NEW ADVANCES IN OPIOID RESEARCH: FROM BENCH TO THE BEDSIDE

INRC 2022

VALENCIA (SPAIN)
4th-8th July 2022 | Hotel Meliá Valencia
INRC 2022

NEW ADVANCES IN OPIOID RESEARCH: FROM BENCH TO THE BEDSIDE

SCIENTIFIC COMMITTEE

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Shogo Tokuyama
Minoru Narita
From 06:00 pm
Registration at the Venue

07:00-08:30 pm
Welcome Reception and Opening Ceremony
08:30-09:10 am
PLENARY LECTURE
Chair: Lucia Hipólito (University of Valencia)

- How did it come to be, and what is the trajectory?
  Dr. Chris Evans (University of California Los Angeles)

09:10-09:20 am
Discussion

09:20-11:00 am
SYMPOSIUM 1
Development of KOR agonists as therapeutic agents
Chair: Lee-Yuan Liu-Chen (Temple University)

- 09:20-09:40 am
  KOR Agonists Reduce Neuroinflammation and Promote Remyelination in Preclinical Models of Multiple Sclerosis
  Thomas Prisinzano (University of Kentucky)

- 09:40-10:00 am
  Anti-Pruritic Effects of Kappa Opioid Receptor (KOR) Agonists: Evidence from Rodents to Humans
  Saadet Inan (Temple University)

10:00 -10:20 am
COFFEE BREAK

- 10:20-10:40 am
  A Newly Synthesized Kappa Opioid Receptor Agonist Ameliorates Acute and Chronic Pain without Causing Sedation or Aversion in Mice
  Hiroshi Nagase (University of Tsukuba)

- 10:40-11:00 am
  Agonist-Promoted Phosphorylation and Internalization of the Kappa Opioid Receptor (KOR) in Male Mouse Brains: Lack of Connection with Conditioned Place Aversion
  Lee-Yuan Liu-Chen (Temple University)

11:00-11:10 am
Discussion
11:10-11:50 am
HOT TOPIC
Chemistry, structural biology and computational approaches to design new opioid ligands

Chairs:
Susruta Majumdar (UHSP/Washington University)
Nurulain Zaveri (Astraea Therapeutics)

11:10-11:20 am
Targeting the allosteric sodium binding pocket in mu opioid receptor
Susruta Majumdar (UHSP/Washington University)

11:20-11:30 am
Structure-based discovery of novel chemotypes and functionalized ligands for OUD targets
Vsevolod “Seva” Katritch (University of Southern California)

11:30-11:40 am
Taking two shots on goal with a single chemical entity- Using structure-based design to tailor bifunctional opioid pharmacology of Nociception Opioid Receptor (NOP) Ligands
Nurulain Zaveri (Astraea Therapeutics)

11:40-11:50 am
Structure, function and pharmacology of delta opioid receptor bitopic ligands
Tao Che (Washington University)

11:50 am-12:00 pm
Discussion

12:00-12:30 pm
DATA BLITZ

Chairs:
Ream Al-Hasani (University of Health Sciences and Pharmacy/ Washington University)
Meritxell Canals (Nottingham University)

12:30-01:30 pm
LUNCH
NEW ADVANCES IN OPIOID RESEARCH: FROM BENCH TO THE BEDSIDE
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→ Tuesday 5th July

01:30-02:50 pm
SYMPOSIUM 2
New tools for in-vivo studies of signaling and circuits

Chairs:
Carrie Stine (University of Washington)
Patrick O’Neill (University of California Los Angeles)

- 01:30-01:50 pm
In vivo photopharmacology with caged opioid drugs and peptides
Matthew Banghart (University of California San Diego)

- 01:50-02:10 pm
Illuminating the dynamics of neuromodulators and their intracellular signals
Yao Chen (Washington University)

- 02:10-02:30 pm
Next-gen opto-GPCRs: from cells to circuits
Patrick O’Neill (University of California Los Angeles)

- 02:30-02:50 pm
Genetically encoded opioid peptide sensors for detecting endogenous opioid release
Carrie Stine (University of Washington)

02:50-03:00 pm
Discussion

03:00-04:00 pm
SYMPOSIUM 3
The role of opioid receptors in headache disorders

Chair: Amynah Pradhan (Univeristy of Illinios Chicago)

- 03:00-03:20 pm
Uncovering a neuroendocrine link to female-selective pain and migraine
Frank Porreca (University of Arizona)

- 03:20-03:40 pm
Differential role of mu and delta opioid receptors in migraine
Amynah Pradhan (University of Illinois Chicago)

- 03:40-04:00 pm
Identification of NOP receptor agonists for the treatment of migraine
Katarzyna M. Targowska-Duda (Medical University of Lublin)
04:00-04:10 pm
Discussion

04:10-06:00 pm
POSTER SESSION (with coffee)
08:30-9:10 am
PLENARY LECTURE

Chair: Amynah Pradhan (University of Illinois Chicago)

- Opioid receptors: 30 years into brain function
  Dr. Brigitte Kieffer (INSERM/University of Strasbourg France)

09:10-09:20 am
Discussion

09:20-11:00 am
SYMPOSIUM 4
Mechanisms of function of endogenous and exogenous opioids in pain, reward and affective neural circuits

Chair: Grégory Scherrer (University of North Carolina at Chapel Hill)

- 09:20-09:40 am
  Mu opioid receptor-mediated regulation of ventral pallidum mechanisms of addiction
  Meaghan Creed (Washington University)

- 09:40-10:00 am
  Dynorphinergic control of amygdalo-striatal circuits for goal-directed action
  Michael Bruchas (University of Washington)

10:00 -10:20 am
COFFEE BREAK

- 10:20-10:40 am
  MOR-neurons in the dorsal raphe nucleus: role in reward and affective behaviors
  Lola Welsch (University of Strasbourg/INSERM)

- 10:40-11:00 am
  Regional and cell-type specific molecular architecture of the opioid system in neural circuits
  Grégory Scherrer (University of North Carolina at Chapel Hill)

11:00-11:10 am
Discussion
11:10-11:50 am
HOT TOPIC
Prefrontal cortical opioid systems: from synapses to affective-and pain-related behavior

Chair: Hugo Tejeda (National Institute of Mental Health, National Institutes of Health)

