Network for Cross-disciplinary assessment of Endocrine Disrupting compounds
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Doctoral candidate 10:

Novel approaches to assess the impact of EDCs in the adult nervous system

Host Institution	Università degli Studi di Milano, Italy
PhD enrolment	Department of Pharmacological and Biomolecular Sciences "Rodolfo Paoletti", Università degli Studi di Milano, Italy
Lead Supervisor	Barbara Viviani, Laboratory of Toxicology and Risk Assessment, Neurotoxicity Unit
Subject area	Neurotoxicology, New Approach Methodologies, Adverse Outcome Patways

About this vacancy

NeXED is a Marie Skłodowska-Curie Actions (MSCA) Doctoral Network, funded by the European Union. NeXED will in total recruit 15 enthusiastic, talented and driven Doctoral Candidates (DCs) who are highly motivated to be part of a new generation of cross-disciplinary toxicologists specialised in using harmonised approaches in a One Health framework to develop and support the implementation of innovations in the field of endocrine disruptor assessment. This vacancy is one of those 15 opportunities. Make sure to also read the general eligibility and selection criteria!

Host institution and research group

The Università degli Studi di Milano (UMIL; https://www.unimi.it/en), is the only Italian member of the League of European Research Universities (LERU). The University of Milan offers several study programmes covering three macro-disciplinary areas: i) Humanities, Social Sciences and Law, ii) Medicine and Healthcare, iii) Natural Sciences. UMIL is one of Italy's leading universities in terms of investment in research infrastructure and human capital: two essential elements for meeting the complex challenges of knowledge in a rapidly changing social and industrial context.

As a public institution dedicated to the development and progress of knowledge, the University has always been committed to research projects that have an impact on the quality of life of citizens. Research at the University of Milan is mainly carried out in the Faculties and in the many specialised structures (Departments, Research Centers and Core facilities), favouring the creation and growth of collaborative networks at local, national and international levels.

Scientific activity involves the entire academic community, from professors, researchers, doctoral students, scholars and fellows to undergraduates.

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This DC position will be hosted by Laboratory of Toxicology and Risk Assessment, Neurotoxicity Unit, Department of Pharmacological and Biomolecular Sciences "Rodolfo Paoletti" (https://www.unimi.it/en/university/offices-and-facilities/departments).

The **Department of Pharmacological and Biomolecular Sciences** (DiSFeB) brings together research groups to promote multidisciplinary research in drug discovery and related basic and applied sciences and is fully equipped to develop and conduct in vitro research. DiSFeB is the promoter of the Centre of Research on Novel Approach Methodologies (NAMs) in Chemical Risk Assessment (SAFE-MI). The Centre aims to provide international visibility as a reference point for the promotion of NAMs to support chemical risk assessment based on mechanistic reasoning (e.g. Adverse Outcome Pathway (AOP), Integrated Approaches for Testing and Assessment (IATA)). DiSFeB is involved in chemical risk assessment methodologies and regulatory processes in collaboration with EFSA (CONTAM and PPR Panel), OECD, Italian Ministry of Health, Malta Competition and Consumer Affairs Authority, Scientific Committee on Consumer Safety (SCCS).

The main scientific interest of the **Toxicology and Risk Assessment Laboratory** is the study of how toxic substances work at the molecular level and its relevance to human risk assessment. The activity focuses on hazard characterisation, i.e. the assessment of adverse effects associated with biological, chemical and physical agents. This involves identifying and characterising the biochemical mechanisms involved in cell responses to toxic agents and exploring the molecular pathways involved in damage initiation and maintenance. The laboratory has developed several areas of interest: alternative methods, immunotoxicology, neurotoxicology and genotoxicity.

The Neurotoxicology Unit studies:

- The mechanisms of glial activation, neuronal death and glial-neuronal communication
- The regulation of synaptic plasticity under conditions of toxicity induced by environmental pollutants.

It focuses on:

- New Approach Methodologies (NAM): in vitro methods to study neurotoxicity based on neurons differentiated from human induced pluripotent stem cells and rodent primary neuronal cells.
- Development of Adverse Outcome Pathways (AOPs): analytical models that allow the identification of a sequence of key events required to produce a toxic effect and that inform the development of NAMs.

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The laboratory is fully equipped for cell cultures, biochemistry and molecular biology experiments. As part of DiSFeB the laboratory has access to UNITECH, the core facilities to support university researchers with state-of-the-art equipment and high level multidisciplinary technical support and services. NOLIMITS (Transmitted and Fluorescent Optical Microscopy and Electron Microscopy), OMICS (Proteomic, Lipidomic and Metabolomic studies) and INDACO (Computing infrastructure for complex data analysis) are particularly relevant to support the current project.

