



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Terapia Del Dolore E Cure Palliative Pediatriche / Pediatric Pain Treatment And Palliative Care

2627-122R-22

Title

Pediatric Pain Treatment and Palliative Care: A Translational Neuroscience Approach

Teacher(s)

Prof. Pablo Mauricio Ingelmo
Dr. Marta Adavastro
Dr. Marta Somaini
Dr. Fausto Giuliana

Language

English (Available in Italian and spanish uppon request)

Short description

Recent advances in neuroscience have transformed our understanding of pain, symptom burden, and chronic complex conditions across the pediatric lifespan. Pediatric Pain Medicine and Pediatric Palliative Care represent unique models for studying the interactions between nervous system development, neuroimmune mechanisms,

inflammation, genetics, psychosocial factors, and brain plasticity.

This interdisciplinary course is designed for PhD students in Neuroscience from diverse backgrounds, including physicians, psychologists, nurses, rehabilitation professionals, and basic and translational scientists. The course provides an overview of Pediatric Pain Medicine and Pediatric Palliative Care as paradigms of translational neuroscience, emphasizing the continuous exchange between laboratory research, clinical practice, and healthcare innovation.

A central concept of the course is bidirectional (inverse) translational research, where clinical observations generate new scientific questions for experimental investigation, while advances in molecular neuroscience, neuroimmunology, genetics, psychology, engineering, and data science contribute to the development of innovative diagnostic and therapeutic strategies.

Rather than focusing on diseases, the course adopts a mechanism-based and person-centered approach, recognizing that many acute and chronic pediatric pain conditions share common biological pathways, symptom phenotypes, and therapeutic targets. Pain and symptom burden will be explored across the pediatric lifespan, from neonates to young adults, integrating developmental neuroscience with precision medicine.

The course is organized into four interconnected modules:

1. From molecular mechanisms to pain phenotypes: neurodevelopment, neuroimmune interactions, inflammation, sensitization, biomarkers, and precision medicine.
2. From nociception to pain experience: multidimensional pain assessment, psychosocial determinants, pain phenotyping, and integration of biological and behavioral mechanisms.
3. Clinical models of pediatric pain and symptom management: mechanism-based assessment and treatment of acute, chronic, procedural, and cancer-related pain, together with the principles of Pediatric Palliative Care.
4. Translational research and innovation: integration of clinical care and research through precision phenotyping, digital health, implementation science, artificial intelligence, and multidisciplinary collaborative models.

The course combines interactive lectures, discussion of landmark scientific papers, and problem-based analysis of real clinical cases to stimulate interdisciplinary dialogue between clinicians and researchers and promote the development of clinically relevant research questions.

CFU / Hours

1 for a total of 8 hours

Teaching period

March, April, May

Sustainable Development Goals

REDUCED INEQUALITIES | PARTNERSHIPS FOR THE GOALS
