Marc BAJÉNOFF, PhD

Group leader:
From lymphoid structure to lymphocyte migration

Background

In 1998, I joined the CIML where Iperformed my doctoral training under the supervision of Dr S. Guerder.

I then joined the laboratory of Pr. Glaichenhaus in 2003 (Valbonne) for a post-doctoral training. During that period, I also had the chance to work 2 years in Dr Germain's lab in the NIH where I got familiarized with 2P microscopy.

I was recruited as a CNRS researcher in 2006 and eventually setlled my laboratory in the CIML in 2010.

Main achievements

During my doctoral training, I studied the influence of lymph node (LN) architecture on the regulation of CD4+T cell/Dendritic Cell (DC) encounters using static imaging techniques. In this work we demonstrated that incoming DCs do not settle randomly in the LN but rather accumulate around high endothelial venules, the entry door of blood circulating lymphocytes.

This strategic location allowed blood circulating CD4+T cells to rapidly find their Ag loaded DCs as soon as they entered the LN via these structures. This study allowed me to get familiarized with LN anatomy as well as with static imaging techniques (mainly confocal).

During my post-doctoral trainings, I extended my investigations and studied the influence of lymphoid organ structures on the immune system using a dynamic approach (2-photon microscopy). My main contribution to my own research field was made during that period with our discovery that, in secondary lymphoid organs (SLOs), T and B cells migrate on different subsets of stromal cells, namely the Fibroblastic Reticular Cells (FRCs) and the Follicular Dendritic cells (FDCs) that populate T and B cells areas respectively.

These studies were the first applications of the 2-photon methods for intravital imaging to an extensive analysis of the function of stromal elements within lymphoid tissues. Given the assumption by most readers of existing imaging papers that dynamic lymphocyte movement reflected free migration in an open field with no specific guidance cues, these articles provided a very different picture of how immune cells were positioned and moved within organized lymphoid tissues.

They also emphasized the critical importance of visualizing stromal elements in understanding immune cell function within lymphoid tissues as well as the danger of ascribing cell autonomous behavior to cells simply because important features of the tissue are not fluorescent and hence, are not visualized.

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Selected publications

- Bajénoff M, Germain RN., B cell follicle development remodels the conduit system and allows soluble antigen delivery to follicular dendritic cells. *Blood.* 2009 Dec 3;114(24):4989-97
- Bajénoff M, Glaichenhaus N, Germain RN., Fibroblastic reticular cells guide T lymphocyte entry into and migration within the splenic T cell zone. *J Immunol.* 2008 Sep 15;181(6):3947-54.
- Bajénoff M, Egen JG, Qi H, Huang AY, Castellino F, Germain RN., Highways, byways and breadcrumbs: directing lymphocyte traffic in the lymph node. *Trends Immunol.* 2007 Aug;28(8):346-52.
- Bajénoff M, Egen JG, Koo LY, Laugier JP, Brau F, Glaichenhaus N, Germain RN., Stromal cell networks regulate lymphocyte entry, migration, and territoriality in lymph nodes. *Immunity* 2006 Dec;25(6):989-1001.
- Bajénoff M, Granjeaud S, Guerder S., The strategy of T cell antigen-presenting cell encounter in antigen-draining lymph nodes revealed by imaging of initial T cell activation. *J Exp Med.* 2003 Sep 1;198(5):715-24.

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