

## Report on the “Cannabinoid Conference 2011” for the International Society of Neurochemistry

The “Cannabinoid Conference 2011” held on September 8-10, 2011 in Bonn, Germany was a joint meeting of the 5th European Workshop on Cannabinoid Research and the IACM 6th Conference on Cannabinoids in Medicine. It was attended by over 200 delegates. The two and a half day program included 3 plenary lectures, 15 lectures from invited speakers, 22 oral presentations from selected abstracts and 80 poster presentations.

The meeting was opened on Thursday afternoon by a plenary presentation of Dr. Daniele Piomelli from the University of California, Irvine. Dr. Piomelli presented exciting results obtained with a novel genetic mouse model, which clarified the selective role of brain endocannabinoids in the regulation of metabolic functions. He also presented new evidence suggesting that his group has successfully identified an endocannabinoid transporter. The presence of such a transporter was postulated, based on endocannabinoid uptake kinetics and specific antagonists blocking this uptake. This finding presents a major breakthrough, because none of the previous attempts to characterize this transporter at the molecular level was successful.

The following session was devoted to the important functions of the endocannabinoid system in the brain. Dr. Ken Mackie from the Indiana University, Bloomington presented new results that elucidate the mechanisms of cannabinoid receptor CB1 desensitization. He identified specific serines in the receptor, which are responsible for receptor desensitization upon phosphorylation. Using a novel genetic mouse model in which those serines have been exchanged for alanines, he demonstrated the *in vivo* functional significance of this desensitization mechanism. Dr. Lutz from the University of Mainz presented new results from mouse models with a deletion of CB1 receptors in specific neuronal populations. These mouse models are instrumental to dissect the contribution of endocannabinoid signalling in different neuronal circuits. Three oral presentations addressing the role of endocannabinoid signalling in the modulation of emotional and social behaviours of animals, as well as mismatch negativity in schizophrenia patients concluded this session.

The next day also started with an impressive plenary lecture by Dr. George Kunos from the National Institute on Alcohol Abuse and Alcoholism, USA. He presented very exciting findings obtained with novel peripherally acting CB1 receptor antagonists. These compounds do not penetrate the blood-brain barrier and therefore have no CNS side effects. Yet, animal studies show that they are extremely useful for the treatment of the metabolic syndrome and thus promise a great therapeutic potential.

The next two sessions were devoted to the regulation of metabolic and inflammatory processes by endocannabinoid signalling. Dr. Vincenzo Di Marzo from the Institute of Biomolecular Chemistry, Naples, showed approaches to treat metabolic disorders using plant cannabinoids and n-3 polyunsaturated fatty acids. Dr. Sophie Lotersztajn from Inserm, Paris, showed that endocannabinoids modulate several pathogenic steps in liver fibrosis, including the polarization of liver macrophages. Dr. Javier Fernández-Ruiz, Complutense University, Madrid, showed very promising findings demonstrating that cannabinoids offer therapeutic potential in animal models of Huntington’s disease and his preparations for first clinical trials. Dr. Andreas Zimmer from the University of Bonn

showed pronounced analgesic efficacy of the phytocannabinoid beta-caryophyllene in an animal model of neuropathic pain, suggesting that dietary phytocannabinoids contribute to the cannabinoid tone. Dr. Andrea Hohmann, Indiana University, Bloomington also addressed the involvement of the endocannabinoid system in the regulation of pain perception. She presented interesting findings obtained with novel inhibitors of endocannabinoid metabolizing enzymes. The sessions also included presentations from selected abstracts. Drs. Zvi Vogel and Martínez-Orgado discussed the effects of cannabidiol in models of experimental autoimmune encephalomyelitis and hypoxic-ischemic brain damage, respectively. Drs. Sabine Steffens and Onintza Sagredo presented results about the role of endocannabinoid metabolizing enzymes in animal models of atherosclerosis and neurodegeneration. Dr. Judith Alferink showed that CB2 receptor signalling contributes to the susceptibility of cerebral malaria.

The final session on Friday was devoted to translational and preclinical studies. Dr. Manuel Guzmán from the Complutense University in Madrid has pioneered the exploration of cannabinoids as potential anticancer drugs. He discussed molecular mechanisms involved in the determination of cannabinoid-resistant vs. cannabinoid-sensitive human glioma cells. Dr. Aron Lichtman from the Virginia Commonwealth University connected to presentations of the previous session and showed that long-term treatment with inhibitors of fatty acid amidohydrolase maintained anti-nociceptive activity, while the effects of monoacylglycerol lipase inhibitors were short lived, due to a functional tolerance of CB1 receptor-mediated responses. Two oral presentations concluded Friday's meeting. Dr. Evelyn Gaffal showed that CB1 receptors on keratinocytes regulate epidermal barrier function and sensitivity to allergic contact dermatitis. Dr. Ethan Russo presented evidence that some of the potential therapeutic effects of cannabidiol may be mediated by TRPV1 receptors.

