Beta glucan – new candidate for vaccines and drug delivery

Beta-glucans have been studied extensively as immune stimulants in anti-infective, anti-tumor immunity, immunoadjuvant in cancer therapy, wound healing, and for stress and the lowering of cholesterol. After a long history of research, mechanisms of glucan actions are now established and the role of various receptors such as, CR3 and Dectin-1 and subsequent signaling is clear. With recent studies, stimulation of humoral immunity including antibody response, glucan-mediated immunotherapy may link both innate and adaptive immune responses. In addition, glucan is similarly active in all animal species including humans. One possibility is to use glucan in an immunocyte-targeting delivery system, which is particularly advantageous for therapeutic DNA or RNA. Similar approach uses glucan particles encapsulating various bacterial antigens. Another option is the development of vaccines, where glucan can substitute aluminium and offer higher immunostimulation. As glucan is similarly active when administered orally or parenterally, glucans can improve immunogenicity of oral vaccines. Glucans act as pathogen-associated molecular patterns and recognize specific receptors on immune cells, followed by triggering innate immunity and regulating adaptive immunity. In addition, glucans are safe and biodegradable without tissue deposits. Therefore, glucan-based compounds and formulations are significant vaccine adjuvant candidates. It is clear, that the glucans might offer an ideal solution as they are inexpensive, generally free from side effects and capable of significant biological effects.

Biography
Vaclav Vetvicka has completed his PhD at the Institute of Microbiology in Prague. After working at the same institute as a Researcher, he spent a year at the Oklahoma Medical Research Foundation in Oklahoma City. Since 1991, he is working at the Department of Pathology, University of Louisville, KY, USA. He has published more than 260 scientific publications, seven books and eight international patents.

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