- 11:10-11:20 am
  Genetic strategies targeting nociceptive and opioidergic cortical cell-types
  Gregory Corder (University of Pennsylvania)

- 11:20-11:30 am
  Enkephalin regulation of synaptic transmission in anterior cingulate cortex
  Will Birdsong (University of Michigan)

- 11:30-11:40 am
  The role of the endogenous dynorphin / kappa-opioid receptor system in regulating prefrontal cortical threat processing and circuit function
  Huikun Wang (National Institute of Mental Health, National Institutes of Health)

- 11:40-11:50 am
  Mouse models of surgical and neuropathic pain produce distinct alterations to the excitability of prodynorphin-expressing neurons in the prelimbic cortex
  Patrick Sheets (Indiana University School of Medicine)

11:50 am-12:00 am
Discussion

12:00-12:30 pm
DATA BLITZ

Chairs:
  Ream Al-Hasani (University of Health Sciences and Pharmacy/ Washington University)
  Meritxell Canals (Nottingham University)

12:30-01:30 pm
LUNCH
NEW ADVANCES IN OPIOID RESEARCH: FROM BENCH TO THE BEDSIDE
INRC2022

→ Wednesday 6th July

01:30-02:30 pm
FOUNDER'S LECTURE
- From CSF to reversal of opioid-induced damages to the brain
  Fred Nyberg (Uppsala University)
- Pain inhibition via peripheral opioid receptors
  Christoph Stein (Charité Universitätsmedizin Berlin, Freie Universität Berlin)

02:30-03:50 pm
SYMPOSIUM 5
The gut-brain-axis: a key regulator of opioid pharmacology or just a gut feeling?
“The symposium is supported by the British Pharmacological Society”

Chairs:
Anna Taylor (University of Alberta)
Alexis Bailey (St. George’s University of London)

- 02:30-02:50 pm
  The Epithelium-Nociceptor Interaction in Opioid-Induced Dysbiosis
  Hamid Akbarali (Virginia Commonwealth University)

- 02:50-03:10 pm
  Dose- and Sex-Dependent Bidirectional Relationships for Intravenous Fentanyl Self-Administration and the Gut Microbiome
  Michelle Ren (University of California Irvine)

- 03:10-03:30 pm
  Gut-Brain Axis and Early Life Opioid Receptor Neurodevelopment: The Devil is in the Milk
  Alexis Bailey (St. George’s University of London)

- 03:30-03:50 pm
  Daily Intermittent Fasting in Mice Enhances Opioid Pain Relief and Reduces Side Effects
  John Streicher (University of Arizona)

03:50-04:00 pm
Discussion

04:00-06:00 pm
POSTER SESSION (with coffee) Room Valentia A
Wednesday 6th July

08:15-09:30 pm
INRC BAR
Place: Àtic-Palau Alameda
Address: Calle de Muñoz Seca,1 - 46010 Valencia.
THURSDAY 7TH JULY

08:30-10:10 am
YOUNG INVESTIGATOR AWARDS 2020, 2021 AND 2022
Chair: Lee-Yuan and Liu-Chen (Temple University)

YIA 2020: Ream Al-Hasani (University of Health Sciences and Pharmacy/ Washington University)
YIA 2021: Richard M. Van Rijn (Purdue University)
YIA 2022: John Streicher (University of Arizona)

08:30-09:20 am
YIA 2020: How the support of a scientific community advanced my research
Ream Al-Hasani (Washington University)

09:20-10:10 am
YIA 2022: The Organization of Mu Opioid Receptor Signal Transduction Cascades in the Spinal Cord by Heat Shock Protein 90
John Streicher (University of Arizona)

10:10-10:30 am
COFFEE BREAK

10:30-12:50 am
SYMPOSIUM 6
Sex specific opioid signaling: implications for pain management and abuse potential
“MJ Kreek Memorial Symposium”

10:30-10:40 am
MJ Kreek Memorial
Brian Reed (Rockefeller University)
Chair: Anne Z. Murphy (Georgia State University)

10:40-11:00 am
Impact of age and sex on mu opioid receptor signaling in the periaqueductal gray of male and female rats
Anne Z. Murphy (Georgia State University)

11:00-11:20 am
Time-dependent effects of oxycodone abstinence on thalamo-accumbens synaptic plasticity and cue reinstatement
Yanaira Alonso-Carballeiro (University of Minnesota, Harvard University)
Thursday 7th July

11:20-11:40 am  
Pain-associated fentanyl intake in males is driven by dynamic activity of ventral tegmental area dopamine neurons  
Jessica Higginbotham (Washington University)

11:40-12:00 am  
Probing PAG dopamine circuits in pain  
Thomas L. Kash (University of North Carolina Chapel Hill)

12:50-01:00 pm  
Discussion

12:30-01:30 pm  
LUNCH

01:30-03:00 pm  
SYMPOSIUM 7  
Neonatal opioid exposure: immediate and long-term consequences  
Chair: Julie A. Blendy (University of Pennsylvania)

01:30-01:50 pm  
Neonatal Opioid Withdrawal Syndrome in mice impacts behavior and gene expression  
Shivon A. Robinson (University of Pennsylvania, Williams College)

01:50-02:10 pm  
Behavioral and brain transcriptomic adaptations in outbred CFW mice and inbred FVB substrate differences in a model for neonatal opioid withdrawal syndrome  
Camron D. Bryant (Boston University)

02:10-02:30 pm  
Perinatal oxycodone exposure affects developmental milestones and adult sensory and reward behavior in mice.  
Marwa Mikati (Washington University)

02:30-02:50 pm  
The impact of prenatal methadone exposure on sensorimotor cortices  
Brady Atwood (Indiana University)

02:50-03:00 pm  
Discussion
NEW ADVANCES IN OPIOID RESEARCH: FROM BENCH TO THE BEDSIDE

INRC 2022

→ Thursday 7th July

04:00-05:30 pm
MENTORING ACTIVITIES

07:00 pm
VISIT TO CIUDAD DE LAS ARTES Y LAS CIENCIAS

Important: In case you are interested it is mandatory to notify your attendance to inrc2022@viajeseci.es before 1st July.

