Researchers from 5 countries to test hygiene hypothesis

May 28 2008

Why do Finnish children have type 1 diabetes and allergic symptoms approximately 5 times more often than children in Russian Karelia?

High living standards and the life style connected to them seem to promote the development of autoimmune diseases and allergic symptoms. This has lead to the assumption that the immune system begins to overreact to the organism's own structures or to exogenous non-infectious proteins, i.e. allergens, when it does not have to work hard enough to protect the individual from infections.

The European Union with its Seventh Framework Program has allocated 6 million euros to the University of Helsinki coordinated DIABIMMUNE research project for the years 2008-2013 to establish whether the decrease in the infection load is connected to type 1 diabetes and the emergence of allergies.

The project comprises 12 partners from five countries. The study will include 7 000 children from Finland, Estonia and Russian Karelia in northwestern Russia. In each country the study will follow more than 300 children from birth to their 3rd birthday. In addition, the research will focus on 2 000 children from their third to fifth birthdays.

"Earlier we have studied autoimmune phenomena and allergic responses in Finnish and Russian Karelian school children. Now we are to study infants and toddlers in order to yield new information on the maturation of the immune system and the interaction between the immune system

and the environment", says Professor Mikael Knip from the University of Helsinki.

Based on earlier studies it is known that the incidence of type 1 diabetes is six times higher and the prevalence of celiac disease five times higher among Finnish children than among Russian Karelian children. The HLA gene variants that predispose people to autoimmune diseases are however approximately equally common in both populations. The studies have also revealed that Russian Karelian school children have helicobacter antibodies as signs of earlier infections 15 times more often, Toxoplasma antibodies five times more often, and hepatitis A antibodies 12 times more often than Finnish children. Karelian children also have considerably more often antibodies against the Coxsackie B4 virus, belonging to the enterovirus group, than Finnish children have.

"The differences in the frequency of autoimmune phenomena and allergic responses between Finland and Russian Karelia cannot be due to genetic causes. High living standards and the associated life style appear to promote the development of autoimmune diseases and allergic responses", Knip says.

The DIABIMMUNE project focuses for example on the development of the intestinal bacterial flora after birth and the effect the living environment has on the composition of the bacterial flora. The research also studies the effect infections have on the maturation of the human immune system and the operation of the white blood cells that regulate immune responses. In addition, the researchers study whether the protection conferred by infections against autoimmune and allergic responses is associated with the overall infection load or due to specific microbes. The project also examines the effect of the child's nutrition on the maturation of the immune system, the intestinal bacterial flora and the occurrence of infections.

“The diseases we are studying are the most common chronic diseases in children and their impact, both societal and medical, is vast. We are searching for ways to stop these diseases from becoming more frequent and to prevent their development”, Knip says.

Source: University of Helsinki