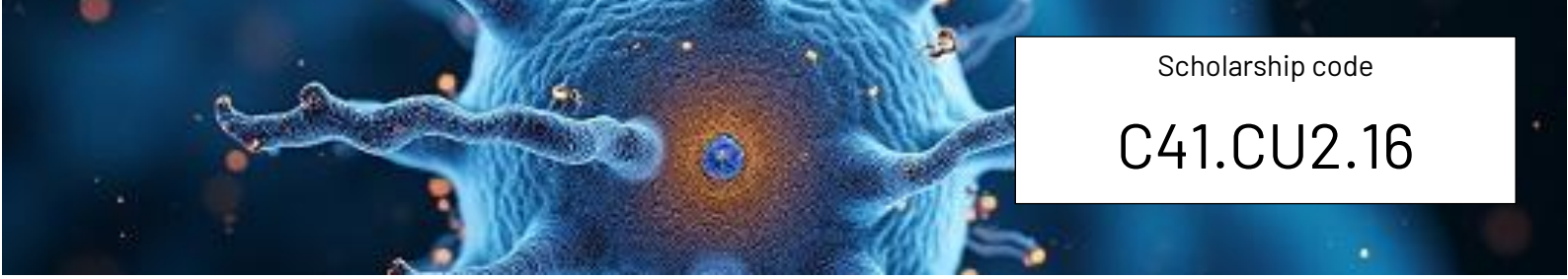
Precision gene editing

Reference ERCs: LS7_5 Applied gene, cell and immune therapies

Available positions: 1

Description of the research topic

Ex vivo gene addition in hematopoietic stem and progenitor cells (HSPCs) is a clinically validated approach that has successfully treated several inborn errors of metabolism (IEMs). However, this strategy carries safety concerns related to random genomic integration and potential activation of nearby oncogenes, particularly when strong viral promoters are used to drive therapeutic gene expression. Targeted gene editing using nucleases and homology-directed repair (HDR) represents a safer alternative, allowing site-specific integration of therapeutic transgenes. Yet, it remains inefficient due to the genotoxicity associated with the quality and quantity of the vectors used. This project aims to develop innovative gene editing and selection strategies for enriching precise edits to overcome the current limitations of HDR. The research will focus on four main objectives: (1) optimizing donor template delivery by improving viral vector design (AAV, IDLV) and refining cell culture conditions to preserve HSPC stemness and clonal diversity; (2a) enriching for precisely edited cells using fluorescence-activated cell sorting (FACS)-based positive selection, where a transiently expressed selector is activated only upon successful HDR-mediated integration; (2b) establishing a purging selection approach that targets an essential haploinsufficient gene, allowing only cells with precise HDR that express gene of interest



Scholarship code

C41.CU2.16

(GOI) to survive while eliminating those repaired by error-prone non-homologous end joining (NHEJ). (3) Simplifying the selection process using a Cas9-based epigenome editor that simultaneously mediates gene editing and transiently transactivates selector or genes to promote functionality and selection of edited HSPCs. (4) Therapeutic potential of this editing and selection platform will be demonstrated in two rare diseases: X-linked adrenoleukodystrophy (X-ALD) and Pompe disease, both requires supra-physiological levels of enzyme production. Key experimental readouts will include editing efficiency, clonal diversity assessments, transgene expression profiling, and functional validation through xenotransplantation into immunodeficient mice to assess long-term engraftment and lineage differentiation. Altogether, this project seeks to establish a safe, efficient, and scalable genome editing platform for HSPCs, advancing the clinical translation of gene therapy for inborn errors of metabolism.

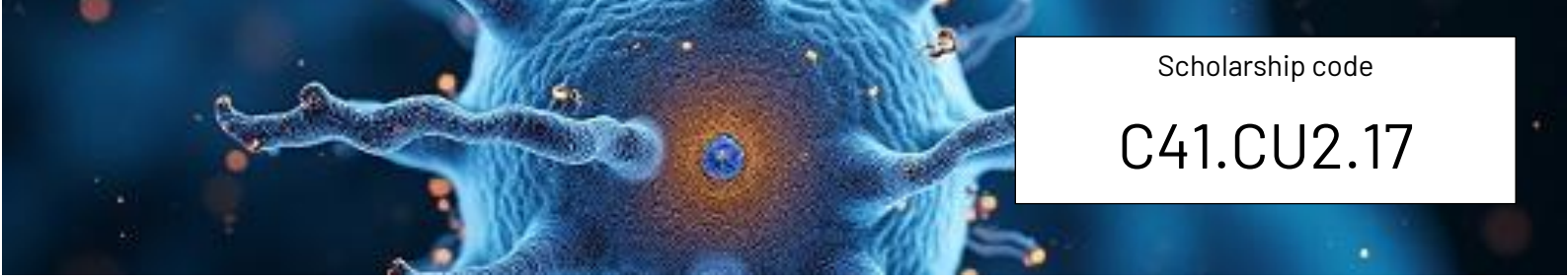
Research team and environment

SR-Tiget represents a multi-disciplinary environment, blending scientific expertise in developing innovative gene and cell therapies, access to preclinical models to evaluate efficacy and safety, and competence in conducting early-phase clinical trials. This bench-to-bedside capacity fosters alliances with industrial partners and start-up companies, crucial for securing resources to address regulatory hurdles and manufacturing needs to bring therapies to registration and make them available to patients. Our unit, Novel Gene Therapy Strategies, focuses on improving methods for therapeutic genetic manipulation of hematopoietic stem cells and exploring novel approaches. Current main goals include clinical translation of gene editing of hematopoietic cells, enhancing HDR-mediated gene editing, exploring novel applications of emerging editing systems, and developing non-genotoxic conditioning.

https://research.hsr.it/en/institutes/san-raffaele-telethon-institute-for-gene-therapy.html

Suggested skills for this research topic

Candidates should exhibit enthusiasm and interest for the fields of gene therapy and gene editing. Good knowledge of molecular and cellular biology is required, with particular focus on the mechanisms of gene transfer and gene integration, cellular DNA repair pathways, and hematopoietic stem cells biology. Previous work experience in hematopoietic stem cells engineering is particularly welcome. Skill requirements encompass bench molecular biology, expertise in flow cytometric assays and analysis, expertise in primary cells culture and cell lines culture, previous work with in vivo murine models and, preferably, with immuno-compromised hematochimeric murine models of hematopoiesis, data analysis, data generation and data presentation.



Scholarship code

C41.CU2.17

CU2 - GENE AND CELL THERAPIES

Gene therapy and genome editing in the retina

Reference Person: Alberto Auricchio

(auricchio@tigem.it)

Host University/Institute: Fondazione Telethon

Telethon Insitute of Genetics and Medicine (TIGEM)

Location: Pozzuoli (NA), Italy

Research Keywords: Gene editing

Adeno associated vectors

Inherited retinal diseases

Reference ERCs: LS7_5 Applied gene, cell and immune therapies

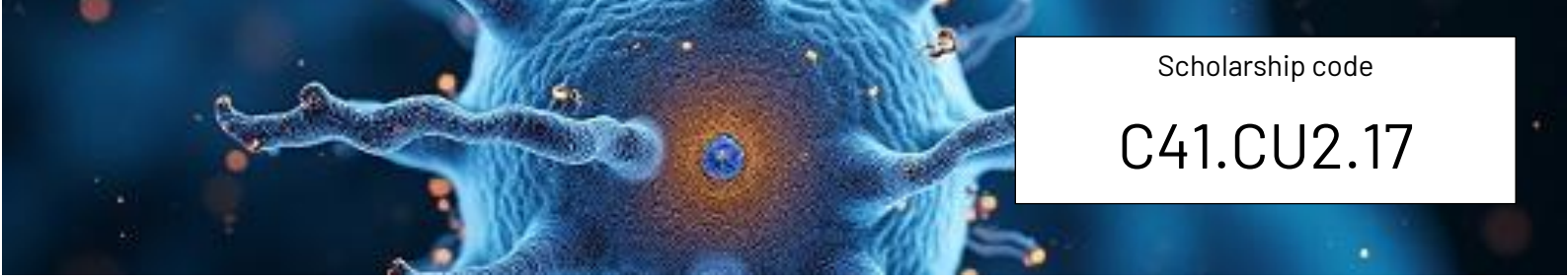
Available positions: 2

Description of the research topic

Inherited retinal diseases (IRD) are a major cause of blindness worldwide, primarily due to mutations in genes expressed in retinal photoreceptor cells (PR). Recent advancements in gene therapy using adeno-associated viral vectors (AAV) have led to the approval of Luxturna, the first gene therapy for an ocular disease, treating a rare form of inherited childhood blindness. However, many genes involved in IRD are too large for AAV vectors. Our research aims to overcome this challenge to develop therapies for common IRDs. Traditional gene replacement is ineffective for dominant IRDs due to gain-of-function mutations. Therefore, new approaches using AAV and CRISPR-Cas9 are being evaluated to block mutant alleles and replace them with wild-type copies, potentially offering new treatments for severe blinding conditions.