06:50 pm
MEETING POINT AT:
Restaurante Contrapunto Les Arts
Av. del Profesor López Piñero, 1, 46013 Valencia

07:00 pm
START OF THE VISIT
(groups accompanied by guides)

08:00-09:30 am
GET TOGETHER

LOCATION
Restaurante Contrapunto Les Arts
Av. del Profesor López Piñero, 1, 46013 Valencia

Important: Please notify your attendance “by clicking” the activity assistance at your web registration profile. Please notify before 1st July
08:30-09:10 am
PLENARY LECTURE
Chair: José Morón-Concepción (Washington University)
- Implantable wireless systems for the study and treatment of pain, substance use disorder, and overdose
  Dr. Robert W. Gereau (Washington University)

09:10-09:20 am
Discussion

09:20-11:00 am
SYMPOSIUM 8
Dynorphin and KOR signaling controlling pain, cognition and stress responses

Chairs:
Charles Chavkin (University of Washington)
Elyssa Margolis (University of California, San Francisco)

- 09:20-09:40 am
Stress can reverse the sign of KOR signaling in midbrain dopamine neurons.
Elyssa Margolis (University of California San Francisco)

- 09:40-10:00 am
Dissecting the accumbal dynorphinergic outputs underlying affective pain
Nicolas Massaly (Washington University)

10:00 -10:20 am
COFFEE BREAK

- 10:20-10:40 am
The role of the endogenous dynorphin / kappa-opioid receptor system in regulating prefrontal cortical threat processing and circuit function
Hugo Tejeda (National Institute of Mental Health, National Institutes of Health)

- 10:40-11:00 am
Stress potentiation of addiction risk: dynorphin-mediated cellular and circuit mechanisms
Charles Chavkin (University of Washington)

11:00-11:10 am
Discussion
11:10 am-01:30 pm

SYMPOSIUM 9

Examination of pain and addiction: the hits, the misses, and the opportunities

“The symposium is supported by the Institute of Neuromune Pharmacology”

Chairs:
Yolanda Campos-Jurado (Washington University)
Arbi Nazarian (Western University School of Medicine)
Sulie L. Chang (Institute of Neuromune Pharmacology/Seton Hall University)

Part I: Pain and opioid addiction

11:10-11:30 am
Pain-induced impulsivity, the role of opioids, and where we go from here
Arbi Nazarian (Western University of Health Sciences)

11:30-11:50 am
Pain and opioid abuse: thinking outside the brain
S. Stevens Negus (Virginia Commonwealth University)

11:50 am-12:10 pm
Opposing effects of striatal mu opioid receptor involvement in opioid mediated analgesia
Catherine Cahill (University of California Los Angeles)

12:10-12:20 pm
Discussion

Part II: Pain, alcohol addiction and opioid receptors

12:20-12:40 pm
Alcohol modulation of the pain system
Sulie L. Chang (Institute of Neuromune Pharmacology/Seton Hall University)

12:40-01:00 pm
Which comes first, neuroimmunity or mu-opioid receptors? A pivotal relationship to unravel inflammatory pain-induced alcohol use disorders
Javier Cuitavi (University of Valencia)
01:00-01:20 pm  
Alcohol, sex and pain: a convoluted cocktail?  
Yolanda Campos-Jurado (Washington University)

01:20-01:30 pm  
Discussion

01:30-02:30 pm  
LUNCH

02:30-03:50 pm  
SYMPOSIUM 10  
Opioids and cannabinoids for pain: translational research session  

Chairs:  
Kelly E. Dunn (Johns Hopkins University)  
Lawrence Carey (University of Texas Health Science Center)

02:30-2:50 pm  
Cannabinoid/opioid interactions in rhesus monkeys: effects of phytocannabinoids on opioid antinociception, withdrawal, and self-administration.  
Lawrence Carey (University of Texas Health Science Center)

02:50-03:10 pm  
Human Laboratory Examination of the Opioid-sparing Effects of Cannabinoids  
Ziva D. Cooper (University of California Los Angeles)

03:10-3:30 pm  
How Opioid Sensitivity May Play a Role in Cannabinoid Opioid-sparing Effects: A Human Laboratory Examination  
Kelly E. Dunn (Johns Hopkins University)

03:30-03:50 pm  
Examining the Association between Endocannabinoid System Gene Variants and the Reinforcing and Analgesic Effects of Hydromorphone Measured in a Human Laboratory Study  
Cecilia L. Bergeria (Johns Hopkins University)

03:50-04:00 pm  
Discussion
“NEW ADVANCES IN OPIOID RESEARCH: FROM BENCH TO THE BEDSIDE”

INRC\textsuperscript{2022}

→ Friday 8\textsuperscript{th} July

04:00-04:20 pm
COFFEE BREAK

04:20-05:20 pm
BUSINESS MEETING

05:20 pm
CLOSING REMARKS AND FAREWELL
\begin{itemize}
  \item INRC Best Poster
  \item INRC/Brain Sciences PhD Award Ceremony
\end{itemize}

08:00 pm
GALA DINNER

\begin{itemize}
  \item LOCATION
    Hotel Balneario Las Arenas 5* GL
    Eugenia Viñes, 22, 24, 46011 Valencia
  \item Bus available. Route: from Hotel Melia to Hotel Las Arenas.
    Ask Technical Secretariat for departure's time
  \item All attendance should bring the dinner ticket with you.
\end{itemize}

\textit{Important: Please notify your attendance \textit{by clicking} the activity assistance at your web registration profile. Please notify before 1\textsuperscript{st} July}
PLENARY SPEAKER

**Chris Evans**
UCLA, Department of Psychiatry

**Brigitte Kieffer**
INSERM/University of Strasbourg France

**HOW DID IT COME TO BE, AND WHAT IS THE TRAJECTORY?**

*Short biography*

Dr. Chris Evans received his graduate training in peptide chemistry at the UK Medical Research Council Research Institute in London. He then moved to Stanford University for his postdoctoral training with Dr. Jack Barchas where his research focused on the myriad of endogenous opioid peptides, confirming their existence, understanding precursor processing, and mapping the distribution of opioid peptides throughout the mammalian brain. In 1990, he moved to UCLA to begin his independent career that centered on continued research of the opioid system but focusing on the receptors. Currently, he is the Hatos Professor and Director of the Hatos Center for Neuropharmacology at UCLA. He has published extensively in opioid neuropharmacology including the identification of molecules constituting the endogenous opioid system. His interests are in the evolution of the opioid system, in using the conditional knockouts to identify circuits involved in opioid functions and creating effective drug outreach programs.

