

**2-year Postdoctoral fellowship at IBMC  
CNRS / University of Strasbourg, France  
Team “Pathogenesis of Bacterial Infections and Immunity”  
Headed by Dr. Benoit Marteyn**

**Title**

**Role of *Shigella* and *Salmonella* virulence factors in neutrophil activation and cell-death induction**

Upon *Shigella* or *Salmonella* infections, neutrophils are the most abundant immune cells recruited to foci of infections. Our team has previously demonstrated that these interactions occur mainly in low-oxygen conditions, induced by pathogen aerobic respiration. The expression and activity of *Shigella* and *Salmonella* secretion systems (T3SS, T5SS) are tightly regulated by oxygen (Marteyn, 2010) (Tinevez, 2019). Neutrophil viability is maintained under low-oxygen conditions (Monceaux, 2016).

In this project, we aim at deciphering how oxygen modulates interactions between pathogenic bacteria and neutrophils. In more details, we will investigate how *Shigella* and *Salmonella* T3SS and T5SS induce neutrophil activation (inflammasome activation, phagocytosis, degranulation, NET formation) or cell-death (apoptosis, pyroptosis). Experiments will be conducted under controlled oxygen levels (0, 1, 4% O<sub>2</sub>) to reflect various conditions potentially encountered *in vivo*; particularly in mice and guinea pigs, which are the animal models of salmonellosis and shigellosis used in routine in our laboratory.

Tinevez JY, Arena ET, Anderson M, Nigro G, Injarabian L, Andre AC, Ferrari M, Campbell-Valois FX, Devin A, Shorte SL, Sansonetti PJ, [Marteyn BS](#). Enteropathogen mediated oxygen depletion is essential for intestinal mucosa colonization. *Nat. Micro*. 2019 nov 4 (11), 2001-2009.

Monceaux V, Chiche-Lapierre C, Chaput C, Witko-Sarsat V, Prevost MC, Taylor CT, Ungeheuer MN, Sansonetti PJ, [Marteyn BS](#). Anoxia and glucose supplementation maintain neutrophil viability and increase transfusion and transfection efficiency, *Blood*. 2016 Aug 18;128(7):993-1002

[Marteyn B](#), West N, Browning D, Cole J, Shaw J, Palm F, Mounier J, Prevost MC, Sansonetti PJ and Tang CM, Modulation of *Shigella* virulence in response to available oxygen *in vivo*. *Nature*, 2010 May 20;465(7296):355-8

**Team:** The “Pathogenesis of Bacterial Infections and Immunity” team is hosted at the Institut de Biologie Moléculaire et Cellulaire (University of Strasbourg). The team is currently composed of three PhD students, one Master student and a technician.

**Keywords:** *Shigella*, *Salmonella*, neutrophil, oxygen

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**Eligibility**

We are searching for a highly collaborative and inquisitive scientist to join our team. This position is a full-time, 2-year post-doctoral fellowship that requires previous experience in host-pathogen interaction using interdisciplinary techniques and knowledge in cellular and molecular biology.

**Additional comments**

This project will be conducted in collaboration with Pr. Jonathan Jantsch (University of Regensburg, Germany).