Research team and environment

The Telethon Institute of Genetics and Medicine (TIGEM) is a renowned research institute dedicated to understanding the genetic basis of human diseases and developing innovative therapies. Located in Pozzuoli, Italy, TIGEM focuses on translational research, bridging the gap between basic science and clinical applications. The institute is known for its cutting-



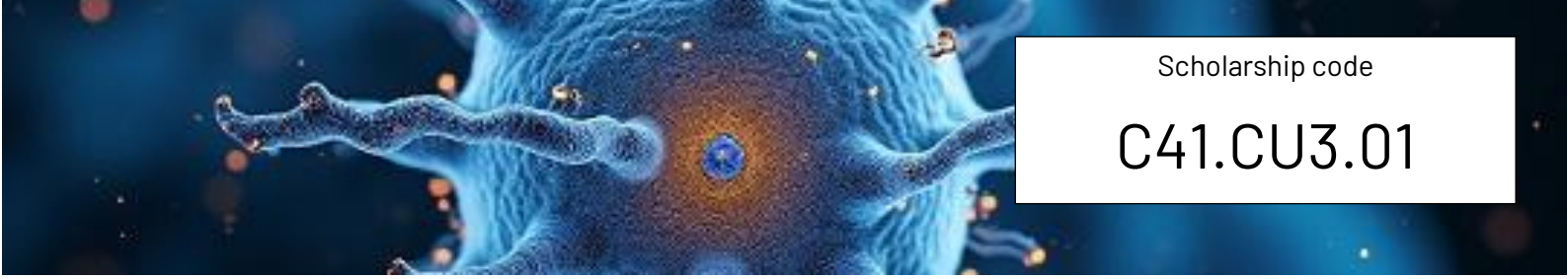
Scholarship code

C41.CU2.17

edge work in gene therapy, particularly using adeno-associated viral vectors (AAV) and CRISPR-Cas9 technologies (www.tigem.it)

Suggested skills for this research topic

The ideal candidate for this graduate program should have a Bachelor's or Master's degree in molecular biology, genetics, or a related field. They should have practical laboratory experience and basic labporatory skills (molecular biology, cloning, histology etc..). The candidate should possess good analytical skills and the ability to interpret data accurately. Strong problem-solving abilities and attention to detail are important. Soft skills such as effective communication, teamwork, and adaptability are essential for working in a collaborative research environment. Proficiency in English is required.



Scholarship code

C41.CU3.01

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES

Molecular Mechanisms of Coenzyme Q biosynthesis

Reference Person: Andrea Mattevi

(andrea.mattevi@unipv.it)

Host University/Institute: Università degli studi di Pavia

Dipartimento di Biologia e Biotecnologie

Location: Pavia, Italy

Research Keywords: Enzyme biochemistry

Redox biology

Inhibitor discovery

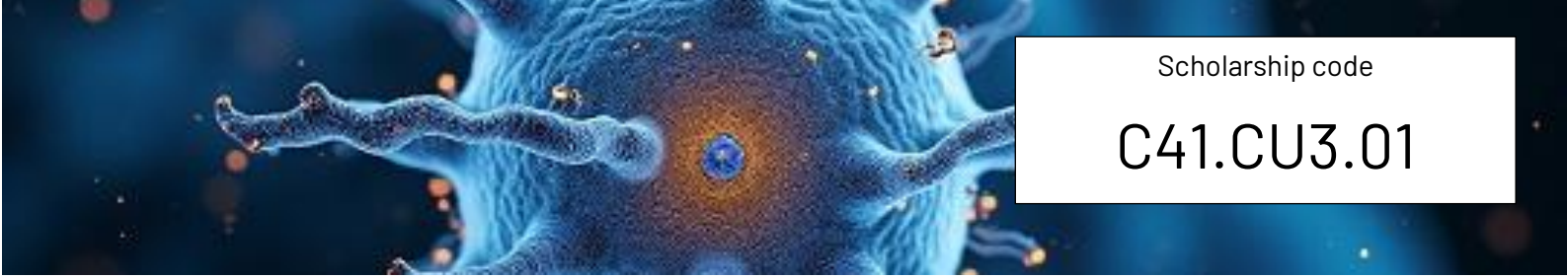
Reference ERCs: LS1_1 Macromolecular complexes including interactions involving nucleic acids, proteins, lipids and carbohydrates

Available positions: 1

Project: MetaQ, ERC Advanced Grant 2022, n. 101094471

Description of the research topic

Coenzyme Q (CoQ), a crucial lipid-soluble molecule involved in the mitochondrial electron transport chain, is synthesized through a complex and highly regulated pathway. This biosynthetic process is orchestrated by a network of specialized proteins that assemble into a multi-enzyme complex on the matrix side of the inner mitochondrial membrane, forming a dynamic and spatially organized structure known as the COQ metabolon. This metabolon serves as a scaffold that facilitates substrate channeling, enzyme stabilization, and the efficient production of CoQ. Our long-term research objective is to uncover and define the molecular and structural mechanisms that govern the assembly, regulation, and functional dynamics of this biosynthetic metabolon. The PhD candidate will play a pivotal role in this project and will be primarily responsible for the development, optimization, and execution of expression systems for the various COQ proteins. This includes heterologous expression in appropriate systems, purification using advanced chromatographic techniques, and the implementation of in vitro enzymatic assays to assess protein function and interaction. In addition to bench work, the candidate will also contribute to



Scholarship code

C41.CU3.01

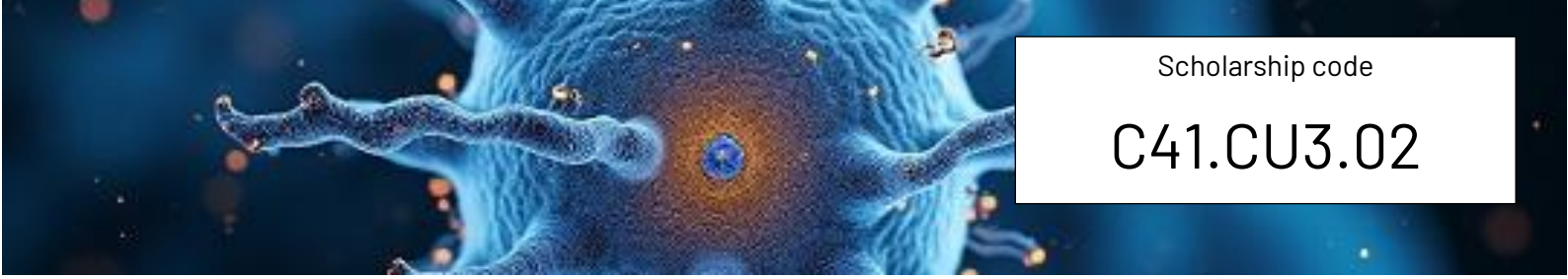
experimental design, data interpretation, and collaborative efforts with structural biology and bioinformatics teams.

Research team and environment

Structural and Molecular Biology group coordinated by Andrea Mattevi

Suggested skills for this research topic

Protein biochemistry, enzymology, analytical chemistry, and biophysics.



Scholarship code

C41.CU3.02

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES

Molecular Mechanisms of Coenzyme Q biosynthesis

Reference Person: Andrea Mattevi

(andrea.mattevi@unipv.it)

Host University/Institute: Università degli studi di Pavia

Dipartimento di Biologia e Biotecnologie

Location: Pavia, Italy

Research Keywords: Enzyme biochemistry

Redox biology

Inhibitor discovery

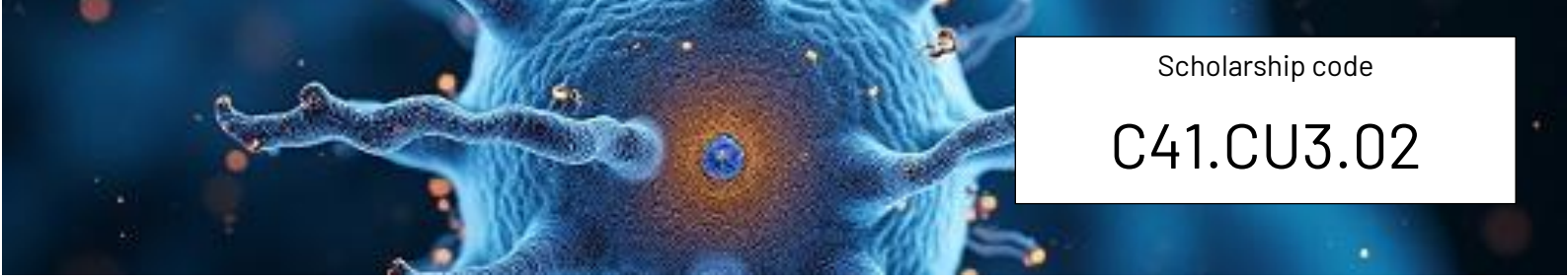
Reference ERCs: LS1_1 Macromolecular complexes including interactions involving nucleic acids, proteins, lipids and carbohydrates

Available positions: 1

Project: MetaQ, ERC Advanced Grant 2022, n. 101094471

Description of the research topic

Coenzyme Q (CoQ), a crucial lipid-soluble molecule involved in the mitochondrial electron transport chain, is synthesized through a complex and highly regulated pathway. This biosynthetic process is orchestrated by a network of specialized proteins that assemble into a multi-enzyme complex on the matrix side of the inner mitochondrial membrane, forming a dynamic and spatially organized structure known as the COQ metabolon. This metabolon serves as a scaffold that facilitates substrate channeling, enzyme stabilization, and the efficient production of CoQ. Our long-term research objective is to uncover and define the molecular and structural mechanisms that govern the assembly, regulation, and functional dynamics of this biosynthetic metabolon. By understanding how the constituent COQ proteins interact, associate, and co-function within this complex, we aim to uncover new biological insights that could be leveraged for therapeutic development, particularly in the context of CoQ deficiencies and mitochondrial disorders. The PhD's project will pivot toward the identification and screening of small molecule inhibitors that specifically target either the structural integrity of the metabolon or key proteins responsible for substrate trafficking, metabolon organization, and catalytic activation.



