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Press Release

Immune system and intestinal bacteria: the key to balanced cohabitation

Researchers from the Institut Pasteur, CNRS and Inserm have just discovered a key mechanism that maintains the essential balance between bacteria living in our intestine and the immune system controlling them. Their research, published in the journal *Nature*, paves the way for new forms of treatment for infectious diseases of the intestine, such as dysentery, or chronic inflammatory diseases, such as Crohn's disease.

There are billions of bacteria in our intestine. These bacteria are not harmful, but help with digestion and also play a protective role by forming a barrier around the intestine, thus preserving it from attacks by pathogenic organisms. But, when their development ceases to be regulated, they can proliferate and become pathogenic themselves. The balance between these bacteria, known as commensals, and the immune system controlling them, is therefore essential. Changes in this balance can cause severe intestinal diseases, such as Crohn's disease, or other chronic inflammatory conditions with serious sequelae.

In an article published in *Nature*, Gerard Eberl and his Lymphoid Tissue Development Group at the Institut Pasteur (CNRS, URA1961) give a step-by-step description of a mechanism that maintains this subtle balance between intestinal commensal flora and the immune system. In particular, the researchers demonstrate how certain bacteria trigger an immune response leading to the formation of new lymphoid tissues responsible for modulating their development.

The scientists first show that an essential component of the bacterial wall, recognized by a protein in the epithelial cells of the intestine, triggers the first step of an immune chain reaction. This reaction leads to the formation of lymphoid tissues which, in turn, secrete immunoglobulins. It is these small molecules that control the bacterial flora on the surface of the intestine.

Above all, in cooperation with Ivo Gomperts Boneca and his Biology and Genetics of the Bacterial Cell Wall Group (Institut Pasteur/AVENIR Inserm Team), Gérard Eberl's team demonstrate that, once isolated, the bacterial cell wall component can alone induce this

regulation mechanism. Thus, thanks to this molecule, researchers hope to contribute to the development of new forms of treatment against inflammatory diseases of the intestine and intestinal infections.

Source

"Lymphoid tissue genesis induced by commensals through NOD1 regulates intestinal homeostasis", **Nature**, published on line on November 5, 2008.

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