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Targeting of host organs by gut bacteria peptidoglycan

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Variations in gut microbiota composition and altered production of gut microbiota-derived products have been shown to influence a plethora of mammalian host processes, including gastrointestinal, immune and neuronal functioning and development. However, it is unknown whether and to what extent such perturbations can be mediated by peptidoglycan the major and fundamental constituent of the bacterial cell wall. We have thus set out to establish the *in vivo* uptake and distribution of gut bacteria peptidoglycan throughout the murine mammalian host. By employing fluorescently and radiolabeled bacteria peptidoglycan we have discovered a constitutive, physiological, uptake of gut bacteria peptidoglycan molecules from the intestinal lumen. We have subsequently established which organs are targeted the most and identified the brain as the major reservoir for gut bacteria peptidoglycan. The cortex was identified as the major reservoir of bacterial peptidoglycan, but the olfactory bulb is where peptidoglycan is concentrated the most. We are in the process of identifying which brain cell populations take up peptidoglycan the most. Most peptidoglycan taken up from the gut travels to distant organs via the bloodstream where we have established its proportional distribution (e.g. cells, exosomes, etc.). Other intriguing features were uncovered and are currently being studied, including the possibility for entero-hepatic recirculation and putative vehicles for peptidoglycan shuttling inside the mammalian host. We are in the process of demonstrating that gut bacteria derived peptidoglycan is functional in distant host target organs using an NFkB luciferase reporter mouse model. Alternative methods for *in vivo* tracking of gut bacteria peptidoglycan are in parallel being developed and herein presented.

Biography

Paulo Bastos has a degree in Biomedicine obtained at University of Aveiro (Portugal) and a degree in Biochemistry obtained at Biomedical Research Foundation, Academy of Athens (Greece), in partnership with University of Aveiro (Portugal). He has worked on a Neuroimmunology research group at Institute of Science and Technology (IST) in Vienna (Austria), a Microbiology research group at Institute Pasteur in Paris (France), a Proteomics Unit for the Academy of Athens (Greece), a Proteomics and Cell Signaling research group at the iBiMED, Institute for Biomedicine (Portugal) and a Clinical Pathology Laboratory at the Baixo Vouga Hospital Center (Portugal). He is the first author several peer reviewed publications. Currently, he is a PhD researcher at Institute Pasteur in Paris working on host microorganism interactions. The main project at the moment focuses on Mechanisms for the Dissemination of Bacteria and their Products from the Gut to the Brain and the Consequences Thereof.

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