**OPIOID RECEPTORS: 30 YEARS INTO BRAIN FUNCTION**

*Short biography*

Brigitte Kieffer is Research Director at INSERM U1114/Dpt Psychiatry at the University of Strasbourg, France and Adjunct Professor in the Dpt Psychiatry at McGill University, Montreal Canada. Dr. Kieffer isolated the first gene encoding an opioid receptor, opening an entire research field towards understanding the molecular basis of opioid-controlled behaviors. Her genetic dissection of the opioid system has brought major advances in pain, addiction and mood disorders research, as well as in the area of molecular pharmacology and G protein coupled receptor biology. She has received numerous awards, including the Lounsbery (French and US Academies of Science) and the Lamonica Award of Neurology (French Academy of Science); in 2014 she received the International L’OREAL-UNESCO Award for Women in Science (European Laureate) and was elected Member of the French Academy of Sciences.
Robert W. Gereau
Washington University
School of Medicine

**IMPLANTABLE WIRELESS SYSTEMS FOR THE STUDY AND TREATMENT OF PAIN, SUBSTANCE DISORDER, AND OVERDOSE**

**Short biography**

Dr. Robert Gereau is the Dr. Seymour and Rose T. Brown Professor and Vice Chair for Research in the Department of Anesthesiology at Washington University School of Medicine, where he also serves as Director of the Washington University Pain Center. His research program seeks to understand cellular and molecular changes that underlie chronic pain conditions, and to develop new medications and technologies for the treatment of pain. He was the recipient of the Frederick WL Kerr Award for Basic Science Research from the American Pain Society and the Landis Award for Outstanding Mentorship from NINDS. Gereau serves on the Board of Directors for the US Association for the Study of Pain, as a member or chair of several grant review panels, as Chair of the Board of Scientific Counselors for NIDCR, and as a member of advisory boards related to strategic planning for pain research and the NIH HEAL Initiative.

Ream Al-Hasani, PhD

**HOW THE SUPPORT OF A SCIENTIFIC COMMUNITY ADVANCED MY RESEARCH**

**Short biography**

Ream Al-Hasani is an Assistant Professor in the Center for Clinical Pharmacology at the University of Health Sciences & Pharmacy in St. Louis and Washington University in St. Louis. She earned her BS(Hons) in Pharmacology from the University of Portsmouth. Dr. Al-Hasani focused her interests on addiction by pursuing a PhD in Neuropharmacology at the University of Surrey with Ian Kitchen and Susanna Hourani where she studied the involvement of adenosine A2 receptors in morphine and cocaine addiction. Dr. Al-Hasani completed her post-doctoral training in the Department of Anesthesiology at Washington University with Michael Bruchas where she used basic research models to dissect the role of the opioid circuitry in motivated behaviors. Dr. Al-Hasani identified two distinct subpopulations of dynorphinergic neurons within the nucleus accumbens that drive aversive and reward-
related behaviors. She also uncovered a novel role for GABAergic projection neurons from the ventral tegmental area to the ventral nucleus accumbens in reward reinforcement. This work was the basis for her Pathway to Independence Award (K99/R00) from the National Institute on Drug Abuse. Dr. Al-Hasani’s current research focuses on better understanding opioid peptide release dynamics and function in mouse models of natural rewards and threats, during drug withdrawal and following in utero exposure to opioids. Dr. Al-Hasani has also discovered a role for the kappa opioid system in cold hypersensitivity. Dr. Al-Hasani received the Cutting Edge Basic Research Award from the National Institute on Drug Abuse, the Young Investigator Award from the International Narcotics Research Conference and the Brain and Behavior Foundation Young Investigator Research Award.

Richard M. Van Rijn
Department of Medicinal Chemistry and Molecular Pharmacology, Purdue University
Septerna Inc,

TOWARDS A TARGET CANDIDATE PROFILE FOR A G-PROTEIN-BIASED DELTA OPIOID AGONIST FOR THE TREATMENT OF ALCOHOL USE DISORDER

Short biography

Richard van Rijn received a bachelor and master’s degree in Bio-pharmaceutical Sciences from Leiden University, and a PhD in molecular pharmacology of G-protein-coupled histamine receptors from VU university Amsterdam. He expanded his GPCR skillset via a postdoctoral position at the Ernest Gallo Clinic and Research Center at UCSF, studying behavioral pharmacology of opioid receptors in relation to opioid and alcohol use disorder. In 2013, he joined the faculty of the Department of Medicinal Chemistry and Molecular Pharmacology at Purdue University. His research program, supported by multiple NIH grants, aimed to establish G-protein-biased delta opioid agonism as potential treatment for alcohol use disorder, mood disorder and chronic pain conditions. He obtained tenure in 2019, and performed a sabbatical in the research group of Dr. Shoichet at UCSF to acquire skills in large-scale docking of virtual drug libraries. In 2021, he was recruited by Septerna to aid their GPCR-focused drug discovery programs.
THE ORGANIZATION OF MU OPIOID RECEPTOR SIGNAL TRANSDUCTION CASCADES IN THE SPINAL CORD BY HEAT SHOCK PROTEIN 90

Short biography

John Streicher is an Associate Professor in the Department of Pharmacology, College of Medicine, at the University of Arizona. His research program focuses mainly on the molecular mechanisms of signal transduction by the opioid and cannabinoid receptors in pain, while using these mechanisms to design novel drug discovery strategies for analgesic drugs with a better efficacy and side effect profile than opioids. He earned his B.S. from George Fox University in 1999, his M.S. from Oregon Health and Science University in 2002, and his Ph.D. from University of California – Los Angeles in 2009. His postdoctoral training was with Laura Bohn at The Scripps Research Institute from 2009 – 2012. His first faculty position was at the University of New England in 2012, and he joined the University of Arizona in his current position in 2015.