The research project

Project Title- Novel Approaches to Assess the Impact of Endocrine Disruptor Chemicals (EDCs) in the Adult Nervous System

Project Overview -This project aims to identify novel endpoints sensitive to endocrine disruption (ED) in the adult nervous system and to develop assays by focusing on mechanisms of ED in relation to neurocognitive conditions.

Objectives

1. **Mechanistic Understanding of ED:** Investigate the disruption of retinoid signaling pathways and their interactions with other nuclear receptors (CAR, PXR, PPARs, LXR, THR) and estrogen receptors (ERα, ERβ) in vertebrate models (adult human- and rat-derived neuronal/glial cell).
2. **Comparative Analysis Across Species:** In collaboration with other partners assess heterodimeric signaling cascades (e.g., RXR-TR) in vertebrates and compare with invertebrates to identify commonalities in endocrine signaling and neurotoxic effects.
3. **Development of Adverse Outcome Pathways (AOPs):** The experimental approach and the identification of the most relevant endpoints will be supported by the development of cross-species retinoid system-relevant AOPs which will integrate the data obtained in the project in an iterative process to define their taxonomic applicability.
4. **Advancing Regulatory Approaches:** Incorporate non-EATS modalities into Integrated Approaches to Testing and Assessment (IATAs) and regulatory case studies, ensuring a broader perspective on endocrine disruption.

By addressing critical knowledge gaps in ED assessment, this project will contribute to a more comprehensive understanding of how endocrine disruptors affect the adult nervous system, ultimately informing improved regulatory and environmental protection strategies.

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Your tasks

The Doctoral Candidate will

- Enrol in the PhD in **Pharmacological Biomolecular Sciences, Experimental and Clinical** and comply with the doctoral training requirements
- Write **project reports** on a regular basis, and **publish** high-quality research results related to the research project in international conference proceedings and peer-reviewed scientific journals
- **Participate actively** in the NeXED training, dissemination, communication and exploitation activities
- Work actively on the preparation and defence of a **doctoral thesis** in the field of Neurotoxicology

Secondments

The following research stays are planned:

- Intersectoral secondment: Kristina Bartman (2 months) at DNTOX GmbH (Germany)
- Interdisciplinary secondment: Lucia Vergauwen (2 months) at Universiteit Antwerpen (Belgium)
- Intersectoral secondment: Tanima Sengupta (3 months) at Stifelsen NILU (Norway)

What we offer

- The selected candidate will be employed full-time by **Università degli Studi di Milano, Department of Pharmacological and Biomolecular Sciences** on the MSCA-DN project for a period of **36 months**
- Doctoral candidates are offered a contract, with a **competitive remuneration** based on the MSCA allowances in line with the MSCA WP 2023-2025
- The selected candidates will be hired full-time and with a fixed-term contract governed by the Italian labor legislation in force at the time of hiring, by the regulations of the University of Milan and by the rules of the Marie Skłodowska-Curie actions
- **The gross salary before taxes and fees** will be €3,911/month (covering living and mobility allowances) plus family allowance (660€/month) if applicable
- The **expected start date** is between June - December 2025. Last-year master students expected to graduate by this time are encouraged to already apply.
- Read more about working at **Università degli Studi di Milano** here

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Specific requirements

In addition to the general eligibility and selection criteria of the NeXED Doctoral Network,

- Admission to the programme is open to applicants who hold a 2nd Level Master's Degree (120 ECTS + 180 ECTS in a bachelor's degree) or a Single Cycle Degree (minimum 300 ECTS), or a comparable university degree (Second Cycle qualification
- The suitability of the foreign academic qualifications in terms of content is evaluated by the Admission Committee of each doctoral programme, in compliance with the regulations in force in Italy and in the country in which the academic qualification was issued, and with the international treaties or agreements on the recognition of qualifications for the continuation of studies
- Applicants who have not yet obtained their second-cycle degree may also apply, but they are required to earn the second-cycle degree by the programme starting date
- Highly motivated and science-driven person holding a master's degree or equivalent in Life Sciences or related disciplines. A background in neuroscience or related areas of biology (e.g., neurobiology, molecular biology), toxicology, endocrinology and experience matured in the preparation and maintenance of primary cell cultures is an added value
- Applicant to UMIL positions must hold an English language certificate from one of the certifying bodies recognised by the University (see https://www.unimi.it/en/study/language-proficiency/placement-tests-and-englishcourses/accepted-language-certificates) **at B2 level or above** of the Common European Framework of Reference for Languages (CEFR).

Please ensure you hold all the eligibility criteria (those set by the EU programme and those set by the NEXED consortium) before applying since ineligible candidates cannot be considered.

Application procedure

Applications can be submitted through the NeXED online job application platform (https://www.uantwerpen.be/en/projects/nexed/job-openings/apply/).

Deadline for applications: April 21, 2025, 23:59 CET. More information about the application procedure for NeXED PhD positions can be found here.

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Contact

For additional information about this vacancy, please contact Barbara Viviani (barbara.viviani@unimi.it).

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