

## **Additional information for Dr. Dantzer: The Laboratory of Neuroimmunology of Cancer-Related Symptoms (NICRS) welcomes GSBS students**

Located in the Institute of Biosciences and Technology of the Texas A&M Health Science Center, NICRS is part of the Department of Symptom Research at The University of Texas MD Anderson Cancer Center. Its faculty (Professors Annemieke Kavelaars, Cobi J. Heijnen, and Robert Dantzer), postdoctoral fellows, and graduate students study the neuroimmune mechanisms that mediate cancer-related symptoms. Patients with cancer experience pain, fatigue, depression, cognitive deficits, and a number of other sickness-like symptoms because of the tumor and the effects of cancer therapy. These symptoms are important because they are distressing for the patient and frequently interfere with adherence to therapy. Moreover, they can persist after the cessation of treatment and can compromise return to social and professional functionality. An understanding of the underlying mechanisms is required to allow development of interventions aimed at alleviating or preventing these symptoms.

Inflammation associated with the tumor and related cancer therapy is the most likely candidate mechanism underlying cancer-related symptoms. This hypothesis is studied at both the clinical and preclinical levels, with an emphasis on pain, depression, fatigue, and cognitive alterations. At the clinical level, investigations focus on immune correlates of symptoms, with the objective of defining a neuroimmune signature of the risk for developing symptoms in response to cancer therapy. At the preclinical level, the emphasis is on the mechanisms that allow the propagation of the peripheral immune message to the central nervous system and the identification of the key cells and molecular signals that are involved in the development and recovery of symptoms. Current targets include G protein-coupled receptor kinases, which regulate inflammation via p38 mitogen-activated protein kinase, and the tryptophan-degrading enzyme indoleamine 2,3 dioxygenase, which generates potentially neurotoxic compounds. In addition, the possibility of using stem cell transplantation to alleviate cognitive impairment will be studied. Approaches are pluridisciplinary and encompass behavioral neurosciences, neuroimmunology, and cellular and molecular biology.

### **Representative articles**

Dantzer R, Meagher M, Cleeland CS. Translational approaches to treatment-induced symptoms in cancer patients. *Nature Rev Clin Oncol* 9(7): 414-26, 2012.

Willemen HL, Huo XJ, Mao-Ying QL, Zijlstra J, Heijnen CJ, Kavelaars A. MicroRNA-124 as a novel treatment for persistent hyperalgesia. *J Neuroinflammation* 9: 143, 2012.

van Velthoven CT, van de Looij Y, Kavelaars A, Zijlstra J, van Bel F, Huppi PS, Sizonenko S, Heijnen CJ. Mesenchymal stem cells restore cortical rewiring after neonatal ischemia in mice. *Ann Neurol* 71(6): 785-96, 2012.

### **Enquiry:**

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