Scholarship code

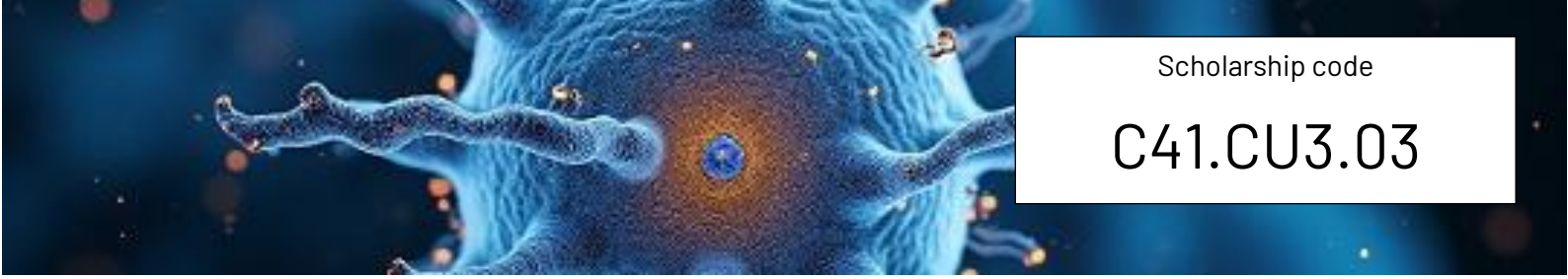
C41.CU3.02

Research team and environment

Structural and Molecular Biology group coordinated by Andrea Mattevi

Suggested skills for this research topic

Protein biochemistry, enzymology, analytical chemistry, and biophysics.



Scholarship code

C41.CU3.03

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES

Development of new anti-cancer drugs based on high-affinity, highly selective ligands

Reference Person:	Samuele Cazzamalli
	(samuele.cazzamalli@philochem.ch)
Host University/Institute:	Philogen
	R&D (Philochem AG Zürich)
Location:	Otelfingen (ZH), Switzerland

Research Keywords:	Targeted therapies
	Oncology
	Encoded Libaries
Reference ERCs:	PE5_18 Medicinal chemistry
	PE8_13 Industrial bioengineering

Available positions:	4 (reserved for Philochem Company's employees)

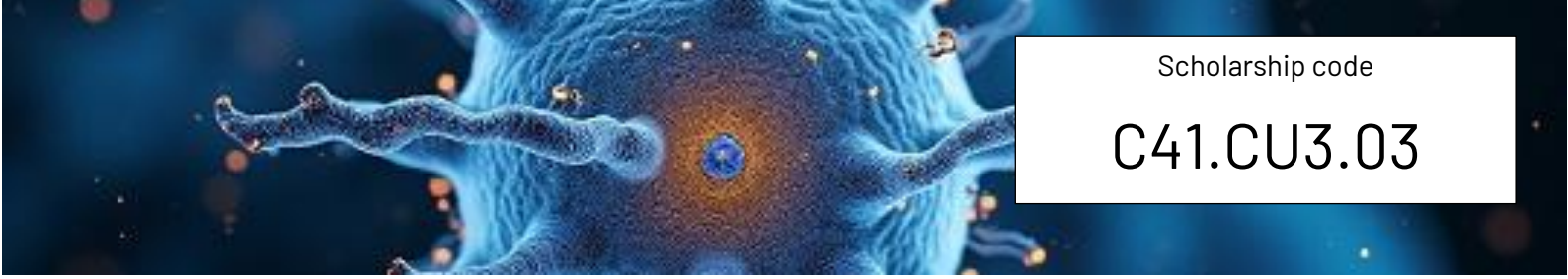
Description of the research topic

Conventional anti-cancer chemotherapy relies on the use of antiproliferative drugs that lack tissue selectivity and are therefore associated with high systemic toxicity.

This research project focuses on the development of new anti-cancer drugs conjugated with small organic molecules, peptides, or antibodies that exhibit high affinity and selectivity for tumor-associated proteins. This strategy enables a high accumulation of the active compound at the tumor site without affecting healthy organs, resulting in increased efficacy and reduced toxicity.

During the project, the candidate will work on identifying tumor "target" proteins, generating new selective conjugates, and evaluating them in vitro. Finally, the most promising conjugates will be tested in vivo using animal models.

Research team and environment



Scholarship code

C41.CU3.03

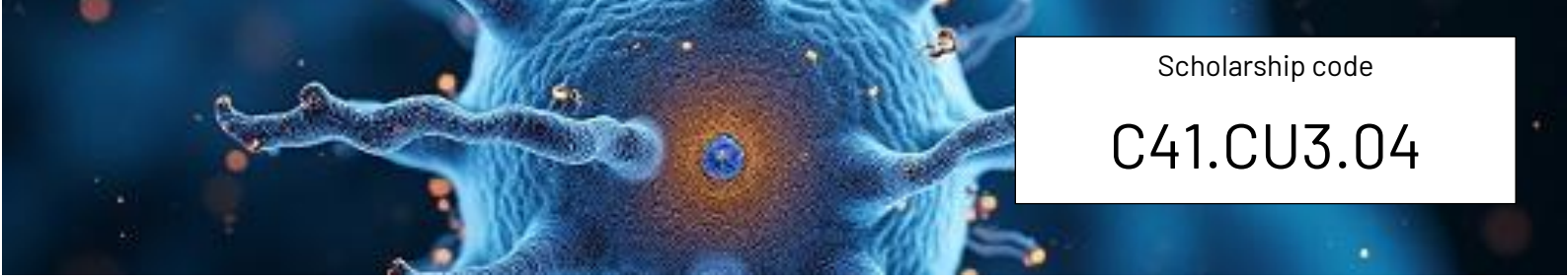
Philogen (www.philogen.com) is a Swiss-Italian biotechnology company, founded in 1996, with a mission to innovate the treatment of cancer and other serious conditions.

Philochem AG (www.philochem.ch) is the Swiss subsidiary of the Philogen group, acting as an R&D unit and developing drug prototypes based on disease-targeted small molecules, peptides, and antibodies.

The Philogen group is experienced in running industrial PhD programs (open since 2017) in collaboration with leading universities, including IUSS Pavia.

Suggested skills for this research topic

- Master Degree in chemistry, medicinal chemistry, or related disciplines.
- Experience in synthesis (small organic ligands and/or peptide chemistry; bioconjugation chemistry is considered a plus) and characterisation of organic compounds OR in protein production and characterization
- Experience with modern analytic techniques (e.g., HPLC, LC-MS OR FPLC, SDS-page) and interpretation of results obtained by spectroscopic techniques (e.g., NMR).
- Good knowledge of data analysis and editing Software (i.e., Excel, Word, Power point, Prism, R, MatLab, Illustrator).
- Experience in performing literature searches using chemistry databases (PubMed, SciFinder, Reaxys) and in applying the results to solve synthetic challenges in the lab.
- Fluency in oral and written English.



Scholarship code

C41.CU3.04

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES

Neuronal network dynamics in health and disease

Reference Person: Claudia Lodovichi

(claudia.lodovichi@cnr.it)

Host University/Institute: Consiglio Nazionale delle Ricerche

Istituto di Biofisica

Location: Pisa, Italy

Research Keywords: Imaging in vivo

Electrophysiology in vivo

Neuronal circuit dynamics

Reference ERCs: LS5_16 Systems and computational neuroscience

LS5_5 Neural networks and plasticity

PE3_16 Physics of biological systems

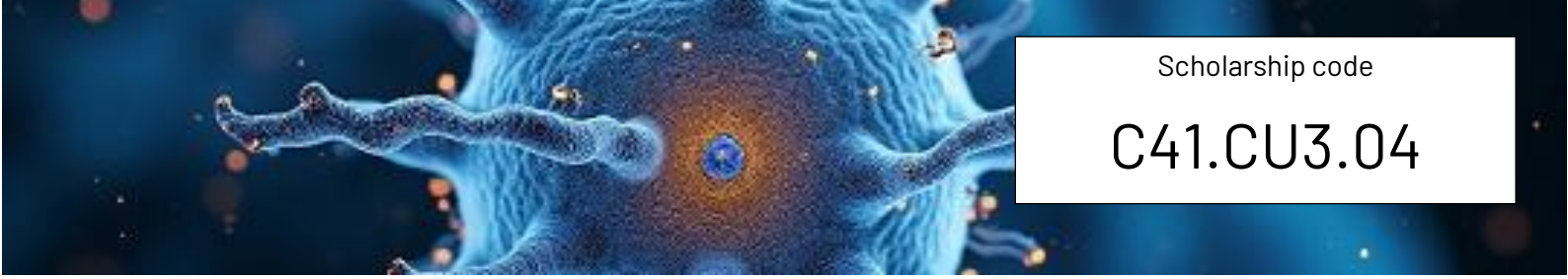
Available positions: 1

Description of the research topic

The project aim at studying neuronal network activity in physiological conditions and in mouse model of brain disorders in vivo, using electrophysiological recording and functional two photon imaging, in awake behaving mice. We will analyze the role of inhibition in regulating neuronal network dynamics, how this changes according to the status of the subject, along the circadian rhythm and how these processes get altered in brain diseases.

Research team and environment

In the lab we are interested in understanding how sensory (and cognitive) information is encoded in the brain, and how these processes get disrupted in pathological conditions. To address these questions, we analyze brain activity, at systems level, in vivo, by using multiphoton imaging and electrophysiology in awake behaving mice. Due to the key role of inhibition in regulating brain activity, we investigate how changes in the inhibitory tone affect the computation of the brain, taking into account the status of the subject and the circadian rhythm.

