Press release

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The biological bases of good health

In a biological sense, what does it mean to be "in good health"? This far-reaching question is the focus of a Laboratories of Excellence project known as "Milieu Intérieur" ("Environment Within"), coordinated at the Institut Pasteur by Professor Matthew Albert (Dendritic Cell Immunobiology Unit, Institut Pasteur/Inserm) and Dr. Lluis Quintana-Murci (Human Evolutionary Genetics Unit, Institut Pasteur/CNRS). The Milieu Intérieur cohort is the first French cohort of its kind, comprised of a thousand healthy donors. Studying this cohort will serve to define the parameters of a healthy immune system. The recent analysis of the first results generated from the cohort represents an important milestone for the scientists in this consortium. In addition to having direct applications in the field of health, the results of this program are of direct interest to the scientific community, as they define a new control system for patient population studies. They should also improve understanding of the variability between individuals, thereby providing reference tools for adapting treatments with a view to developing a personalized approach to patient care.

Despite the fact that immune responses are extremely complex and vary from one person to another, medical practices and public health policies are based on a single model of patient care and drug development. The Milieu Intérieur project was created specifically to address this paradox. This Laboratory of Excellence involves around thirty scientists from the top French research centers[1]. At the Institut Pasteur the project is coordinated by Professor Matthew Albert (Inserm research director) and Dr. Lluis Quintana-Murci (CNRS research director). Its primary objective is to define and increase understanding of the notion of a "healthy" donor, in order to give the research world an unprecedented opportunity to study the relationship between genetics, immunity and environment.

The scientists have just published the recruitment criteria for a cohort of healthy donors, comprising 500 French men and 500 French women aged between 20 and 69 and all in good health. The project has already led to the constitution of a biobank of different samples, including blood, nasal and stool

[1] Institut Pasteur, Institut Curie, Paris-Diderot University, Paris-13 University, INSERM and CNRS

samples as well as skin biopsies. The scientists have also collected medical, nutritional and sociodemographic data, as well as information about donors' lifestyles.

The statistical approach initially adopted by the scientists enabled them to pinpoint the known correlation between certain biological profiles and the age and sex of donors. It confirmed in particular that LDL cholesterol levels increase with age and that creatinine – which measures renal function – is higher in men than in women. These initial results highlighted the integrity and significance of the data collected, and validated the Milieu Intérieur cohort as a benchmark group for the French population.

With the help of biological and epidemiological data, the scientists were also able to observe the impact of environmental factors, in particular smoking, on the immune system, and then draw up a table of biological criteria – an increase in white cells circulating in the blood stream, a reduction in certain classes of antibodies (IgG), etc. – marking out smokers amongst the donors within the cohort as a whole. This work highlights a more general impact of tobacco on health, which goes beyond pulmonary toxicity, and which is to be placed in the wider context and interpreted when all results have been analyzed.

In the long term, the Milieu Intérieur project aims to provide a new reference framework and data control system for patient studies. By providing a better understanding of the variability of immune responses between individuals, it should also constitute a first step towards personalized medicine, tailoring treatment to the individual and developing drugs and diagnostic tests that match the genetic and immune profile of each patient.

Find out more

www.milieuinterieur.fr/fr
Presentation video: https://www.youtube.com/watch?v=IXlKElDJMc8

Source

The Milieu Intérieur study – an integrative approach for study of human immunological variance, *Clinical Immunology*, January 8, 2015.
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