Chlamydia-host cell interactions: Studies of lipid rafts, caveolin proteins, the glycolipid exoantigen (GLXA) and intermediate filament proteins

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Abstract

Chlamydial infections are the most commonly reported infectious bacterial diseases. However, very little is known about the complex host-parasite interactions that allow this pathogen to evade host defenses, causing various debilitating infections. Several chlamydial antigens have been investigated in an effort to find a suitable vaccine candidate but with very limited success. Consequently, the focus has recently been directed to host proteins associated with the chlamydial inclusions, with the hope of finding clues to aid in disease prevention. The work presented here examines three such molecules with the hope of better understanding aspects of the chlamydial infection process and related pathologies. ^ Our results show that some serovars/biovars of *Chlamydiaceae* are dependent on lipid rafts containing cholesterol for entry into HeLa cells. However, raft-mediated entry is not a property of all serovars and biovars of the *Chlamydiaceae*. Hence, for the entry, the *Chlamydiaceae* also can enter cells via a cholesterol-rich lipid pathway and colocalizes with caveolin-1 and -2 proteins found in these rafts. GLXA has been shown to enhance chlamydial infectivity when added to cells prior to infection. Here, this study shows that released GLXA can associate with the membranes of infected and uninfected cells, where it facilitates complement-mediated lysis of these cells. Infected cells displaying GLXA on their surfaces were also lysed when human *Chlamydia* sero-positive serum was added in the presence of complement. This suggests that although released GLXA enhances infectivity, it may nonetheless render the pathogen vulnerable to host immune defenses, therefore potentially serving as a powerful tool in the abrogation of chlamydial infections. Finally, host intermediate filament proteins (IF) are borne on the surfaces of released EBs and elicit a strong antiself response in vivo. The sera of patients with various autoimmune disorders, as well as normal blood donors (NBD) displaying elevated anti-Cp antibodies, also contained elevated titers of anti-IF antibodies. Viable chlamydae were found in 25% of NBD samples and 67% of these culture positive samples had elevated anti-IF titers. These findings provide valuable insights into the entry, development and pathogenesis of *Chlamydia*. ^

Subject Area

Microbiology|Immunology

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