BIOLOGICAL ROLES OF CD23, THE LOW AFFINITY RECEPTOR FOR IgE

We are seeking a highly motivated student to do a masters project or equvalent in experimental immunology, starting in August/September 2011. You should have passed a course in immunology in Sweden and have strong knowledge in immunology. Since the project involves handling of mice you need to feel comfortable with this. A passed research animal course and experience from animal work is qualifying.

The project will be performed at the Department of Medical Biochemistry and Microbiology, unit of Experimental Immunology, BMC, Uppsala, under the supervision of assistant professor Frida Henningson.

Project description

Immunoglobulin E (IgE) is thought to have evolved in mammals as the first line of defense against pathogens, but in modern civilization IgE has turned into being a key player in atopic diseases. Atopic diseases, such as allergic asthma and atopic eczema are now among the most common causes for chronic disease in the western world. Around one in three of the population suffers from allergies. Because of this, IgE has become a molecule of great interest since its discovery over 40 years ago.

IgE has two receptors, FcεRI (high affinity receptor for IgE) and CD23 (low affinity receptor for IgE, FcεRII).

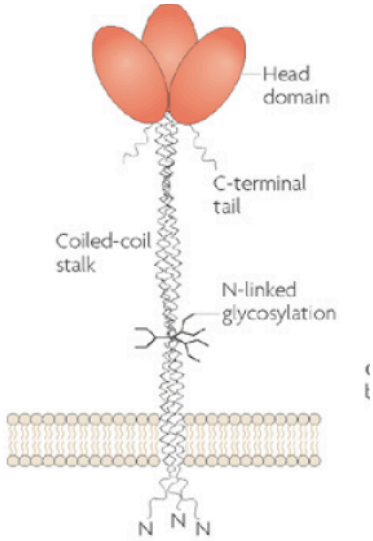


Figure 1.
Structure of membrane bound CD23

We are investigating the biological role of CD23, the low affinity receptor for IgE. Antibodies of IgE-type in complex with antigen have a strong immune stimulating capacity in vivo and it has been shown that CD23, expressed on B-lymphocytes is a key player in this process. We have shown that $CD23^+$ B cells transport IgE-IC to the follicles of the spleen, where it delivers the IC to dendritic cells, being the important antigen-presenting cells. CD23 is a C-type lectin binding carbohydrate structures. CD23 is the only member of the Fc-receptor family that has this structure. However, many receptors in the C-type lectin family are so called pattern recognition receptors (PRRs), binding pathogen associated molecular structures. These receptors are important in the innate immunity towards microbes and viruses. We are now seeking new ligands for the receptor CD23, hoping to show that it, in addition to its IgE-binding properties can function as a pattern recognition receptor, showing a new, unique connection between pathogen infection and allergies.

PRRs function to maintain the balance between controlled responses to pathogens and uncontrolled innate immune activation leading to inflammation. If the immune system can not separate between self and non-self/harmful self (as in necrotic cells)

this might lead to proliferation of the pathogen and sepsis. It can also lead to development of autoimmune and allergic disease. Since CD23 is involved in adaptive immunity, being a receptor for IgE, finding that it is also a PRR would give an unique, new connection between the innate and adaptive immunity.

This project is starting up now, and you will get the opportunity to join our young group with this exciting project, investigating totally new areas of immunology.

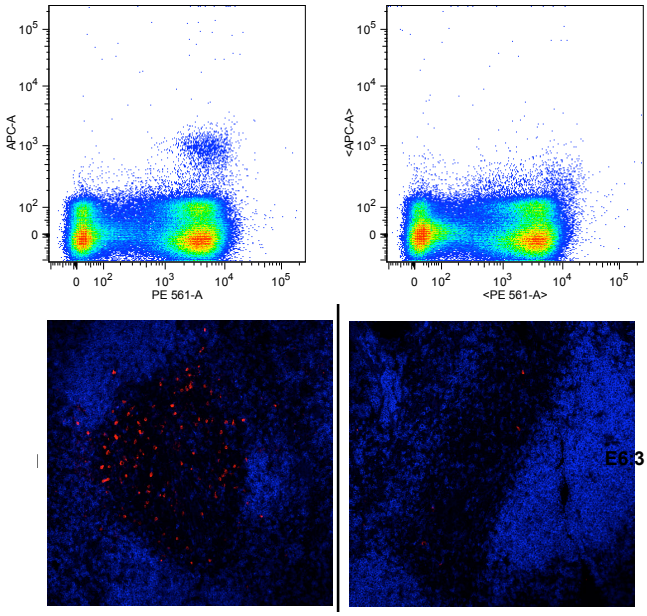
If you

- are a motivated student with a big interest in immunology
- have passed an immunology course in Sweden
- enjoy lab work
- can work independently
- feel comfortable with handling of research animals, especially mice
- are interested in learning new techniques

this could be an interesting project for you.

Methods used in the project are:

- Expression and purification of recombinant proteins
- Cell culture, both bacteria and eukaroytic cells
- Flow cytometry
- Confocal microscopy
- Intravenous injections in mice



For more information, please contact:

Assistant Professor Frida Henningson:
frida.henningson_johnson@imbim.uu.se