

<p>Tutorial: The neuroscience of pain, from a signal to suffering</p> <p>1.5 ECTS</p>	
Organizer(s)	Pre Chantal Berna Renella, MD, PhD Dr. Paul Chu Sin Chung PhD and Dre Giada Dirupo, PhD
Summary	The tutorial will be comprised of 15 hours course time and a total of 45h of workload, providing insights into fundamental neuroscience, cognitive aspects and clinical relevance of pain.
Course description	<p>Pain is an aversive signal essential for survival, which if persistent can lead to a pathological condition. Understanding how this physiological signal can lead to pathology is at the heart of the neuroscience of pain, with investigations aiming to provide targets for prevention or early therapy. Furthermore, cognitive and affective processes have been shown to modulate the perception of nociceptive signals, providing higher-level targets for research and possible interventions. In this tutorial, after an introduction of nociception as a physiological process, 3 research perspectives will be provided and expanded: a) At the neuroanatomical and cellular level, we will describe the peripheral and central nervous circuits involved in the transmission of the nociceptive signal. In addition, we will focus on the critical role of some voltage-gated channels in the onset of sensitization processes, potentially leading to chronic pain conditions. b) At the animal level, we will present the main pre-clinical models and behavioral paradigms used in fundamental research to assess sensory and emotional components of pain pathology. c) At the human cognitive-affective level, we will review mechanisms of pain modulation (e.g. placebo mechanisms, concurrent cognitive tasks) and factors of pain chronification (e.g. reward processing networks, stress, social context).</p> <p>The tutorial will consist of a combination of lectures, hands on experience, and student journal club presentations, which will be contextualized by two teachers, one with a fundamental research perspective, and the other one with a cognitive neuroscience background.</p>
Course schedule 2021	<p>All sessions will run live from 13-16h under the Zoom link below. Please keep your camera on; interactions are asked for!</p> <p>https://unil.zoom.us/j/99464625031 (Password: 160421)</p> <ul style="list-style-type: none"> • Session 1 – March 5: - Main introduction (PCSC, CBR, AD) • Session 2 – March 12: Social- affective neuroscience of pain (CCDA & PCSC) <ul style="list-style-type: none"> ○ Presentations & Journal club discussion • Session 3 – March 19: Microglia and neuro-inflammation (MS & CBR) <ul style="list-style-type: none"> ○ Presentations & Journal club discussion

	<ul style="list-style-type: none"> • Session 4 – March 26: Cognitive load and pain (NS & AD) <ul style="list-style-type: none"> ○ Presentations & Journal club discussion • Session 5 – April 16: Human pain models: hands on session & cognitive/affective neurosciences (GD & PCSC) <ul style="list-style-type: none"> ○ Presentations & Journal club discussion
Teachers and fields of teaching	<p>(CBR) Pre Chantal Berna Renella MD, PhD – Human pain models, cognitive neuroscience of pain</p> <ul style="list-style-type: none"> ➤ 1 h – cognitive neuroscience of pain + human pain models intro ➤ 1 X 15 min intro JC, 2h JC supervision <p>(MS) Dr. Marc Suter, MD, PD MER – Microglia: relevance from animals to humans</p> <ul style="list-style-type: none"> ➤ 30 min fundamental neurosci, 2 h JC supervision <p>(PCSC) Dr. Paul Chu Sin Chung, PhD - Animal pain models, fundamental research into neuropathic pain</p> <ul style="list-style-type: none"> ➤ 1 h -- animal pain models and cognitive testing in rodents ➤ 2 x 15 min intro JC, 4h JC supervision <p>(CCA) Prof. Corrado Corradi Dell’Aqua, PhD – Empathy and social cognitive neuroscience of pain</p> <ul style="list-style-type: none"> ➤ 30 min cognitive I neurosci, 2h JC supervision <p>(NS) Dr. Nicolas Silvestrini, PhD – Cognitive neuroscience of pain</p> <ul style="list-style-type: none"> ➤ 30 min cognitive neurosci, 2h JC supervision <p>(GD) Dr. Giada Dirupo, PhD 1h – heat induced pain, QST, cognitive modulation of pain (experience)</p> <ul style="list-style-type: none"> ➤ 30 min -- human pain models, QST, cog modulation ➤ 15 min intro JC, 2h h JC supervision <p>(AD) Dr. Alexandru Deftu, PhD - Cellular pain models, fundamental research</p> <ul style="list-style-type: none"> ➤ 1 h -- cellular pain models ➤ 1 x 15 min intro JC, 3 x 2h JC supervision
Evaluation	<p>The evaluation will be based on papers to be read and presented by students in the journal clubs. Students will pair up and choose the papers they will read and present in the end of the first session. Each student is expected to read all the articles for the course provided, enabling active participation and criticism on the papers. For each journal club discussion, students should be prepared to name, e.g. aspects you would have done differently, questions opened by this line of research, what this adds to your research, etc.).</p> <p><i>Participants are requested to attend at least 80% of the tutorial sessions. Sessions that will be missed should be justified in advance by e-mail to the course organizer and the LN coordinator. If an absence is planned, the day of presentation should be chosen accordingly.</i></p>
Course materials	<ul style="list-style-type: none"> - can be found in https://moodle2.unil.ch - log in with your institutional address (UNIL, CHUV, EPFL) - click on "Faculté de Biologie et de Médecine" > "Ecole doctorale / doctoral school" > "Lemanic Neuroscience Doctoral School" - look for "Tutorial: The neuroscience of pain, from a signal to suffering" - the login password is "PainTut2021". Please contact Ulrike.toepel@unil.ch in case of problems.

Registration The course is limited to 16 participants. Register before February 20, 2021 by writing a mail to Indscourses@gmail.com (with your supervisor in copy) and stating the course title as subject.

Learning objectives

Knowledge

- 1) Anatomy and physiology of the pain signal: nociception, transduction, perception in animals and humans
- 2) Modulation of the nociceptive signal (animal and human contexts)
- 3) Physiopathology et neuroplasticity in chronic pain (animal and human)
- 4) Induced pain models in animals and humans
- 5) Cognitive, emotional and social factors involved in pain (framework and common measures)
- 6) Specificities of study design in pain neuroscience, links to other fields (fear conditioning, sensory neuroscience, mood, reward and addiction research etc.)

Attitudes

- 1) Integration of fundamental and clinical research, multidisciplinary cross-talk
- 2) Hands on experience with some human pain models and a simple cognitive modulation of pain

Know How

- 1) Critical reading of scientific publications
- 2) Critical discussion of study design in the context of pain neuroscience
- 3) Journal Club presentation

You can download and import the following iCalendar (.ics) files to your calendar system for the zoom sessions:

https://unil.zoom.us/joining/tJ0pce2urD4qGdUMYYpPbGU69LzmaGyBpU5a/ics?icsToken=98tyKuChqi0uHNaQsBqGRox5Bo_oLO7zpiVfjadosSbcExBRRTagb85YP7NYCfrA