Istituto di Ricerca in Biomedicina
Institute for Research in Biomedicine

NEWS

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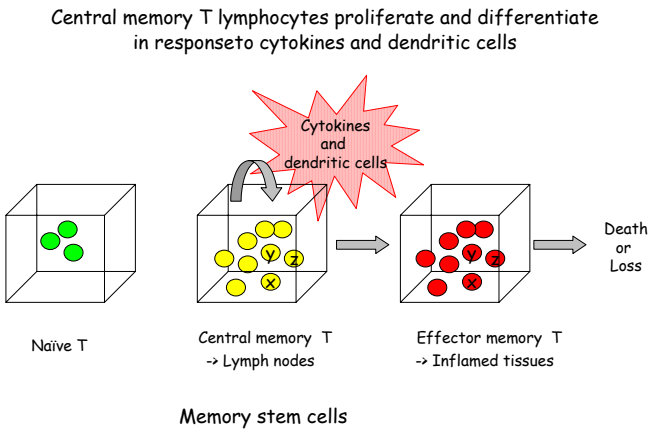
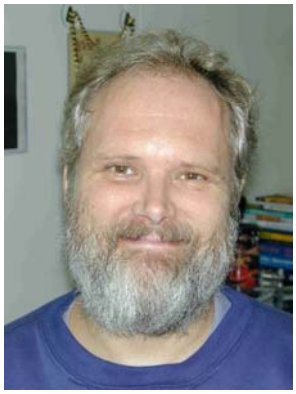
How memories are maintained in the immune system

The ultimate goal of vaccination is to induce and maintain for a lifetime protective memory, i.e. levels of specific antibodies and cytotoxic T lymphocytes sufficient to prevent disease upon encounter with a given infectious agent or toxin. IRB researchers have previously identified two types of memory T lymphocytes that perform distinct functions: "central memory" T lymphocytes, that traffic through secondary lymphoid organs and mount secondary responses upon reencounter with the same infectious agent that has elicited the memory response, and "effector memory" T lymphocytes, that home to inflamed tissues and can immediately react against the specific pathogen. They are now investigating the mechanisms that maintain constant levels of effector memory lymphocytes. In a study published in the December 2001 issue of the *Journal of Experimental Medicine*, Jens Geginat and colleagues show that, in the absence of antigen, central memory T cells proliferate in response to cytokines and dendritic cells and, while proliferating, differentiate to effector cells. They propose that central memory cells behave as "memory stem cells". Being capable of self renewal and differentiation, central memory T lymphocytes maintain constant levels of effector memory T cells which are continuously consumed in inflamed tissues. Scientists at the IRB are now extending the "memory stem cell" paradigm to B cell responses to understand how protective antibody levels can be maintained constant for a lifetime. These studies will ultimately help to define new strategies of vaccination capable of eliciting long term protective immunity.



References: Sallusto et al, Nature. 1999 401:708; Geginat et al. J Exp Med. 2001 194:1711.

Prof. Ian Clark-Lewis from the University of British Columbia at Vancouver, Canada, arrived at the IRB for a sabbatical.



Prof. Ian Clark-Lewis was born in Australia where he studied and obtained his PhD in biochemistry. He gained world wide reputation as an expert in peptide synthesis. Since the discovery of the first chemokine 14 years ago he has chemically synthesized all known human chemokines and in addition, produced a wide range of variants with specific structural modifications. His research focuses on structure/function relationships of these essential mediators of leukocyte traffic. Chemokines represent the most important guidance clue for the recruitment of leukocytes to inflammatory sites and also for homing and activation of leukocytes in lymphoid organs. Several groups at the IRB have long standing collaborations with Prof. Ian Clark-Lewis.