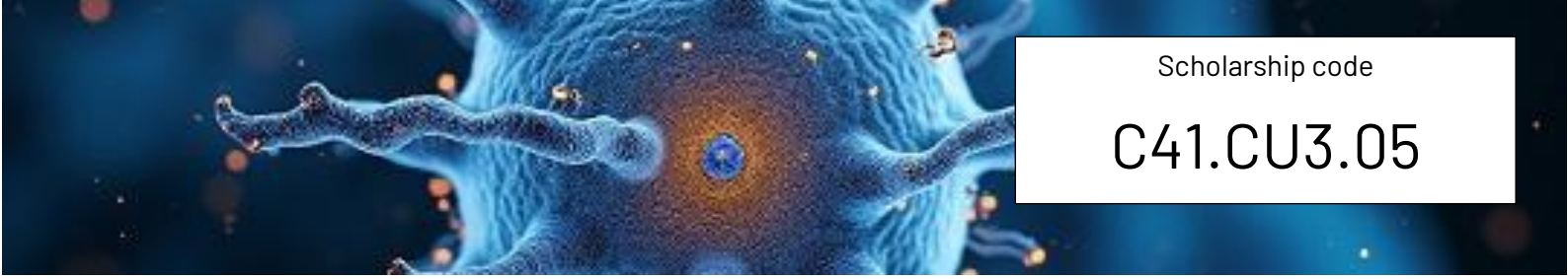


Scholarship code

C41.CU3.04

Suggested skills for this research topic

Master in neuroscience, physics, biological science, engineering, math, medical degree. Ability/ willing to work in vivo. Programming in mat lab and python is required, so having already some knowledge is appropriate.



Scholarship code

C41.CU3.05

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES

Development and optimization of industrial processes for the production of therapeutic proteins

Reference Person: Lorenzo Ghezzi

(lorenzo.ghezzi@philogen.com)

Host University/Institute: Philogen SpA

Development & Industrialization

Location: Siena, Italy

Research Keywords: Biopharmaceutical process

GMP manufacturing

Process development and improvement

Reference ERCs: PE8_13 Industrial bioengineering

PE8_10 Manufacturing engineering and industrial design

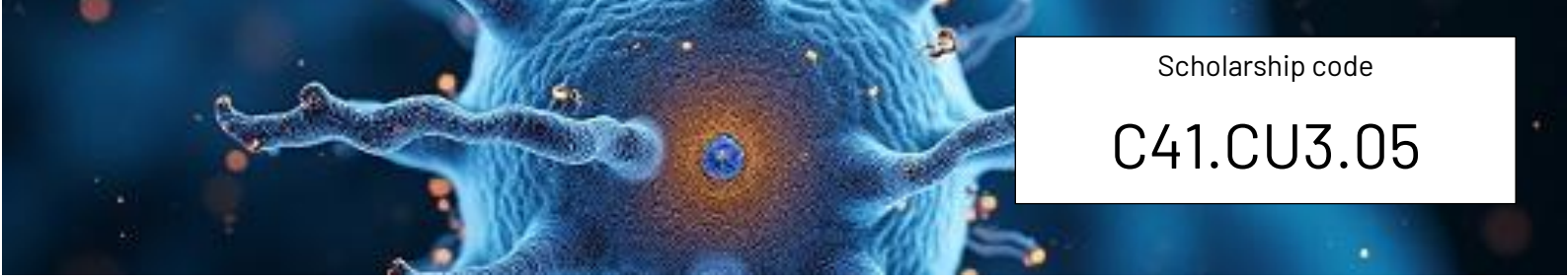
Available positions: 1 (reserved for Philogen Company's employees)

Description of the research topic

The new frontier in anti-cancer drug development lies in conjugating them with small organic molecules, peptides or antibodies that have a high affinity for and selectivity towards tumour-associated proteins, thereby increasing their efficacy. This research project focuses on developing and optimizing industrial biotechnological processes for producing recombinant therapeutic proteins. During the project, the candidate will work on developing and optimising cell fermentation and chromatographic purification, to determine the optimal production conditions for the protein of interest, seeking the best compromise between yield and purity. The identified process will then be transferred to industrial GMP production.

Research team and environment

Philogen (www.philogen.com) is a Swiss-Italian biotechnology company, founded in 1996, with a mission to innovate the treatment of cancer and other serious conditions.



Scholarship code

C41.CU3.05

Philochem AG (www.philochem.ch) is the Swiss subsidiary of the Philogen group, acting as an R&D unit and developing drug prototypes based on disease-targeted small molecules, peptides, and antibodies.

The Philogen group is experienced in running industrial PhD programs (open since 2017) in collaboration with leading universities, including IUSS Pavia.

Suggested skills for this research topic

• Master's degree in health biology, biotechnology, or related disciplines.

• Experience in cell culture (the ability to handle cells in suspension is considered a plus).

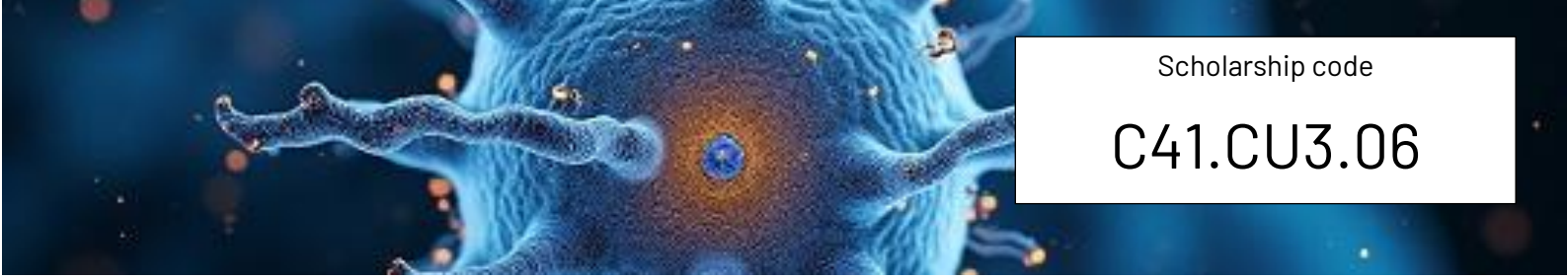
• Experience in protein purification through chromatographic and non-chromatographic methodologies (e.g., FPLC, TFF).

• Experience with modern analytic techniques (e.g., HPLC, SDS-page, ELISA, UV-Vis).

• Good knowledge of data analysis and editing Software (i.e., Excel, Word, Power point).

• Experience in performing literature searches using scientific databases (e.g., PubMed) and in applying the results to solve process challenges in the lab.

• Fluency in oral and written English.



Scholarship code

C41.CU3.06

CU3 – BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES

Targeting Autism in lysosomal storage Disorders: from bed to bench side

Reference Person: Elvira De Leonibus

(elvira.deleonibus@cnr.it)

Host University/Institute: Consiglio Nazionale delle Ricerche

Istituto di Biochimica e Biologia Cellulare (IBBC)

Location: Monterotondo (RM), Italy

Research Keywords: Lysosomal storage disorders

Drug-Repurposing

Neurobehavioral Dysfunctions

Reference ERCs: LS5_3 Neural development and related disorders

LS5_11 Neurological and neurodegenerative disorders

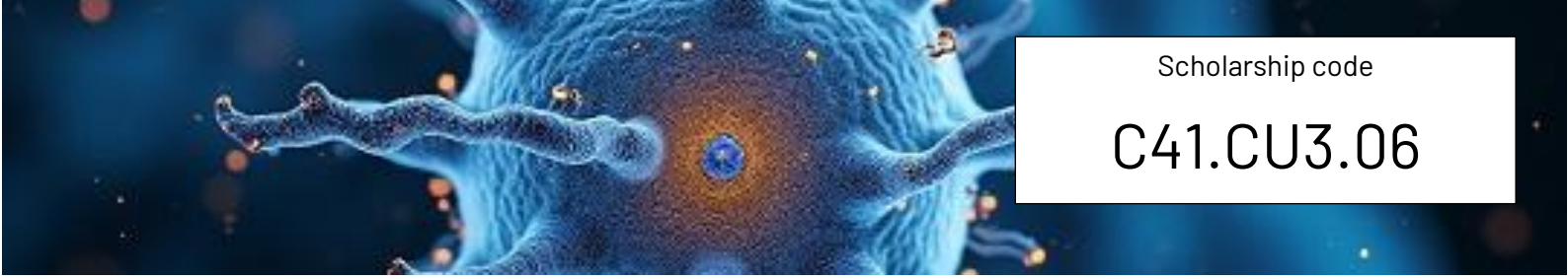
LS7_7 Pharmacology and toxicology

Available positions: 1

Description of the research topic

This PhD project explores the neurobiological basis of complex behavioral symptoms observed in rare pediatric disorders, with a focus on lysosomal dysfunction and its impact on neural circuits regulating motivation, cognition, and sleep. Neurodevelopmental disorders linked to lysosomal defects often present early-life behavioral disturbances such as hyperactivity, stereotypies, and profound sleep impairment, followed by progressive cognitive decline. The lack of effective treatments for these symptoms highlights the urgent need for targeted therapeutic approaches that go beyond the standard palliative care.

Recent evidence from animal models indicates that alterations in neurotransmitter signaling and disruptions in sleep–wake transitions may originate from developmental imbalances in specific brain circuits, independently of classical neurodegeneration. This project aims to dissect the contribution of these circuits in modulating rest-activity



rhythms and behavioral states and to repurpose FDA-approved treatments to improve the symptomatology and the disease progression. Advanced tools such as in vivo electrophysiology, optogenetics, and molecular profiling will be used to identify causal mechanisms and therapeutic targets.

