

### Key Facts

- **Team :**  
 Researchers : 1  
 Technicians : 6  
 PhD students : 3  
 Postdoc fellows : 3
- **Translational approaches :**  
 Patents : 4  
 Clinical research grants : 4  
 Industry partners : 1
- **International research links :**

### Keywords

- Tumor immunity
- Antigen cross-presentation
- Autophagy
- Bladder cancer
- Hepatocellular carcinoma
- Biomarkers
- Cytometry
- Mouse models
- Human subject studies

### Biological resources

- Clinical trial C07-11 (Inserm), C10-08 (Inserm), C10-54 (Inserm), C11-33 (Inserm)
- RBM 2007-40 (Institut Pasteur), 2004-09 (Institut Pasteur), 2006-02 (Institut Pasteur)

**Our uniqueness stems from the application of a bedside-to-bench approach to scientific discovery that ensure we stay rooted in medically relevant questions, which help direct our pathogenesis-based studies of immune regulation.**

### Research brief

The Albert lab addresses fundamental questions related to mechanisms of antigen cross-priming as well as tumor immunity in bladder cancer and hepatocellular carcinoma (HCC). Of particular importance is how antigen-presenting cells (APCs) capture and present peptide antigens acquired from phagocytosed dying cells. Termed cross-presentation, this process plays a critical role in immune surveillance by allowing priming of CD8+ T cells to tumor antigens that are not normally expressed by APCs. We have recently demonstrated that the status of the autophagy pathway within dying cells has a profound influence on the efficiency of cross-presentation, indicating additional complexity in the interplay between the dying cell and the APC.

In the context of bladder cancer, we aim to define the mechanism by which BCG immunotherapy mediates tumor immunity. Following from our mechanistic studies and pre-clinical results, we have identified a strategy to enhance immunotherapy by strengthening the patient's immune response.

Additionally, we have progressed in our work on HCV infection, currently the main cause of hepatocellular carcinoma worldwide. With respect to the state-of-the-art for tumor immunity, evidence suggests that lymphocyte infiltration into tumors is associated with a good prognosis. We are particularly interested to apply our ideas to the treatment of HCC. This choice is based on the urgent medical need for new approaches for the management of HCC.

### Methodologies used

- Imaging flow cytometry (AMNIS)
- Tetramer enrichment
- Multiparametric cytometry
- Small animal imaging
- Single cell qPCR
- Luminex based biomarker discovery
- Mouse models
- Observational studies
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### Publications

- Casrouge A, Decalf J, Ahloulay M, Lababidi C, Mansour H, Vallet-Pichard A, Mallet V, Mottez E, Mapes J, Fontanet A, Pol S, Albert ML. Evidence for an antagonist form of the chemokine CXCL10 in patients chronically infected with HCV. *Journal of Clinical Investigation*. Jan 4;121(1):308-17 (2011).
- Bouvier I, Jusforgues-Saklani H, Lim A, Lemaitre F, Lemercier B, Auriou C, Nicola MA, Leroy S, Law HK, Bandeira A, Moon JJ, Bousso P, Albert ML. (2011) Immunization route dictates cross-priming efficiency and impacts the optimal timing of adjuvant delivery. *Frontiers in immunology* 2: 71.
- Cécile Alanio, Fabrice Lemaitre, Helen KW Law, Milena Hasan, and Matthew L. Albert. Enumeration of human antigen-specific naive CD8+ T cells reveals conserved precursor frequencies. *Blood*. 115(18):3718-25 (2010).
- Yatim N and Albert ML. Dying to Replicate: the orchestration of the viral life cycle, cell death pathways and immunity. *Immunity*. 2011 Oct 28;35(4):478-90.
- Breban R, Bisiaux A, Biot C, Rentsch C, Bousso P, Albert ML. (2012) Mathematical model of tumor immunotherapy for bladder carcinoma identifies the limitations of the innate immune response. *Oncoimmunology* 1: 9-17.
- Biot C, Rentsch C, Gsponer J, Birkhäuser FD, Saklani HJ, Lemaitre F, Auriou C, Bachmann A, Bousso P, Demangel C, Peduto L, Thalmann GN and Albert ML. Pre-existing BCG specific immunity improves intravesical immunotherapy for bladder cancer. *Science Translational Medicine*. 2012 Jun 6;4(137):137ra72.

Patents, pending/registered

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