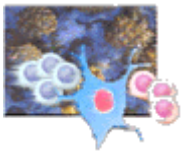
BURNET'S CLONAL SELECTION THEORY



The 1960 Nobel Laureate Sir Frank McFarlane Burnet was a great researcher in the history of immunology. To date, his theory is still the accepted explanation for B-cell-mediated adaptive immune responses. Furthermore, the theory may be applied to T-cell-mediated adaptive immune responses too.

Sir F.Macfarlane Burnet (1899-1985)

Postulates of Clonal Selection Theory:

1. The "universe of antigens" of the surrounding environment corresponds to the clonal diversity of T cells and B cells in each human body. Nowadays, it is known that most amino acid sequences of TCR and BCR are encoded by the certain genes located on chromosomes 2, 7, 14, and 22.

2. If a random antigen invades the body, the pre-existing T-cell clone and B-cell clone are involved in the adaptive immune responses. These processes result in the formation of specific T cells and antibodies directed to the antigen. Finally, the immune system eliminates the antigen and even develops a memory about this event.

3. Lymphocytic clones specific to self-antigens are deleted, deactivated or suppressed during T lymphopoiesis and B lymphopoiesis, and in the periphery. The state is called self-tolerance.

4. Self-antigens in the *immune privileged sites* (the eye, brain, placenta, testes, etc.) are inaccessible for the immune system in the course of T lymphopoiesis and B lymphopoiesis, so there is also self-tolerance to these autoantigens. However, this may be broken down if contact of lymphocytes with these self-antigens occurs.