

## Lipopolysaccharide of *Coxiella burnetii*: A promising candidate molecule in search for a new Q fever vaccine

Rudolf Toman and Martina Frimmelova

Slovak Academy of Sciences, Slovak Republic

*Coxiella burnetii* is etiological agent of Q fever. The disease is a worldwide zoonosis affecting mammals, birds and anthropods. In most cases, the human infection follows inhalation of aerosols derived from the excretions and secretions of infected animals such as cattle, sheep and goats. The recent large Q fever outbreak in the Netherlands stressed a need for a new and effective vaccine against Q fever. There were several attempts to produce safe and effective vaccines against the disease in the past. Although these vaccines showed high efficacy in establishing protection against infection, the application of them has been problematic. Vaccination often causes adverse local, or occasionally, systemic reactions in people previously sensitized to the pathogen. Therefore, skin tests, serological tests, and/or in vitro lymphocyte proliferation assays were pre-requisites prior to vaccination. This makes vaccination time-consuming and costly for large-scale applications. Lipopolysaccharide (LPS) has been considered to be a major antigen determinant of virulence expression and infection of *C. burnetii*. The LPS is highly immunogenic and contains a noticeable amount of two sugars virenose (Vir) and dihydrohydroxystreptose (Strep), which have not been found in other LPSs and are considered as unique biomarkers of the bacterium. We have shown that both sugars are located in the O-polysaccharide chain of LPS, mostly in terminal positions. Our studies on modification/modelling of the O-specific chain of *C. burnetii* have indicated that Vir and Strep could be indispensable components for the resulting protective qualities of the vaccine. It appears that LPS of *C. burnetii* is a promising candidate molecule for the development of a new subunit vaccine against Q fever.

### Biography

Rudolf Toman received his PhD in Organic Chemistry and later DSc in Microbiology from Slovak Academy of Sciences, Bratislava, Slovakia. He has published more than 130 papers in reputed journals, edited several books and served as an editorial board member of international journals. He is engaged mainly in glycomic/proteomic and immunological studies of the intracellular pathogen *Coxiella burnetii* that is classified as a category B biological warfare agent.

[virutoma@savba.sk](mailto:virutoma@savba.sk)