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Head, Structural Biology of *Helicobacter Pylori* Virulence Factors



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OTHER PROGRAM AFFILIATIONS



Cancer

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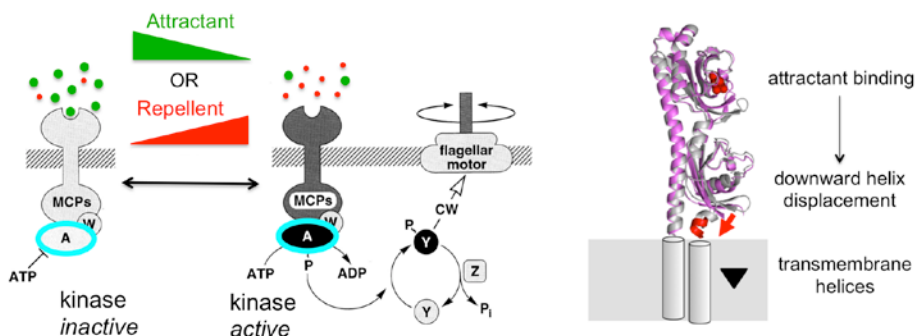
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The research focus of our group is structural biology of virulence factors of the carcinogenic bacterium *Helicobacter pylori*. (I) *H. pylori* must be able to swim by means of its flagella in order to infect the human host and persist for years in the gastric mucosa. We study the mechanism of force generation in *H. pylori* flagellar motor and the structure and function of the key motility and chemotaxis proteins. (II) Development of gastric cancer in infected individuals is facilitated by exposure of gastric cells to *H. pylori* protein CagA. We investigate the mechanism of CagA-mediated gastric cell transformation. (III) The eradication rates achieved with the standard therapy have been declining and now fail in approximately 20%-30% of the patients, mainly due to antibiotic resistance. We investigate structure and function of the essential *H. pylori* proteins that have not yet experienced selective pressure in the clinical setting. The structural insights gained through this work will provide strategies for rational design of novel therapeutics.

Research Projects

1. Carbonic anhydrase inhibitors as new anti-*H. pylori* agents (Collaboration with Dr Terry Kowk-Schulein & Professor C. Supuran (Univ. of Florence))
2. How does *H. pylori* sense environmental cues? (Collaboration with Professor K. Ottemann (Univ. of California))



Selected significant publications:

1. Modak JK, Rut W, Wijeyewickrema LC, Pike RN, Drag M, **Roujeinikova A**. 2016. Structural basis for substrate specificity of *Helicobacter pylori* M17 aminopeptidase. *Biochimie* 121, 60-71.
2. Narayanan S, Modak JK, Ryan CS, Garcia-Bustos J, Davies JK and **Roujeinikova A**. 2014. Mechanism of *Escherichia coli* resistance to pyrrolic acid. *Antimicrob Agents Chemother* 58, 2754-2762.
3. **Roujeinikova A**. 2008. Crystal structure of the cell wall anchor domain of MotB, the stator component of the bacterial flagellar motor: implications for peptidoglycan recognition. *Proc Natl Acad Sci USA* 105, 10348-10353.
4. Masgrau L, **Roujeinikova A**, Johannissen LO, Hothi P, Basran J, Ranaghan K, Mulholland A, Sutcliffe MJ, Scrutton NS and Leys D. 2006. Atomic description of an enzyme reaction dominated by proton tunnelling. *Science* 312, 237-241.
5. **Roujeinikova A**, Baldock C, Simon JW, Gilroy J, Baker PJ, Stuitje AR, Rice DW, Slabas AR and Rafferty JB. 2002. X-ray crystallographic studies on butyryl-ACP reveal flexibility of the structure around a putative acyl chain binding site. *Structure* 10, 825-835.