

BACCALAURÉATS GÉNÉRAL ET TECHNOLOGIQUE
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ÉPREUVE SPÉCIFIQUE MENTION « SECTION EUROPÉENNE OU DE LANGUE ORIENTALE »
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Binôme : Anglais / SVT

THEME : 3 A Immune system Série S

Sujet n°8

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Cholesterol Boosts the Memory of the Immune System

5 The immune system becomes acquainted with a pathogen during an initial infection and understands that it must be combated. When the T cell receptors of the immune system come across the same pathogen a second time, they are much more sensitive toward them than during the first encounter, and it thus takes less pathogens to activate the immune system. It was previously unclear why the receptors become more sensitive.

10 In 2011, Schamel's research group and a team led by Prof. Dr. Balbino Alarcon from the Autonomous University of Madrid, Spain, found the answer to this fundamental question. In a publication in the journal Immunity, they showed that the increased sensitivity is caused by a clustering¹ of the T cell receptors: In a naive cell that has not yet met the pathogen, the receptors are arranged individually on the cell membrane, each fending for itself. A large number of receptors thus needs to be confronted by a large number of pathogens in order for the immune system to react. In a so-called memory cell, which remembers the pathogen, the receptors are arranged in groups on the membrane. When a pathogen binds to a receptor from a cluster, all of the receptors within the cluster are activated at once. This makes the immune system more sensitive. The team
15 has succeeded in demonstrating how a cell forms these receptor clusters. The research group isolated the receptors and reconstructed them in a synthetic membrane. After one and a half years of work, the scientists discovered that the composition of the lipids of a membrane is responsible for the clustering of the receptors. The lipid composition of a naive cell differs from that of a memory cell. Cholesterol is the key factor in this process, as it is present in higher concentrations in a
20 memory cell. This higher concentration of cholesterol leads to the aggregation of receptors, because the cholesterol joins them together like glue.

Dec. 21, 2012

From <http://www.sciencedaily.com/releases/2012/12/121221081619.htm>

Sum up this article and explain the main ideas using your scientific knowledge

¹ Clustering: regroupement