

Current Topics in Neuroscience NEUR602
Unit 4: "Basic and Clinical Aspects of CNS Inflammation"

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PLACE: Montreal Neurological Institute, Room BT 100
TIME: Wednesday, 2:00-5:00 PM

OFFICE HOURS: By appointment

This unit will deal with a number of aspects of neuroinflammation and brain diseases. The contents of this course will range from an introduction to basic fundamentals of neuroimmune interactions and develop to discussions of the molecular aspects, pathology and clinical presentation of the disease and will explore interventions in its management and treatment. The sessions will be divided into three distinct blocks, each of which will be coordinated by one of the supervising faculty. Each block will focus on a specific topic related to neuroinflammation.

INSTRUCTIONAL METHOD: See introductory section of the syllabus.

EVALUATION: Evaluation is described in the introductory section of the syllabus.

COURSE CONTENT:

SECTION 1- DR JI Zhang

Neuro-Immune Interactions in chronic pain

Section Review (s)

Fabien Marchand, Mauro Perretti and Stephen B McMahon. Role of the immune system in chronic pain. Nature Reviews Neuroscience, 2005 (6) 521-532

Joachim Scholz and Clifford Woolf. The neuropathic pain triad: neurons, immune cells and glia. Nature Neuroscience, 2007 10 (11), 1361-1368

Sept. 3rd- Involvement of glial cells in the pathogenesis of neuropathic pain (mini lecture)

Hidetoshi Tozaki-Saitoh, Makoto Tsuda, Hiroyuki Miyata, Kazuaki Ueda, Shinichi Kohsaka and Kazuhide Inoue. P2Y₁₂ receptors in spinal microglia are required for neuropathic pain after peripheral nerve injury. *The Journal of Neuroscience* 2008, 28 (19), 4949-4956.

Sept.10th - How do immune factors contribute to chronic pain? (mini lecture).

Yasuhiko Kawasaki, Zhen-Zhong Xu, Xiao-Ying Wang, Jong Yeon Park, Zhi-Ye Zhuang, Ping-Heng Tan, Yong-Jing Gao, Kristine Roy, Gabriel Corfas, Eng H Lo and Ru-rong Ji. Distinct roles of matrix metalloproteases in the early- and late-phase development of neuropathic pain. *Nature Medicine* 2008 14 (3), 331-336

Sept. 17th - Update on the new therapeutic strategy for neuropathic pain by targeting glial cells/immune factors (min lecture).

Z Zhou, X Peng, S Hao, DJ Fink and M Mata. HSV-mediated transfer of interleukin-10 reduces inflammatory pain through modulation of membrane tumor necrosis factor in spinal cord microglia. *Gene Therapy* 2008 (15), 183-19

SECTION 2- DR NATHALIE ARBOUR

T lymphocytes and the CNS: beneficial and detrimental interactions

Section Reviews:

Samuel MA and MS Diamond. 2006. Pathogenesis of West Nile Virus Infection: a Balance between Virulence, Innate and Adaptive Immunity, and Viral Evasion. *Journal of Virology*. 80: 9349–9360.

HF McFarland & Roland Martin. 2007. Multiple sclerosis: a complicated picture of Autoimmunity. *Nature Immunology* 8:913-9.

Bergmann CC, TE Lane, and SA Stohlman .2006. Coronavirus infection of the central nervous system: host-virus stand-off. *Nature Reviews in Microbiology*. 4:121-32.

Oct. 1st : Contribution of T cells in controlling viral infections of the CNS

Shrestha and Diamond. 2007. Fas ligand interactions contribute to CD8⁺ T-cell-mediated control of West Nile virus infection in the central nervous system. *Journal of Virology*. 81:11749-57

Oct. 8th , Oct. 15th , and Oct. 22nd : Multiple sclerosis and its animal models

Oct. 8th : Stromnes IM, LM Cerretti, D Liggitt, RA Harris, and JM Goverman. 2008. Differential regulation of central nervous system autoimmunity by TH1 and TH17 cells. *Nature Medicine*.14:337-42.

Oct. 15th: Walsh KB, MB Lodoen, RA Edwards, LL Lanier, and TE Lane. 2008. Evidence for Differential Roles for NKG2D Receptor Signaling in Innate Host Defense against Coronavirus-Induced Neurological and Liver Disease. *Journal of Virology* 82:3021-30.

Oct 22nd :Serafini B, B. Rosicarelli, D. Franciotta , R. Magliozzi, R Reynolds , P. Cinque, L. Andreoni, P. Trivedi, M. Salvetti, A. Faggioni , F. Aloisi. 2007. Dysregulated Epstein-Barr virus infection in the multiple sclerosis brain. *Journal of Experimental Medicine* 204: 2899-2912.

SECTION 3: DR GIAMAL LUHESHI

Inflammation, cytokines and mental disorders

Section Review (s):

-Meyer U, Feldon J & Yee BK. A Review of the Fetal Brain Cytokine Imbalance Hypothesis of Schizophrenia. *Schizophr Bull.* 2008 Apr 11. [Epub ahead of print].

-Patterson PH. Neuroscience. Maternal effects on schizophrenia risk. *Science.* 2007 Oct 26;318(5850):576-7.

-Potvin S, Stip E, Sepeshy AA, Gendron A, Bah R, Kouassi E. Inflammatory cytokine alterations in schizophrenia: a systematic quantitative review. *Biol Psychiatry.* 2008 Apr 15;63(8):801-8.

Oct. 29th- -Meyer U, Murray PJ, Urwyler A, Yee BK, Schedlowski M, Feldon J. Adult behavioral and pharmacological dysfunctions following disruption of the fetal brain balance between pro-inflammatory and IL-10-mediated anti-inflammatory signaling. *Mol Psychiatry.* 2008 Feb;13(2):208-21.

Nov. 5th -Buka SL, Cannon TD, Torrey EF, Yolken RH; Collaborative Study Group on the Perinatal Origins of Severe Psychiatric Disorders. Maternal exposure to herpes simplex virus and risk of psychosis among adult offspring. *Biol Psychiatry.* 2008 Apr 15;63(8):809-15.

Nov.12th - Romero E, Guaza C, Castellano B, Borrell J. Ontogeny of sensorimotor gating and immune impairment induced by prenatal immune challenge in rats: implications for the etiopathology of schizophrenia. *Mol Psychiatry*. 2008 Apr 15. [Epub ahead of print]

Nov. 19th – **No course (Society for Neuroscience meeting)**

Nov. 26th - Smith SE, Li J, Garbett K, Mirnics K, Patterson PH. Maternal immune activation alters fetal brain development through interleukin-6. *J Neurosci*. 2007 Oct 3;27(40):10695-702.

Dec 3rd - *Discussion of grant proposals. (GL, NA, JZ).*