In parallel, the student will help develop and validate an integrated preclinical platform designed for sustainable, high-throughput drug screening. This system will combine behavioral and physiological data from mouse models with automated analysis pipelines and machine learning to identify early biomarkers of disease and treatment efficacy.

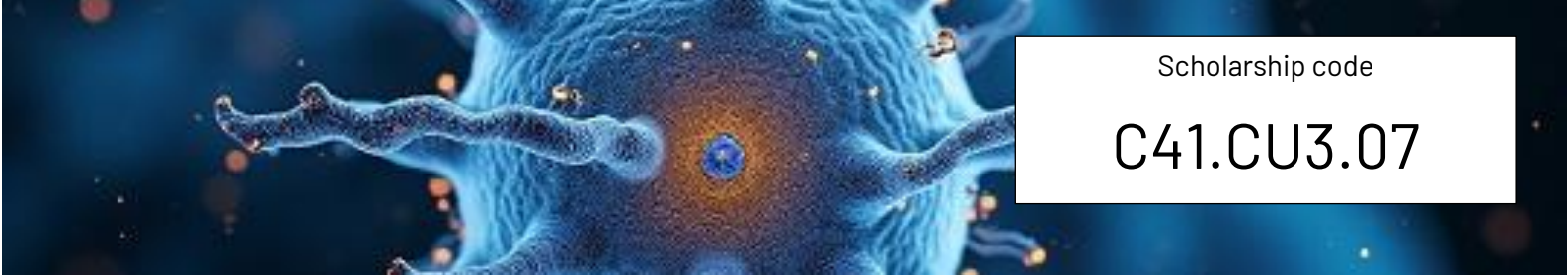
The project is positioned at the intersection of neuroscience, rare disease research, and translational medicine. It is embedded within an international collaborative framework and aligned with global efforts (e.g., IMPC and EMMA) to accelerate the development of personalized therapies. The PhD candidate will receive multidisciplinary training in behavioral neuroscience, neuropharmacology, data analysis, and in vivo modeling, preparing he/she for a career in academic or applied biomedical research.

Research team and environment

The PI is a Research Director at IBBC-CNR (Elvira De Leonibus – IBBC) with extensive experience in mentoring PhD students, postdocs, and early-career researchers (ORCID: 0000-0002-1871-2440). The team includes senior scientists and young researchers (e.g., Lattao, Marotta, D'Elia), fostering a dynamic, collaborative environment. The project is embedded in a translational neuroscience hub with strong links to the Mouse Clinic and the IMPC (https://www.mousephenotype.org), and benefits from new technological platforms for in vivo phenotyping and digital behavioral profiling. The PhD candidate will receive interdisciplinary training in neurobiology, pharmacology, data science, and preclinical research. IBBC is located in the Monterotondo Research Campus, which hosts the EMBL outstation (https://www.embl.org/about/info/embl-in-italy/) and offers a stimulating international scientific environment.

Suggested skills for this research topic

The ideal candidate holds a degree in biomedical sciences, preferably with a background in neurobiology, neuroscience, or related fields. A strong motivation to pursue experimental research, critical thinking skills, and the ability to work both independently and collaboratively within a team are essential. Prior experience with animal models, behavioral neuroscience, or neuropharmacology—whether through laboratory work or certified training courses—is considered an asset. The candidate should be open to interdisciplinary approaches and eager to develop new technical and analytical skills. Proficiency in English is required; no additional languages are necessary.



Scholarship code

C41.CU3.07

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES

Epidemiological studies in birth cohorts and in vitro/vivo models for non-communicable diseases

Reference Person: Gaspare Drago

(gaspare.drago@irib.cnr.it)

Host University/Institute: Consiglio Nazionale delle Ricerche

Istituto per la Ricerca e Innovazione Biomedica (CNR-IRIB)

Location: Palermo (PA), Italy

Research Keywords: Exposome

Birth cohort

Biomarkers

Reference ERCs: LS7_9 Public health and epidemiology

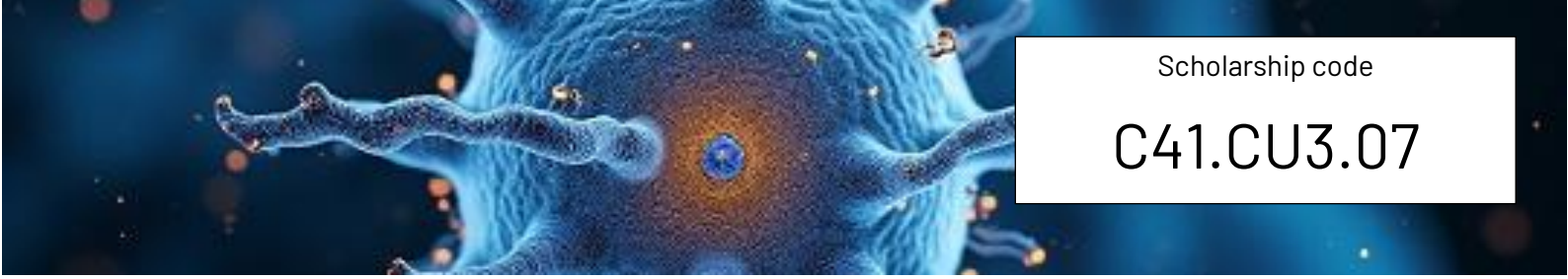
LS4_8 Impact of stress (including environmental stress) on physiology

LS7_2 Medical technologies and tools (including genetic tools and biomarkers) for prevention, diagnosis, monitoring and treatment of diseases

Available positions: 1

Description of the research topic

The relationship between environmental exposures and human health is one of the most critical issues in biomedical research. Growing evidence suggests that early life exposure to environmental hazards, along with the adoption of unhealthy lifestyles, may raise the risk for non-communicable diseases (NCDs) later in life. The complex interaction underlying the risk of chronic diseases – starting from intrauterine life – requires a greater knowledge of the events between environmental insults and the risk of future pathology. In this context, the concept of the exposome – defined as the totality of environmental exposures an individual experiences throughout his/her life, from conception onwards – has emerged as a key framework for understanding the environmental contribution to disease etiology. Birth cohort studies represent a valuable research model for investigating the impact of



Scholarship code

C41.CU3.07

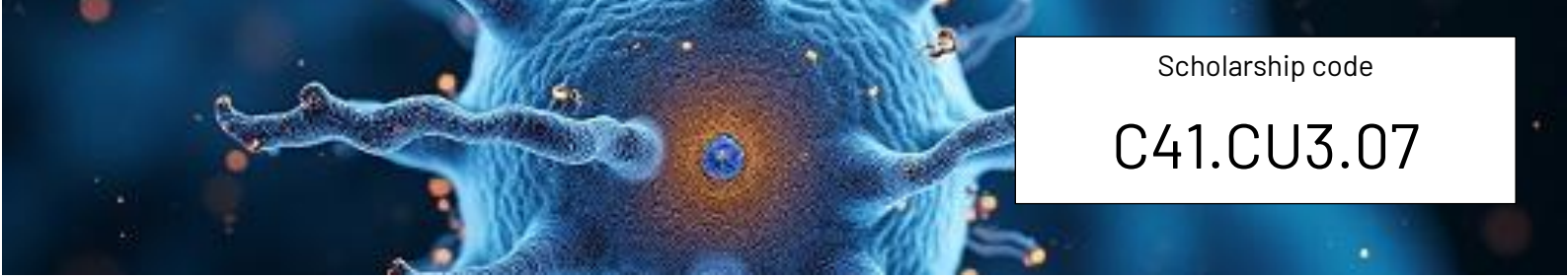
environmental factors over time. By following mother-child pairs from gestation through early life, these studies enable the identification of associations between early exposures and later health outcomes, including developmental and metabolic conditions. These cohorts often include extensive biological sample collections, clinical assessments, and detailed environmental exposure data, forming a solid foundation for studying the human exposome. In parallel, advances in omics technologies and experimental models are making it possible to explore the biological mechanisms underlying observed associations. The integration of longitudinal epidemiological and omics data – such as genomics, epigenomics, metabolomics, and proteomics – along with in vitro and in vivo models, enables researchers to move beyond correlation, toward understanding causal pathways and biological responses to environmental stressors. Exploring the interactions between environmental, biological, and behavioral factors – and their impact on human health – through experimental models and advanced techniques enables the validation of epidemiological data, the elucidation of pathogenic mechanisms, and the identification of clinically relevant biomarkers. This integrative approach has broad practical implications: it can inform early risk assessment, guide the discovery of predictive biomarkers for chronic diseases, support evidence-based regulatory decisions on environmental contaminants, and foster the development of targeted prevention strategies and personalized interventions.

Research team and environment

The PhD project will be carried out at IRIB-CNR (Institute for Biomedical Research and Innovation) in Palermo, within a multidisciplinary team including the Environmental Epidemiology and Molecular Immunology groups. The epidemiology group has solid expertise in longitudinal studies on environmental and lifestyle risk factors affecting maternal and child health. Since 2018, it coordinates the neonatal environment and health outcomes (NEHO) birth cohort, investigating maternal exposure to pollutants, circulating microRNA alterations, and children's growth trajectories. The Molecular Immunology group conducts in vitro and in vivo studies on pollutant-induced innate immune modulation and cell signaling. In collaboration with the epidemiology group, it contributes to identifying early biomarkers and elucidating molecular mechanisms linking environmental exposures to chronic disease risk.

