MGSE Workshop

Confirmed speakers

Prof. Dr. Loriano Ballarin (University of Padova, IT)

Focus on: Ascidian immunobiology, allorecognition, tunicate haemocyte differentiation, apoptosis and recognition of apoptotic cells and corpses

Prof. Dr. Baruch Rinkevich (National Institute of Oceanography, Haifa, IL)

Focus on: marine invertebrates, immunology and developmental biology, aging processes, cell cultures and stem cells from marine invertebrates

Prof. Dr. Louis Du Pasquier (University of Basel, CH)

Focus on: evolution of the immune system, origin of the lymphocyte receptors of the immunoglobulin superfamily

Evolutionary Aspects of Allorecognition: From Intraspecific Conflicts to Links with Adaptive Immunity 6-7 July 2015

Allorecognition

Allorecognition is generally defined as the intraspecific capability of nonself recognition. In invertebrates, it has been described in taxa with sessile, encrusting colonial (clonal) species (sponges, cnidarians, bryozoans, tunicates) in which the reproductive success depends on the ability to compete for substrate colonisation with other species and with other conspecifics and where “natural transplants” frequently occur when colonies contact each other. In this case, either a fusion of colonies in a larger chimeric colony or a nonfusion reaction, preventing colony fusion, occurs depending on the presence or absence of shared alleles at a limited number of highly polymorphic fusibility/histocompatibility loci.

Histocompatibility

Larger colonies deriving from fusion have undoubtedly some advantages with respect to smaller colonies, such as a higher capability of competition and of surviving to the attack of predators, a higher fecundity, as a great number of zooids contribute to gamete production, or a benefit in terms of resource sharing. In most cases, fusion leads to chimerism, in which a competition between somatic and/or germ cells of different origin can occur leading to somatic or germ cell parasitism, in which one of the cell lines, out of the two deriving from the fused colonies, can prevail and parasitise the whole chimeric colony. Hence, there is a need for histocompatibility, as an acquired response to prevent within-organism conflicts, and the appearance of genetic systems limiting fusion to genetically related colonies.

Allorejection

According to various authors, histocompatibility acts by means of discriminatory nonfusion or allorejection rather than by discriminatory fusion. Sometimes, transitory fusion occurs followed by rejection or resorption of one of the two partners. Allorejection, in all the species considered so far, presents divergences and similarities; in any case, it has the typical features of an inflammatory reaction, including recruitment of a selected, cytotoxic cell type (e.g., cnidocytes), cell degranulation, and the induction of cytotoxicity.

Evolution of self-recognition systems

Growing evidence suggests that animals have evolved a variety of molecular mechanisms to distinguish self from nonself, including VCBPs in protochordates, FREP proteins of molluscs, and VLR receptors in agnathans. All of these molecules, including the *Botryllus* Fu/HC and *Hydractinia* allorecognition proteins, share high polymorphic extracellular domains; in most cases, they have extracellular Ig domains in their sequence/structure.

Issues addressed in the workshop will be:

- What is the origin of the adaptive, Ig domain-based immunity of jawed vertebrates?
- Which relationships, if any, exist between the innate immunity of invertebrates and the adaptive immunity of gnatostomes?
- What can be the origin of the accumulation and maintenance of the extensive polymorphism found in genes involved in allorecognition?

The goals of this workshop are:

- to train the doctoral students in the concept of allorecognition and educate them about the evolution of the immune system,
- to foster collegial exchange and identify opportunities for collaboration on immunobiology,
- and to initiate regular discussions amongst PIs and students of the MGSE which may result in a review/opinion paper or the development of research proposals.

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