FROM CSF TO REVERSAL OF OPIOID-INDUCED DAMAGES TO THE BRAIN

Short biography

Fred Nyberg is currently active as Senior Professor at the Dept of Pharmaceutical Biosciences at Uppsala University. He received his PhD in 1981 on a thesis directed to pituitary polypeptide hormones, and subsequently performed postdoc studies on opioid peptides in relation to chronic pain and opioid addiction. In 1993 he was appointed as Full Professor in Addiction Biology. Between 2002-2007 he served at the Swedish Government as Head of Research Issues at the National Drug Policy Coordinator and during 2008-2017 he was a member of the Advisory Board on addictive drugs at the Social Ministry. He was Chairman for his Department 1999-2006, and from 2006 to 2011 Dean at the Faculty of Pharmacy, Uppsala University. He is an active member of INRC since 1982 and served as president for the organization 2014-2018. Nyberg’s field of research includes aspects on peptidergic mechanisms in chronic pain and drug dependence but it also extends to areas related to neuroendocrinology, neurology and psychiatry. He has over 450 publications in internationally well-recognized research journals.
PAIN INHIBITION VIA PERIPHERAL OPIOID RECEPTORS

Short biography

Christoph Stein (orcid.org/0000-0001-5240-6836) studied Medicine at Ludwig-Maximilians-University (LMU) München, Germany, and received training in Anesthesiology (Klaus Peter, James Cottrell), Pain Medicine (Wilbert Fordyce, John Liebeskind) and Neuropharmacology (Albert Herz) at State University of New York, University of California Los Angeles, LMU and Max-Planck Institute for Psychiatry (München, Germany). He then accepted a faculty position at Johns Hopkins University and established a research group at the National Institute on Drug Abuse (Baltimore, USA). In 1997 he assumed the Chair of Anaesthesiology and Intensive Care Medicine at Freie Universität Berlin, Germany (since 2003: Charité Campus Benjamin Franklin) and built an interdisciplinary research laboratory including neuroscientists, pharmacologists and clinicians. His work has focused on mechanisms underlying opioid analgesic effects outside the central nervous system with the aim to avoid adverse side effects.
SESSION POSTER 1

14. FUNCTIONAL SELECTIVITY OF KAPPA OPIOID RECEPTOR: FOCUS ON ENDOGENOUS AGONISTS
Luca, Zangrandi, Charitém Austria

54. DELTA OPIOID RECEPTORS IN CANNABIDIOL ANTIALLODYNIC, ANXIOLYTIC AND ANTIDEPRESSANT EFFECTS
Gaborit, Marion, INCI-CNRS, France

72. EVALUATION OF SYNERGISTIC EFFECTS BETWEEN THC AND MORPHINE AND THE POSSIBLE MOR-CB1 HETEROMERIZATION IN HUMAN CELL MODELS CO-EXPRESSING MOR AND CB1
Elisabetta, Cuna, Dept. Pharmacy and Biotechnology - University of Bologna, Italy

83. EXPLORING THE SIGNALLING BIAS AND EFFICACY OF CARFENTANIL
Nokomis Ramos-Gonzalez, Nokomis, University of Bristol, United Kingdom

91. AN ELECTROCHEMICAL APPROACH FOR SELECTIVE AND SENSITIVE DETECTION OF OPIOID PEPTIDES
Sineadh, Conway, Anesthesiology, United States

98. IN SILICO-BASED MOLECULAR CHARACTERIZATION OF SELECTED G PROTEIN-BIASED AGONISTS OF MU OPIOID RECEPTOR
Sabina, Podlewska, Maj Institute of Pharmacology, Polish Academy of Sciences (IF PAS), Poland

101. KAPPA RECEPTOR PARTIAL AGONISTS INACTIVATE KOR THROUGH A JNK/ROS MECHANISM
Carlie, Neiswanger, University of Washington - Department of Pharmacology, United States

28. MU OPIOID RECEPTORS IN VGLUT2-EXPRESSING GLUTAMATERGIC NEURONS MODULATE OPIOID AVERSION
Kaitlin, Reeves, Indiana University School of Medicine, United States

50. DORSAL HIPPOCAMPUS ACTIVATION OF ACCUMBAL DYNORPHIN NEURONS DRIVE REINFORCEMENT.
Khairunisa, Ibrahim, Washington University in St. Louis, United States

76. KAPPA OPIOID RECEPTOR CURRENTS IN MOUSE PARAVENTRICULAR THALAMUS
Eloise, Kuijer, University of Bath, United Kingdom

79. TEMPORAL DYNAMICS OF LOCUS COERULEUS MODULATION OF STRESS-INDUCED ANTINOICEPTION
Makenzie, Norris, Center for Clinical Pharmacology, United States

89. MU-OPIOID RECEPTOR ACTIVATION IN THE VENTRAL TEgmentAL AREA AND ITS IMPACT ON MICROGLIAL PROLIFERATION: ROLE OF INFLAMMATORY PAIN
David, Meseguer, Faculty of Pharmacy - University of Valencia, España

106. ACUTE STRESS SHIFTS KAPPA-OPIOID RECEPTOR FUNCTION FROM INHIBITORY TO EXCITATORY IN A SUBSET OF VTA DOPAMINE NEURONS
Elyssa, Margolis, UCSF, United States
Nazzareno, Cannella, School of Pharmacy, University of Camerino, Italy

122. HETEROGENEOUS TOLERANCE TO SNC-80 AT SOMATIC AND PRESYNAPTIC DELTA OPIOID RECEPTORS IN THE ANTERIOR CINGULATE CORTEX
Marie, Walicki, University of Michigan, United States

124. ROLE OF RMTG (TAIL OF THE VTA) ON THE ETHANOL-DERIVED ACTIVATION OF VTA-DA NEURONS.
Claudia, Esposito, Universitat de Valencia, España

37. INFLUENCE OF PSYCHEDELIC PSILOCYBIN ON OXYCODONE-INDUCED CONDITIONED PLACE PREFERENCE IN C57BL/6 MALE AND FEMALE MICE
Alaina, Jaster, Virginia Commonwealth University, United States

74. ADS012, A SINGLE STRAIN LIVE BIOTHERAPEUTIC PRODUCT, ATTENUATES TOLERANCE TO REPEATED MORPHINE DOSING IN MICE
Chesnel, Laurent, Adiso Therapeutics, United States

81. IMPACT OF Δ9-THC ADMINISTRATION ON MEASURES OF OXYCODONE-INDUCED ANTINOCICEPTION, DEPENDENCE AND REWARD
Richard, Slivicki, Washington University, United States