Suggested skills for this research topic

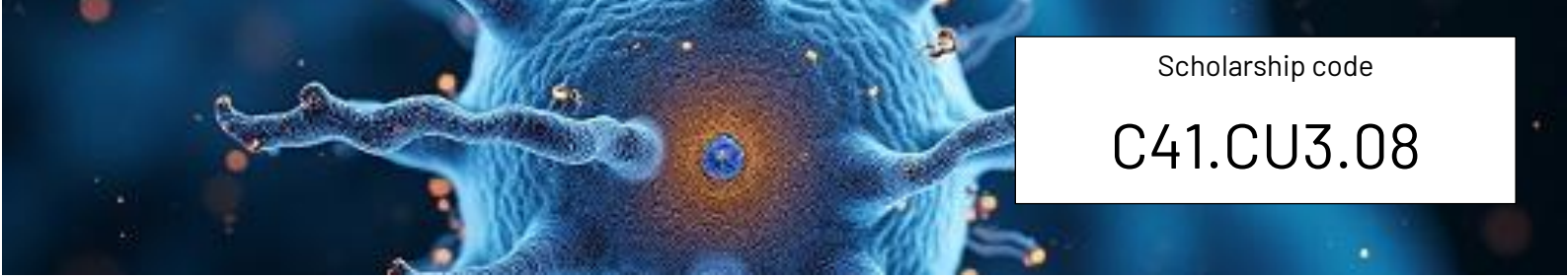
The ideal candidate holds a Master's degree in biology, biotechnology, or related disciplines, including medicine. Experience in data analysis, basic laboratory techniques, handling of biological samples, as well as familiarity with bioinformatics tools and multi-omics data analysis, may represent preferential qualifications, as they are relevant to the activities required for the position. An interest in interdisciplinary research combining molecular and epidemiological approaches is important. The ability to work in a team and manage tasks independently is desirable. Proficiency in English (spoken and written) is required for



Scholarship code

C41.CU3.07

communication and publication. Knowledge of Italian is not mandatory but may be helpful for integration and fieldwork.



Scholarship code

C41.CU3.08

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES

Vaccines for Cancer & Infection using mRNA Tech, ExtraVesicles, and Microbiota-Driven Innate Memory

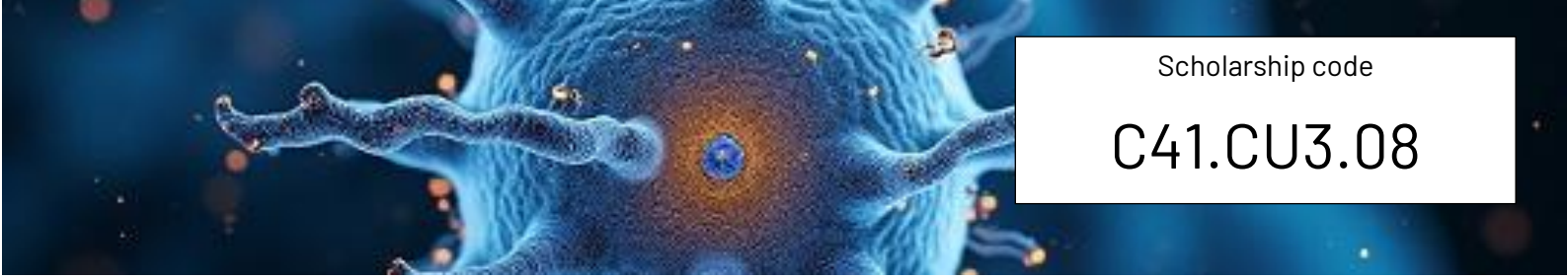
Reference Person:	Paola Italiani
	(paola.italiani@cnr.it)
Host University/Institute:	Consiglio Nazionale delle Ricerche
	Istituto di Biochimica e Biologia Cellulare (IBBC)
Location:	Naples, Italy

Research Keywords:	Immunotherapy based on innate immune cells
	Innate Immune Memory
	Advances in vaccinology against cancer/infection
Reference ERCs:	LS6_1 Innate immunity
	LS6_11 Innovative immunological tools and approaches, including therapies
	LS6_10 Vaccine development

Available positions: 1

Description of the research topic

The PhD candidate will be engaged in three research activities, all designed to generate novel insights for the development of advanced vaccines targeting cancer and infectious diseases. The project aims to develop personalized vaccines based either on idiotype mRNA-modified Dendritic Cells or on lipid nanoparticles carrying patient-specific idiotypic mRNA, as novel therapeutic strategies to improve treatment of B-cell lymphomas and Chronic Lymphocytic Leukemias. The candidate will be involved in all phases of vaccines' development, with a focus on determining their interaction with monocytes and monocyte-derived macrophages (MDM). This interaction will be assessed as to inflammation, MDM polarization, and triggering of Innate Immune Memory (IMM). Known molecular mechanisms and new regulatory ones will be investigated and identified.



Scholarship code

C41.CU3.08

The study will then be extended to evaluate these mechanisms upon stimulation with BCG (Bacillus Calmette-Guérin) vaccine or infection with Mycobacterium tuberculosis (Mtb). The communication between innate immune cells and BCG or Mtb via Mycobacterial extracellular vesicles (MEVs) and Macrophage-derived extracellular vesicles (MDEVs) will be investigated. By exploring composition and immunomodulatory effects of EVs, the study aims to: identify immunomodulatory molecules within MEVs that may contribute to immune evasion or manipulation; determine host-derived cargo from MDEVs that could act as antimicrobial or bacterial-physiology modulators; provide foundational data supporting the development of EV-based immunotherapies or vaccine adjuvants.

The IIM involvement serves as a "trait d'union" for a third pivotal player in anti-tumor and infection immunity: the microbiota. The candidate will investigate how the microbiota and its modulation influence IIM induction in DCs and MDM, clarifying its role in cancer control, infection resistance, and vaccine efficacy. The candidate will study ex-vivo the IIM in DCs and MDM isolated from cancer patients or BCG-vaccinated individuals, exposed to selected microbiota bacteria. The goal is to identify specific microbial strains—or personalized combinations—that can act as IIM inducers promoting a functional phenotype optimized against cancer and infections. This study could lay the groundwork for addressing key open questions: What is the impact of the microbiota on IIM? How can we leverage microbiota-induced IIM mechanisms to improve cancer prognosis and/or infectious disease outcomes?

Research team and environment

The research team of Laboratory of Innate Immunity, Inflammation and Nanoimmunosafety at CNR-IBBC headed by Dr Paola Italiani has a twenty years' experience in immunology (especially in innate immunity and inflammation), in comparative immunology, in molecular and cell biology, pharmaco-toxicology, and nanosafety, in project management in academy and in collaboration with industry, and in higher education and training.

Chemists from IRIB-CNR (Italy) and Immunologists from Shenzhen Institute of Advances Technologies (Cina) and from Butantan Institute, Vaccine Development Laboratory (Brasile) will be involved in the research team as external collaborators.

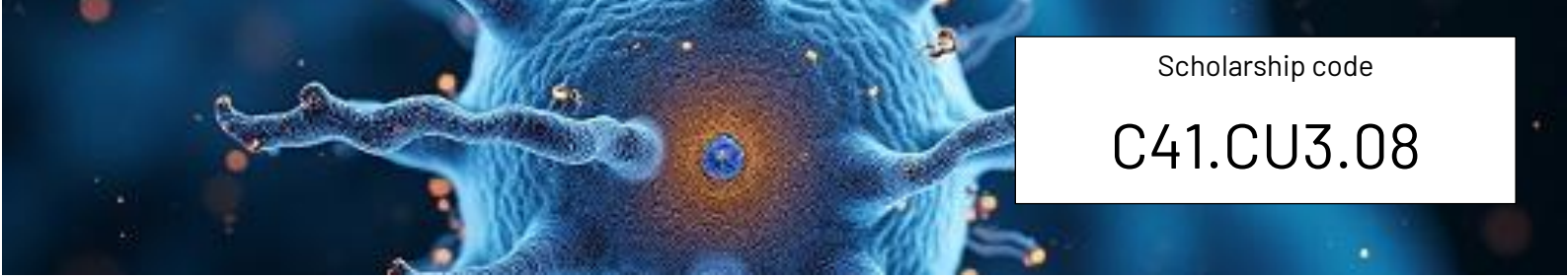
The team can count on well-equipped laboratory (e.g., real-time PCR, ELLA, Bioanalyser) and cell culture room, and on the access to FACS facility, CyTOF facility, Advanced Microscopy facility (Euro-bioimaging).

