MEETING REPORT

Workshop on “SEMAPHORIN FUNCTION AND MECHANISMS OF ACTION”

Location: FRANCE. The meeting was held at the "Abbaye des Vaulx de Cernay" near Paris.

Dates: May 8-11. 2008.

APPLICANT: ANALIA RICHERI. PhD student. IIBCE. MONTEVIDEO, URUGUAY.

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The expected benefits stated in my application were overwhelmed. My participation in the workshop gave me the opportunity to discuss with scientists working on different experimental systems involving semaphorins. I appreciated very much having the chance to discuss my own results and interact with Dr. Klagsbrun, Dr. A. Bagri, (angiogenesis and cancer), Christine Holt, Oded Behar (Neurvous System). Indeed, I was able to establish academic contact with Dr. A. Bagri. This collaboration allowed me to receive an antibody directed against one of the semaphorins receptors, which will be essential for my future work.

That is why I am strongly grateful for CAEN’s financial support that allowed me to attend this workshop as well for being awarded for my poster presentation by the European Molecular Biology Organization (EMBO). The award consisted of one year subscription to EMBO Reports which, also has positively impacted on the laboratory and other laboratories of the institution.

As mentioned before, this workshop gave a unique chance to regroup and share results from scientists interested in semaphorins and their receptors. Semaphorins are a large and diverse family of secreted and membrane-associated proteins, which are conserved both structurally and functionally across divergent animal phyla. The expression of semaphorins has been described most fully in the nervous system, but they are also present in most, or perhaps all, other tissues. Functionally, semaphorins were initially characterized for their importance in the development of the nervous system and in axonal guidance. Although best known for their role as axonal repellents, semaphorins subserve diverse roles unrelated to axon guidance, including organogenesis, angiogenesis, neuronal apoptosis, neoplastic transformation, and immune system function.

Though multifaceted, the disparate interests of scientists working on how semaphorins influence cellular development and function are united by conserved molecular and cellular principles that define how semaphorins impart their important functions. In this sense this meeting provided a unique venue for enhancing the efforts of research in fields which have much to teach each other, but which often do not have a suitable forum for productive interactions. I believe this workshop accomplished one of its main objectives that was to foster discussion, cross-disciplinary exchange of ideas, and the establishment of new collaborations among scientists working on different experimental systems involving semaphorins.

The workshop consisted of five sessions which dealt with the several cellular contexts in which semaphorins are involved: neuronal development, signaling, immunology, angiogenesis, and cancer/diseases. Within each session speakers who have made major contributions in the field tackled these issues from different points of view. (Speakers detailed below).

Workshop sessions:

- Neural Development I
- Immunology
- Signaling and Nervous System II
- Angiogenesis
- Cancer and disease

A common theme in the mechanisms of semaphorin function is that they alter the cytoskeleton and the organization of actin filaments and the microtubule network. These effects occur primarily through binding of semaphorins to their receptors, although transmembrane semaphorins also serve as receptors themselves. The best characterized receptors for mediating semaphorin signaling are members of the neuropilin and plexin families of transmembrane proteins. In fact, the workshop allowed all the participants to enjoy the closing lecture in which Dr. Hajime Fujisawa shared with us his own experience in the discovery of these semaphorin receptors and their function in neural development. Dr. Fujisawa presented his both discoveries of Neuropilin-1 and PlexinA1 employing hybridoma techniques in 1991 and 1995, respectively.

From the lectures, one could conclude that given the importance of semaphorins in a wide range of functions, including neural connectivity, angiogenesis, immunoregulation, and cancer, much remains to be learned about these proteins and their roles in pathology and human disease. For instance, Dr. Kevin Mitchell presented results showing the involvement of certain transmembrane semaphorins and their receptors in the etiology of schizophrenia. Variation in several of these genes has been associated in humans not only with schizophrenia, but also with anxiety, cognitive performance and white matter volume. This author suggests that class 6 semaphorins and plexinsA family mutants may be informative models to investigate how neurodevelopmental defects can lead to altered physiology and behaviour that may be of direct relevance to the etiology of schizophrenia.

Another speaker, also organizer of the meeting, Dr. Ginty presented results showing that Sema3F modulates synaptic transmission in the adult mouse hippocampus. This finding illustrates the diverse functional repertoire of these guidance molecules and suggests involvement in both the formation and synaptic efficacy of neural circuits.

As the biological functions of Semaphorins continue to be dissected at multiple levels we are likely to answer questions about their involvement in neuronal plasticity, regeneration and neurobiological disease and come up with ways to modulate semaphorin function to treat injury or disease.

Speakers:

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