93. AKAP150 PRIMES PACLITAXEL-INDUCED PERSISTENT PAIN BY SYNCHRONIZING PKA AND PKCΔ ACTIVATION
Ying, He, University of Illinois at Chicago, United States

112. NIH HETEROGENEOUS STOCK RATS TRAINED TO HEROIN SELF-ADMINISTRATION SHOW HETEROGENEOUS RESPONSE TO THE ANTI-ADDICTIVE EFFECTS OF THE MOP/NOP AGONIST CEBRANOPADOL
Nazzareno, Cannella, School of Pharmacy, University of Camerino, Italy

128. NEW NOSE-TO-BRAIN LIPOSOMAL PHARMACEUTICAL FORMULATION TARGETING THE KAPPA OPIOID RECEPTOR
Lucia, Hipolito, Universitat Valencia, España

38. HELPING KIDS PROSPER IN UTAH: AN EVIDENCE-BASED, COMMUNITY APPROACH TO PREVENTION
Claire, Warnick, Utah State University, United States

90. ETHANOL-INDUCED DOPAMINE RELEASE IN THE NUCLEUS ACCUMBENS CORE IN PRE-EXPOSED ANIMALS TO ALCOHOL: ROLE OF INFLAMMATORY PAIN
Ana, Riera, Faculty of Pharmacy, University of Valencia, España

100. OREXIN-RECEPTOR ANTAGONIST EFFECTS ON SLEEP AND STRESS DURING OPIOID WITHDRAWAL: A RANDOMIZED-CONTROLLED TRIAL
Andrew, Huhn, Johns Hopkins University, United States

110. OPIOID USE DISORDER IS ASSOCIATED WITH ALTERATIONS IN CIRCADIAN PATHWAYS: PROTEOMICS ANALYSIS OF HUMAN POSTMORTEM BRAINS.
Stephanie, Puig, Boston University School of Medicine, United States

111. LONG ACCESS HEROIN SELF-ADMINISTRATION INDUCES GREY MATTER VOLUME REDUCTION IN NIH HETEROGENEOUS STOCK RATS.
Nazzareno, Cannella, School of Pharmacy, University of Camerino, Italy

126. THE INFLUENCE OF THE GUT MICROBIOTA DURING OPIOID WITHDRAWAL
Julia, Nickols, University of Alberta, Canada

127. HIPPOCAMPAL MU OPIOID AND CANNABINOID 1 RECEPTORS ARE MODULATED
NEW ADVANCES IN OPIOID RESEARCH: FROM BENCH TO THE BEDSIDE

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FOLLOWING COCAINE SELF-ADMINISTRATION IN MALE RATS
Befort, Katia, Université de Strasbourg, CNRS, UMR7364, France

138. OXYTOCIN AND OREXIN SYSTEMS BIDIRECTIONALLY REGULATE THE ABILITY OF OPIOID CUES TO BIAS CHOICE DURING RELAPSE
Giuseppe, Giannotti

52. SEX DIFFERENCES IN EPIGENETIC MECHANISMS OF OPIOIDS
Falconnier Camille, Falconnier, INCI CNRS UPR 3212, France

71. PREDICTION OF MORPHINE AND PREGABALIN THERAPEUTIC CONCENTRATIONS AT THE BRAIN EXTRACELLULAR FLUID AND EVALUATION OF THEIR EFFECTS ON NEURONAL GENE EXPRESSION OF TARGETS INVOLVED IN PAIN AND ANALGESIA
Andrea, Bedini, Dept. Pharmacy and Biotechnology - University of Bologna, Italy

70. EXAMINING THE ASSOCIATION OF CHRONIC PAIN, GENDER, AND OPIOID WITHDRAWAL SEVERITY DURING THE FIRST WEEK OF TREATMENT
Orrin, Ware, Johns Hopkins University School of Medicine, United States

95. ALTERATIONS IN ASTROCYTES AND THE GLUTAMATE TRANSPORTER GLT-1 IN THE PREFRONTAL CORTEX INDUCED BY INFLAMMATORY PAIN: SEX PERSPECTIVE
Paula, Andrés, Faculty of Pharmacy, University of Valencia, España

125. OPIOID ANALGESIA IN A MODEL OF PAIN-DEPRESSED BEHAVIOR IN MICE: ROLE OF MU OPIOID RECEPTOR AGONIST EFFICACY
Steve, Negus, Virginia Commonwealth University, United States

133. HYDROGEN SULFIDE INCREASES THE ANTIALLODYNIC EFFECTS OF MORPHINE IN ANIMALS WITH NEUROPATHIC PAIN
Olga, Olga, Institut d’Investigació Biomèdica Sant Pau (IIB Sant Pau), España

53. DOES MICROGLIA-ASTROCYTE CROSSTALK ORCHESTRATE SEX DIFFERENCES IN MORPHINE CENTRAL METABOLISM AND ITS ANTINOCICEPTIVE EFFECTS?
Volodya, HOVHANNISYAN. Institut des Neurosciences Cellulaires et Intégratives, France

61. PAIN-DEPRESSED CLIMBING AND AGONIST/ANTAGONIST OPIOID MIXTURES IN MALE AND FEMALE MICE AS TOOLS FOR ANALGESIC DRUG DEVELOPMENT
Edna, Santos, VCU. United States

137. AUTOPHAGY INDUCTION VIA Κ-OPIOID RECEPTOR IS IMPLICATED IN STRESS-DRIVEN SYNAPTIC ALTERATIONS
Christos, Karoussiotis Greece

131. CHARACTERIZATION OF TWO SUBPOPULATIONS IN A COHORT OF FEMALE WISTAR RATS: A GENDER STUDY UNDER THE ADE MODEL
Sandra, Fernández, University of Valencia, España

57. NEGATIVE AFFECT IS ASSOCIATED TO OPIOID MEDICATION MISUSE: A TRANSVERSAL STUDY IN NON-CANCER CHRONIC PAIN PATIENTS
Lucia, Hipolito. Universitat Valencia

SESSION POSTER 2

68. POSITIVE ALLOSTERIC MODULATION OF THE MU OPIOID RECEPTOR: STUDIES IN VIVO
Kelsey, Kochan, University of Michigan, United States
80. KINETICS OF FENTANYLS AND NITAZENES BINDING TO THE MU OPIOID RECEPTOR  
Norah Alhosan, Norah, UoB, United Kingdom