Teams' webpage:

http://www.ibbc.cnr.it/research-applications/innate-immunity-and-inflammation/

Suggested skills for this research topic

We are seeking a highly motivated and enthusiastic PhD candidate to join our dynamic and multidisciplinary research team dedicated to advance our understanding in the field of Immunology. Ideal candidate should have the following background and skills:



Scholarship code

C41.CU3.08

• Strong academic background in Immunology, Molecular Biology, or related biomedical sciences

• Practical prior experience with key laboratory techniques (e.g., PCR, ELISA, Western blotting, flow cytometry, etc.) or human primary cell/line cell culture will be considered an asset;

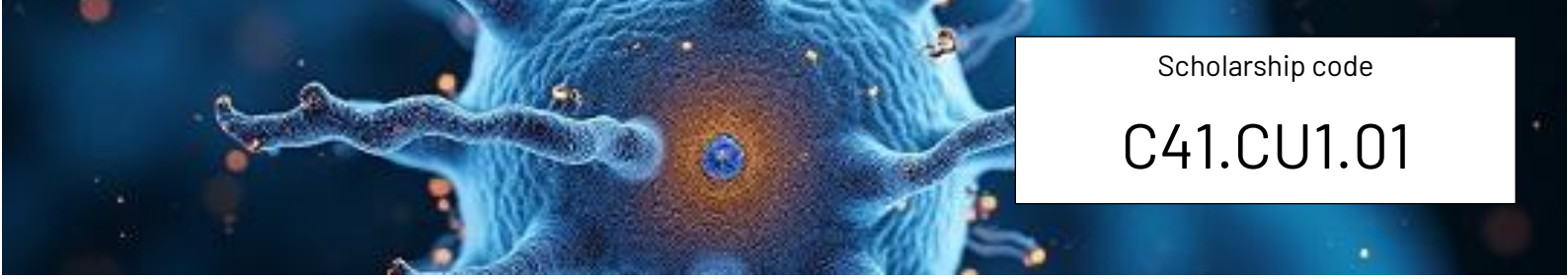
• High level of motivation, curiosity and critical thinking skills:

• Willingness and ability to learn new techniques and work across disciplines;

• Excellent communication and teamwork skills;

• Availability for research internships abroad, as part of international collaborations and training programs;

• Fluent written and spoken English proficiency; no additional languages are necessary.



Scholarship code

C41.CU1.01

CU3 - BIOMOLECULAR AND BIOTECHNOLOGICAL SCIENCES

Macromolecules of Biotechnological and Pharmaceutical Interest

Reference Person:	Federico Forneris
	(federico.forneris@unipv.it)
Host University/Institute:	Università degli studi di Pavia
	Dipartimenti vari
Location:	Pavia, Italy
Research Keywords:	Biological macromolecules
	Pharmaceutics and biocatalysis
	Life science research
Reference ERCs:	LS1_4 Protein biology
	PE5_17 Organic chemistry
	LS7_7 Pharmacology and toxicology
Available positions:	3

Description of the research topic

The main topic of this PhD fellowship can be related to one of the basic research subjects addressed in the Biomolecular Sciences and Biotechnologies curriculum. Depending on the choice of research supervisor (which will be done by the selected PhD fellow) topics will include:

Structural enzymology (Prof. A. Mattevi, http://www-9.unipv.it/biocry/)

Structure-function studies of extracellular protein ensembles (Prof. F. Forneris, https://fornerislab.unipv.it/)

Bio-inorganic chemistry (Prof. E. Monzani, https://chimica.dip.unipv.it/en/research/research-teams-and-topics/inorganic-chemistry/bioinorganic-chemistry)

Biocatalysis (Prof. D. Ubiali, https://scienzedelfarmaco.dip.unipv.it/en/research/our-people-and-divisions/medicinal-chemistry/biocatalysis-laboratory),

Pharmaceutical technology (Prof. B. Conti, https://scienzedelfarmaco.dip.unipv.it/en/research/research-areas/pharmaceutical-technology/pharmaceutical-technology-law-ptl),

Molecular basis of heritable skeletal disorders (Prof. A. Rossi, https://medicinamolecolare.dip.unipv.it/en/research/research-teams-and-topics/biochemistry/molecular-basis-osteochondrodysplasias-antonio),

Neuropharmacology (Prof. C. Lanni, https://scienzedelfarmaco.dip.unipv.it/en/research/our-people-and-divisions/pharmacology/biology-and-pharmacology-aging-inflammatory),

Molecular ematology (Prof. M. Torti, https://dbb.dip.unipv.it/en/research/research-teams-and-topics/cellular-biology-and-biochemistry-vascular-system/platelet),

Molecular microbiology (Prof. S. Buroni, https://dbb.dip.unipv.it/en/research/research-teams-and-topics/molecular-microbiology/molecular-microbiology-laboratory),

Pharmaceutical analysis (Prof. E. De Lorenzi, https://scienzedelfarmaco.dip.unipv.it/en/research/our-people-and-divisions/medicinal-chemistry/organic-chemistry-pharmaceutical-and),

Molecular biology and gene therapy (Prof. A.K. Kajaste-Rudnitski, https://dbb.dip.unipv.it/en/research/research-teams-and-topics/molecular-mechanisms-innate-immunity-and-nucleic-acid-sensing-0).

Candidates are invited to get in touch with potential supervisors to further discuss possible research projects.

Research team and environment

Research activities will be carried out in one of the supervisor's laboratories of the University of Pavia. Details are provided in the websites of the different departments:

Department of Biology and Biotechnology (Profs. Mattevi, Forneris, Torti, Buroni, Kajaste-Rudnitski): https://dbb.dip.unipv.it/en/research

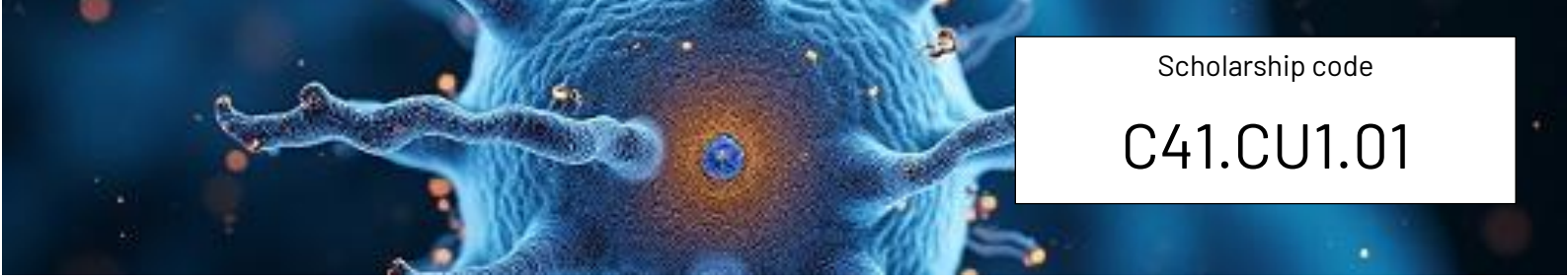
Department of Chemistry (Prof. Monzani): https://chimica.dip.unipv.it/en/research

Department of Drug Sciences: https://scienzedelfarmaco.dip.unipv.it/en/research

Department of Molecular Medicine: https://medicinamolecolare.dip.unipv.it/en/research

Suggested skills for this research topic

Prospective candidates will be selected based on their previous theoretical and practical experiences related to the research activities carried out in the prospective supervisor's host laboratories. Typically, successful candidates hold an M.S. in disciplines such as Biology, Biotechnology, Chemistry, Pharmacy, Physics, Bioinformatics, Biomedical



Scholarship code

C41.CU1.01

Engineering and had opportunities for practical laboratory training during internship activities lasting at least 6 months. Evidence of international mobility during previous training will be considered. Candidates must be able to understand and sustain scientific conversations in English.

Educational Programme

41st Cycle

Academic Years 2025/2026

General information for the PhD course

The National PhD in Science and Technology for Advanced Therapies (STAT) aims to train professionals with interdisciplinary skills, capable of integrating basic research, technological development, and clinical application. The program aims to provide a multidisciplinary training path that combines scientific, technological, methodological, and regulatory aspects.

The Scuola Universitaria Superiore IUSS di Pavia, Fondazione Telethon, University of Pavia, and Fondazione CNAO collaborate to create a stimulating environment to address the challenges of advanced therapies, with particular attention to gene and cell therapies, advanced physical therapies including Hadron therapy and biotechnologies applied in the biomedical field.

The course prepares researchers and professionals able to operate in highly interdisciplinary contexts, developing a common language between experts from different areas, including medicine, biology, engineering, physics, economics, and law. The proposed research projects will address complex issues, focusing on biomolecular sciences, gene therapies, hadron therapy, and physical therapies, involving candidates from the biomedical, technological, and socio-economic-legal sectors.

In addition to specialist training, the program addresses cross-cutting aspects related to innovation in medicine, including technological risks, ethical and legal implications, and possible paths for the transfer of technologies from the laboratory to the market.

The present initiative and the design of a unique inter-university, multi-disciplinary doctoral course considers all of these aspects.

The PhD program is structured in **three distinct curricula**:

- **Curriculum 1:** Hadron therapy and advanced biophysical therapies.
- **Curriculum 2:** Gene and cell therapies.
- **Curriculum 3:** Biomolecular and Biotechnological sciences.

PhD students will benefit from the opportunity to access cutting-edge laboratories in partner institutions and companies involved in the project; internships and industrial collaborations, facilitating entry into the world of work; cross-cutting modules on regulation, ethics, and technology transfer, to address the scientific and social challenges of emerging therapies.

The PhD degree course aims to equip candidates with in-depth knowledge and technical expertise in their chosen specialty, and high-level, cross-disciplinary and robust education in disciplines that are common to all 3 curricula.

The objective is to give all candidates the opportunity to choose among the expertise available in the Italian universities and research centers involved in the project and to work in inter-disciplinary teams on 'hot topics' related to advanced therapies. Students will be able to design their education programmes in terms of the courses and topics studied, to learn how to solve problems from different angles, and how to engage in effective discussion with experts in other domains.

During the PhD-STAT multi-disciplinary events, candidates will work in inter-disciplinary teams on key aspects of the complex problems related to human health. They will be asked to propose effective solutions that take into consideration not only the purely technical aspects of their respective disciplines but also the socio-economical-ethical implication related to the application of advanced technologies in biomedicine.