Saturday's program started with the last pre-clinical session of the conference, which was devoted to the regulation of bone turnover and brain-to-bone signalling by endocannabinoids. Dr. Itai Bab from the Hebrew University of Jerusalem presented novel findings indicating that cannabinoids modulate bone elongation. His results suggest that cannabis use during adolescence may have growth retarding effects, thus providing further arguments to discourage teenagers from using cannabis. Dr. Ruth Ross from the University of Aberdeen discussed the effects of endocannabinoids on osteoclasts and osteoblast function. Dr. Sabatino Maione presented evidence that the expression of CB1 and CB2 receptors, as well as TRPV1 channels is altered in osteoclasts of osteoporotic women. The talk by Dr. Thomas Randau was awarded with the first prize for oral presentations. He investigated very carefully the endocannabinoid system in mesenchymal stem cells from patients with osteoporosis and found evidence suggesting that a dysfunction in CB2 signalling in early progenitor cells may contribute to a deficit observed in differentiated osteoclasts. The final talk of the session by Dr. Jürg Gertsch showed the use of an in vitro system for the analysis of cannabinoid receptor antagonists on osteoclast activity.

The following two sessions focussed on clinical aspects of cannabinoid therapeutics. Dr. Roger Pertwee from the University of Aberdeen gave a comprehensive overview of potential clinical applications for cannabinoids and provided some interesting mechanistical insights into cannabinoid receptor pharmacology. Drs. Jeffrey Hergenrather and Arno Hazekamp presented results from patient questionnaires. Sarah Martin presented a patient perspective. There were next presentations from the pharmaceutical industry and clinicians by Drs. Philip Robson, William Notcutt, Tjalling

Erkelens, Tim Breuer and Franjo Grotenhermen reporting about the clinical experiences with existing therapeutics and novel clinical trials.

Four speakers presented “Hot topics” in the last session of the meeting. Dr. Stefan Engeli reported about a patient study showing that circulating endocannabinoid levels correlate with blood pressure in patients with obstructive sleep apnea. Dr. Attila Oláh showed effects of cannabidiol on lipid synthesis. Dr. Linda Klumpers presented data from another peripherally restricted CB1 receptor antagonist. Viktor Rempel presented interesting data showing that novel xanthine derivative compounds have activity on cannabinoid receptors and GPR55.

The final lecture of the meeting was given by Dr. Raphael Mechoulam, who started scientific research on cannabinoids by discovering THC in the 1960s and the major endocannabinoids anandamide and 2-AG in the 1990s. He pointed out that the brain produces a large number of small lipids compounds, with, in many cases, completely unknown function. Many of these lipids have the potential to act as signalling molecules. He presented the example of oleoyl-serine, a molecule that was recently found to modulate bone turnover via a G-protein-coupled receptor-dependent mechanism. This remarkable presentation was a very appropriate closing of the meeting. It showed that important neuromodulatory systems probably still await being discovered.

The entire contribution from ISN was used to provide travel support to young students and scientist. The maximum amount of funding was dependent on the country of origin. Applicants from Germany received the lowest level of funding and applicants from overseas the highest level.

### Young scientists receiving ISN travel awards

Name	Current Position	Country	Award Amount
Ester Aso Pérez	Postdoc	Spain	€ 500.00
Francesca Castelli	PhD student	Italy	€ 464.00
Maria de Rosa	PhD student	Italy	€ 498,48
Thi Diep	Postdoc	Denmark	€ 500.00
Justin Fishedick	PhD student	The Netherlands	€ 500.00
Anja Goepfrich	PhD student	Germany	€ 300.00
Felipe Gomes	PhD student	Brasil	€ 1,000.00
Mansour Haddad	PhD student	UK	€ 500.00
Valentina Lucchesi	PhD student	Italy	€ 469.00
Marcus May	PhD student	Germany	€ 300.00
Filippo Molica	PhD student	Switzerland	€ 500.00
Rodríguez Pazos	Postdoc	Spain	€ 461.93
Christin Rakers	Graduate student	Germany	€ 300.00
Hardy Richter	Student	Hungary	€ 439.74
Onintza Sagredo	Ass. Prof.	Spain	€ 447.18
Alexander Zörner	PhD student	Germany	€ 300.00
<b>Total</b>			<b>€ 7,480.33</b>

## **Delegate statistics**

Number of participants: 212

national: 98

international: 114

Breakdown into countries of origin:

Belgium:	1
Brazil:	1
Canada:	1
Coratia	1
Czech Republic	1
Denmark	2
France	1
Germany (host country)	98
Hungary	5
Republic of Ireland	1
Israel	8
Italy	8
Japan	2
Luxembourg	1
Mexico	1
Netherlands	16
Portugal	1
Spain	17
Switzerland	9
United Kingdom	14
USA	20