87. STRUCTURE, FUNCTION, AND PHARMACOLOGY OF DELTA OPIOID RECEPTOR  
BITOPIC LIGANDS  
Sarah, Bernhard, Washington University in St. Louis, United States

96. OPIOID EFFECTS ON OXIDATIVE STRESS AND PROTEASOME ACTIVITY IN HUMAN  
NEUROBLASTOMA SH-SY5Y CELLS  
Patrizia, Romualdi, Dept. Pharmacy & Biotechnology, Italy

99. ADDICTION-RELATED BEHAVIORAL EFFECTS OF G PROTEIN-BIASED AGONISTS OF  
THE M-OPIOID RECEPTOR  
Lucja, Kudla, Maj Intitute of Pharmacology, Polish Academy of Sciences, Poland

117. THE GI-PROTEIN COUPLED RECEPTORS MOR AND GPR151 CONTRIBUTE TO SOCIAL  
REWARD IN THE HABENULA  
Allain, Florence, INSERM, France

121. MOTOR CORTEX STIMULATION-INDUCED ANTINOCICEPTION REQUIRES  
ENDOGENOUS OPIOID SIGNALING  
Nicole, Mercer, Stanford University, United States

136. INFRARED AND NEAR-INFRARED FLUORESCENT OPIOID ANTAGONISTS:  
ALTERNATIVE TO RADIOLIGAND BASED ASSAYS  
Brian, Reed, Rockefeller University, United States

33. CONTRIBUTION OF THE CENTRAL AMYGDALA TO PAIN HYPERSENSITIVITY IN A  
MOUSE MODEL OF MULTIPLE SCLEROSIS  
Zoë, Dworsky-Fried, University of Alberta, Canada

59. MU OPIOID RECEPTOR-MEDIATED EFFECTS OF MOR AGONISTS ON WHOLE BRAIN  
FUNCTIONAL CONNECTIVITY IDENTIFIED BY MOUSE FMRI.  
Darcq, Emmanuel, INSERM, France

69. DISSECTING THE ACCUMBAL DYNORPHINERGIC OUTPUTS UNDERLYING AFFECTIVE PAIN  
Nicolas, Massaly, Washington University in St Louis, United States

77. DISSECTING THE EFFECT OF STRESS ON ENDOGENOUS NOCICEPTIN CIRCUITRY IN  
THE VENTRAL TEGMENTAL AREA  
Carolyn, Stine, University of Washington, United States

86. CHRONIC MORPHINE DIFFERENTIALLY ALTERS OPIOID EFFICACY AT SOMATIC AND  
PRESYNAPTIC MORS WITHIN A THALAMO-CORTICO-STRIATAL MICROCIRCUIT  
Elizabeth, Jaeckel, University of Michigan, United States

97. MU-OPIOID RECEPTORS IN THE BNST MEDIATE MORPHINE ANTINOCICEPTION  
Arbi, Nazarian, WesternU, College of Pharmacy, United States

104. UNCOVERING THE RELEASE DYNAMICS OF ENKEPHALINS FOLLOWING ACUTE STRESS  
Marwa, Mikati, Washington University in St. Louis, United States

108. PAIN-ASSOCIATED FENTANYL INTAKE IN MALES IS DRIVEN BY DYNAMIC ACTIVITY OF  
VENTRAL TEGMENTAL AREA DOPAMINE NEURONS  
Jessica, Higginbotham, Washington University, United States

119. UNCOVERING THE DYNORPHINERGIC PROJECTION OF CENTRAL AMYGDALA TO  
NUCLEUS ACCUMBENS: ROLE ON PAIN-INDUCED NEGATIVE AFFECT.  
Jesús David, Lorente, Department of Pharmacy and Pharmaceutical Technology. University of  
Valencia, España
120. INFLAMMATORY PAIN INDUCES ANXIETY- AND ANHEDONIA-LIKE BEHAVIOR IN A SEX-DEPENDENT MANNER: ROLE OF DYNORPHINERGIC AND CORTICOTROPIN-RELEASING SYSTEMS IN THE MCLS.
Jesús David, Lorente, Department of Pharmacy and Pharmaceutical Technology. University of Valencia, España

139. Ventral pallidal perineuronal nets regulate opioid relapse
Carley N., Miller

60. STRUCTURE ACTIVITY RELATIONSHIPS OF FENTANYL ANALOGS
Jessica, Anand, University of Michigan, United States

66. NEW SYNTHETIC OPIOIDS USE AMONG PATIENTS IN TREATMENT FOR AN OPIOID USE DISORDER IN BARCELONA
María, Aliás, IMIM, España

78. SEX DIFFERENCES IN THE ROLE OF CN1H3 IN OPIOID SEEKING
Tania, Lintz, Washington University in St. Louis, United States

85. EXPLORING GPR171 AGONISTS AS NOVEL PAIN THERAPEUTICS
Max, McDermott, Utah State University, United States

107. PPL-138: A BIFUNCTIONAL NOP/MU PARTIAL AGONIST THAT REDUCES COCAINE SELF-ADMINISTRATION IN RATS
Madeline, Martinez, Florida Atlantic University, United States

114. TARGETING PDGFR-BETA TO MAKE OPIOID PRESCRIPTIONS SAFER
Luca, Posa, Boston University, United States

129. PHOSPHOLIPASE CGAMMA1 IN THE NUCLEUS ACCUMBENS ALTERS HEROIN-SEEKING BEHAVIOR
Ethan, Anderson, Medical University of South Carolina, United States

45. ADMINISTRATION OF HUMAN MESENCHYMAL STEM CELLS-DERIVED SECRETOME MARKEDLY INHIBITS ORAL MORPHINE SELF-ADMINISTRATION AND BLOCKS RELAPSE IN TWO RAT MODELS OF MORPHINE DEPENDENCE
Fernando, Ezquer, Center for Regenerative Medicine, School of Medicine, Universidad del Desarrollo, Chile