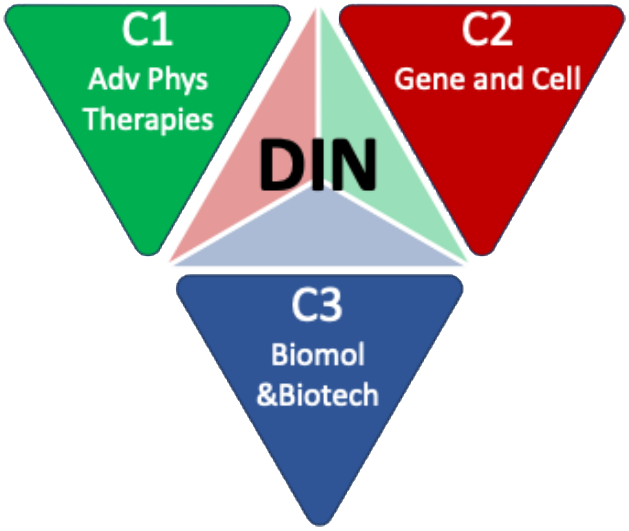


Figure 1 – The 3 curricula offered by the PhD course in Science and Technologies in Advanced Therapies

Programme structure

The PhD program is structured in **three distinct curricula**:

- **Curriculum 1:** Hadron therapy and advanced biophysical therapies.
- **Curriculum 2:** Gene and cell therapies.
- **Curriculum 3:** Biomolecular and Biotechnological sciences.

PhD students will benefit from the opportunity to access cutting-edge laboratories in partner institutions and companies involved in the project; internships and industrial collaborations, facilitating entry into the world of work; cross-cutting modules on regulation, ethics, and technology transfer, to address the scientific and social challenges of emerging therapies.

It is expected that the PhD-STAT community will 30+ PhD candidates enrolled in the supporting universities, along with their academic supervisors and the even more numerous individuals involved in delivering the lectures and training. We expect the community to meet together for around 2 weeks annually to discuss and work together on topics of common interest.

Candidates will be assigned to scholarship in one of the areas within the three curricula. Candidates will be enrolled in the universities/laboratories offering the relevant specializations and will follow an education roadmap that include activities at three levels:

- the multi-disciplinary PhD level;

- the multi-disciplinary level of the student's particular curriculum;
- a more focused level related to the particular disciplinary area.

The students' work will focus mainly on the focal discipline, although we expect some 50% of the training and around 20% of the time will be devoted to study in other disciplines.

To guarantee a multi-disciplinary and inter-university education experience, students will participate in three types of educational events (including seminars, courses, workshops):

- multi-disciplinary (MD) events, which will include all the PhD STAT candidates;
- Curriculum (CU) events, which will include all PhD candidates following that particular curriculum;
- focused (mostly single-discipline) (FD) events, to be agreed with supervisors and which will mostly be held at the universities where students are enrolled.

Table 1 summarizes the minimum hours devoted to MD, CU and FD events. Table 2 present an example of the structure of MD workshops.

Apart from the final year multi-disciplinary workshop, all educational events will take place during the first 18 months of the PhD course, leaving the final 18 months for the doctoral research project.

Event		Organizer	Minimum Number of hours
(MD) Multi-disciplinary events	MD-Workshop 1 (year 1)	PhD board	60 hours
	MD-Workshop 2 (year 3)		
(CU) Curriculum events	CU-Seasonal School (year 1)	Curriculum board	60 hours
	CU-Workshop (year 2)		
(FD) Focused and mostly single-disciplinary events	Thematic courses	Supervisors	40 hours
Total			Minimum 160 hours over 3 years

Table 1. PhD-STAT education events at the three levels: multi-disciplinary, curriculum, and focused and mostly single-disciplinary and minimum number of hours

Multi-Disciplinary Events (MD)

Cross-cutting modules will be offered on risks, regulation, ethical impacts of advanced technologies in medicine, and technology transfer pathways

These courses will be delivered during the second year of the PhD course. In addition to these modules, a couple (one per year) of general multidisciplinary events will be organized to gather together all PhD students (of all the 3 curricula) in workshops including talks from experts in the field of advanced therapies.

Curriculum events (CU)

The CU-events will include content and formats related to the relevant curriculum and will provide a broad overview of the curriculum research topics. The CU-events will be organized in two sessions:

- year-1 CU Seasonal School (CU-SS) will be held in the first year of the PhD and will provide an opportunity for the PhD candidates to attend topical lectures on some of the themes related to their work;
- at the end of each year, the PhD students of each curriculum will have the opportunity to present their activity in front of experts in the field and to share their respective experiences with their peers.

Focused and disciplinary events (FD)

These refer mostly to single-theme and single-disciplinary courses.

FD-events will be defined by the PhD students with their supervisors.

Supporting inclusion and diversity

Inclusion and diversity are fundamental values required for education and scientific excellence. Scholars with diverse talents, backgrounds and perspectives will contribute insights and innovative approaches to tackle difficult scientific problems and societal challenges. Everyone involved in this PhD Program will promote and support inclusion and diversity, and foster an environment where the brightest, most creative minds from every segment of society and every part of the globe can achieve their full academic and professional potential.

PhD program language

All PhD candidates are expected to have a good knowledge of the English language. Note that all MU and CU events and most FD events will be conducted in English. The PhD thesis can be in Italian or English.

CU1. Hadron Therapy and Advanced Biophysical Therapies.

Education aims and method

The education plan for this curriculum exploits the diverse and multidisciplinary expertise of the research theme supervisors. The aim is to train the PhD candidates to deal with the complexity of advanced technologies applied to Biomedicine with a particular focus (but not limited to) Hadron therapy that represents a challenging, multidisciplinary field holding promises for future personalized medical approaches. .

Approach

Given the complexity of the topic, candidates are expected to develop, during their PhD, the ability to engage with experts from other disciplinary fields to address the complex challenges related to the development of innovative technologies for biomedicine.

Teaching methods

The modules will include two-hour lectures focusing on different areas of hadron therapy and technological approaches to medicine; they will provide general background information targeted at non-experts and also will explore certain questions, specific to the curriculum areas, in great depth. The curriculum lectures will be mostly face to face. The training module will foster interaction and collaboration among all participants, from lecturers to students, for building a common core of advanced knowledge.

CU teaching modules

- Radiotherapy (20 hours)
- Radiobiology (30 hours)
- Medical Physics (30 hours)
- Bioengineering (30 hours)
- Biomedical Sensors (30 hours)
- Introduction to Accelerator Physics (30 hours)
- Radiation Protection (20 hours)
- Risk (30 hours)

FD teaching courses

The specific training activities will be tailored to each candidate based on their backgrounds. The courses will be chosen from among the range of courses being offered by all the universities contributing to the curriculum and will include both general and specialized and methodological courses.

Candidates will have the option to customize their training with other specialist seminar activities of the curriculum offered by the experts coming from all Universities and Research Centers participating to the Programme.

CU2. Gene and cell therapies

Education aims and method

The overarching goal of this education plan is to train highly specialized researchers in the design, development, and clinical application of innovative therapies based on genetic technologies.

Approach

PhD candidates are expected to cultivate robust methodological skills, encompassing both quantitative and qualitative approaches, to tackle the scientific and clinical challenges of the future. Emphasis will be placed on the advancement of innovative therapies grounded in genetic technologies, necessitating a profound comprehension of genetics, molecular biology, and precision medicine. Proficiency in utilizing cutting-edge genetic manipulation techniques, such as CRISPR-Cas9, TALENs, and ZFNs, is deemed essential. Furthermore, a thorough understanding of the interplay between gene therapies and the immune system, alongside the ethical considerations and regulatory frameworks governing these therapies, will be crucial

Teaching methods

Teaching methods will include traditional and interactive lectures combined with individual and team activities, including laboratory-oriented activities and group data analysis.

CU teaching modules

Bioinformatics Resources (25 hours)
◦
From the discovery of Tumor-Targeting Ligands to the development of Drugs (16 hours)
◦
Biomolecular methodologies, biomolecular, cellular and pharmacological methods (100 hours)

FD teaching courses

The specific training activities will be tailored to each candidate based on their backgrounds. The courses will be chosen from among the range of courses being offered by all the universities contributing to the curriculum and will include both general and specialized and methodological courses.
Candidates will have the option to customize their training with other specialist seminar activities of the curriculum offered by the experts coming from all Universities and Research Centers participating to the Programme

CU3. Biomolecular and Biotechnological Sciences

Education aims and method

The training in this curriculum is aimed at integrating fundamental disciplines such as structural biology, bioinorganic and pharmaceutical chemistry, biocatalysis, molecular microbiology, neuropharmacology, and molecular hematology in CU teaching modules

Approach

PhD candidates are expected to develop a strong foundation in experimental laboratory research. The emphasis will be on basic sciences such as protein structure and engineering, and on research with industrial interest including work on enzymes and transgenic plants, and research with medical interest related to genes that cause disease, and on drugs with an emphasis on oncological themes and those linked to neurodegeneration.

Teaching methods

Teaching methods will include traditional and interactive lectures combined with individual and team activities, including laboratory-oriented activities and group data analysis.

CU teaching modules

Bioinformatics Resources (25 hours)
From the discovery of Tumor-Targeting Ligands to the development of Drugs (16 hours)
Biomolecular methodologies, biomolecular, cellular and pharmacological methods (100 hours)

FD teaching courses

The specific training activities will be tailored to each candidate based on their backgrounds. The courses will be chosen from among the range of courses being offered by all the universities contributing to the curriculum and will include both general and specialized and methodological courses.

Candidates will have the option to customize their training with other specialist seminar activities of the curriculum offered by the experts coming from all Universities and Research Centers participating to the Programme.