92. SYSTEMIC AND INTRANASAL ADMINISTRATION OF MESENCHYMAL STEM CELL-DERIVED SECRETOME REDUCES THE WITHDRAWAL SYNDROME CAUSED BY OPIOID ADMINISTRATION IN RATS
Mauricio, Quezada, Universidad del Desarrollo, Chile

51. POSITIVE AND NEGATIVE REINFORCEMENT AMONG LONG-TERM HEROIN USERS: ASSESSMENT OF SUBJECTIVE EXPERIENCE OF HEROIN EFFECTS AS A SURROGATE MEASURE
Sukey, Martinez, Columbia University, United States

65. EVIDENCE FOR HEROIN-INDUCED SOCIAL ISOLATION IN THE RAT
Ginevra, D’Ottavio, Sapienza University of Rome, Italy

102. INSOMNIA IS ASSOCIATED WITH PREMATURE TREATMENT DISCONTINUATION AND DEPRESSIVE SYMPTOM SEVERITY IN PERSONS ENTERING TREATMENT FOR OPIOID USE DISORDER
Jennifer D Ellis, Jennifer, Johns Hopkins School of Medicine, United States
109. HEROIN-NAÏVE NIH HETEROGENEOUS STOCK RATS VULNERABLE TO OPIOID USE DISORDERS SHOW REDUCED RESPONSE TO THE ANALGESIC EFFECT OF HEROIN
Nazzareno, Cannella, School of Pharmacy, University of Camerino, Italy

115. THE ENDOCANNABINOID ENZYME NAPE-PLD REGULATES ANXIETY-LIKE BEHAVIORS AND THE REINFORCING PROPERTIES OF ORAL OXYCODONE CONSUMPTION IN MICE
Taylor Woodward, Taylor, IU Bloomington, United States

116. HEALING PLACES, HEALING PEOPLE: INSIGHTS ON SPONTANEOUS CRITICAL PLACE-MAKING FROM AN OPIATE SUBSTITUTE THERAPY PROGRAMME IN DURBAN, SOUTH AFRICA
Michael, Wilson, Bellhaven Harm Reduction Centre, South Africa

132. WHAT IS THE THERAPEUTIC BLOOD LEVEL OF NALTREXONE FOR OUD TREATMENT?
Felipe, Castillo, NYSPI/Columbia University, United States

62. NO EVIDENCE OF ACCELERATED EPIGENETIC AGING AMONG BLACK HEROIN USERS: A CASE VS CONTROL ANALYSIS.
Jermaine, Jones, Columbia University College of Physicians and Surgeons, United States

88. DEVELOPMENT OF NOVEL THERAPEUTIC TARGETS FOR THE TREATMENT OF OPIOID INDUCED HYPERALGESIA.
Elizaveta, Mangutov, UIC, United States

105. CYCLO-GLYCOPEPTIDE DRUGS FOR PAIN MANAGEMENT: OPIOID AND NON-OPIOID EXAMPLES
Robin, Polt, Chemistry & Biochemistry, BIO5, United States

130. HYDROGEN SULFIDE ENHANCES THE ANALGESIC PROPERTIES OF DELTA OPIOID RECEPTORS DURING INFLAMMATORY PAIN
Olga, Olga, Institut d’Investigació Biomèdica Sant Pau (IIB Sant Pau), España

82. CHARACTERISATION OF CARFENTANIL DEPRESSION OF RESPIRATION IN MICE
Damiana Cavallo, Damiana, University of Bristol, United Kingdom

75. DISRUPTION OF VAGAL-BRAINSTEM CONNECTIONS DOES NOT ALTER FENTANYL-INDUCED RESPIRATORY DEPRESSION
Brian Ruyle, Brian, Washington University in St Louis, United States

84. EFFECTS OF COCAINE ON OXYCODONE- AND FENTANYL-INDUCED VENTILATORY DEPRESSION IN MICE
Harrison Elder, Harrison, Virginia Commonwealth University, United States

118. CHRONIC NALTREXONE THERAPY IMPROVED CARDIAC FUNCTION IN VOLUME OVERLOAD-INDUCED HEART FAILURE
Schaefer, Michael, Anaesthesiology, Charité University Berlin, Germany

113. MARCHIGIAN SARDINIAN ALCOHOL PREFERING RATS SHOW INCREASED HEROIN SELF-ADMINISTRATION AND MOTIVATION COMPARED TO NON-PREFERING WISTAR RATS: INVESTIGATING THE ROLE OF THE NOP/MOP SYSTEM.
Jessica, Tooley, Washington University in St. Louis, United States

67. INVESTIGATING SPATIO-TEMPORAL BIAS AT THE MU-OPIOID RECEPTOR
Rebecca, Annells, University of Bath, United Kingdom
RELEVANT INFORMATION

- **VENUE:**
  Hotel Melia Valencia 4*
  Avda. Cortes Valencianas, 52. 46015 Valencia

- **PLENARY SESSIONS:** Valentia B + C (Main room)

- **POSTER SESSION:** Valentia A room

- **MENTORING ACTIVITIES:** Terra room

- **COFFEE BREAK:** Hall of Hotel

- **CONFERENCE PROGRAM LUNCHES:** Terra room

- **SOCIAL EVENTS:**
  
  **WELCOME**
  Monday, 4th July. 07:00-08:00 pm
  Melia Valencia 4* (at the Hall)

  **INRC BAR**
  Wednesday, 6th July 08:30-09:30 pm
  Àtic-Palau Alameda
  Calle de Muñoz Seca, 1. 46010 Valencia
  No ticket need

  **GET TOGETHER**
  Thursday, 7th July 08:00-09:30 pm
  Restaurante Contrapunto Les Arts
  Av. del Profesor López Piñero, 1. 46013 Valencia

  **GALA DINNER**
  Friday, 8th July, 08:30 pm
  Hotel Balneario Las Arenas 5*
  Calle Eugenia Viñes, 22, 24. 46011 Valencia
  - Bring the gala dinner with you.
  - Ask to Technical Secretariat (registration point) for the bus departure.
EXHIBITOR AREA

VENUE
ENTRANCE

VALENTIA A

VALENTIA B + C

FOYER VALENTIA - EXHIBITION AREA

STAND

EXHIBITOR AREA

Valencia (Spain)
4th-8th July 2022 | Hotel Meliá Valencia

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INRC 2022

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4th-8th July 2022 | Hotel Meliá Valencia

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