

CLINICAL SPECIFICATIONS

STREPTOCOCCAL M PROTEIN

Pathogen Type:

M Protein is an extracellular product of *Streptococcus* that contributes to the pathogenicity of the gram-positive bacterium.

Associated With:

Sydenham's chorea^{1, reviewed in 2}
 Tourette's syndrome^{reviewed in 2,3}
 Obsessive compulsive disorder (OCD)^{reviewed in 2}
 Pediatric autoimmune neuropsychiatric disorders associated with streptococcal infections (PANDAS)^{reviewed in 2}

Known Cross-Reactions: Brain tissues,¹ myosin,^{4,5} β -tubulin⁶

Clinical Significance:

The detection of antibodies to Streptococcal M Protein indicates the patient has increased risk of neurological disorders including, obsessive compulsive disorder (OCD), pediatric autoimmune neuropsychiatric disorders associated with streptococcal infections (PANDAS), rheumatic heart disorders and reactive arthritis. Upon host invasion by Streptococci, M protein is released, which ignites inflammation. M protein is capable of stimulating monocytes via toll-like receptor-2 to produce high amounts of proinflammatory cytokines, including interleukin-6, interleukin-1 β and tumor necrosis factor- α , and that this effect is further augmented by heparin-binding protein.⁷ Antigenic similarity between strep M proteins with heart α -myosin and the resulting antibody and T-cell-mediated immune responses is responsible for injury to the heart valves. The stimulation of inflammation cascades and molecular mimicry between streptococcal M protein and human tissue antigens are not the only mechanisms for the induction of autoimmunity. Streptococcal antigens have the capacity to bind to a number of human serum proteins including IgG, IgA human serum albumin, β_2 microglobulin, fibrinogen and factor H.⁸

This array tests for IgG immune reactivity associated with Streptococcal M Protein. This is not a measurement of acute infection. Equivocal or out-of-range results indicate IgG antibody reactivity to the tested antigen. We tested 288 blood donor sera against Streptococcal M Protein antigens at optimal dilution, 12% of these donors were IgG reactive.

References:

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2. Arnold and Richter. Is obsessive-compulsive disorder an autoimmune disease? *CMAJ*, 2001; 165(10):1353-1358.
3. Müller, et al. Increased titers of antibodies against streptococcal M12 and M19 proteins in patients with Tourette's syndrome. *Psychiatry Res*, 2001; 101(2):187-193.
4. Quinn, et al. Immunological relationship between the class I epitope of streptococcal M protein and myosin. *Infect Immun*, 1998; 66(9):4418-4424.
5. Cunningham, et al. Molecular analysis of human cardiac myosin-cross-reactive B- and T-cell epitopes of the group A streptococcal M5 protein. *Infect Immun*, 1997; 65(9):3913-3923.
6. Vojdani, et al. Antibodies to neuron-specific antigens in children with autism: possible cross-reaction with encephalitogenic proteins from milk, *Chlamydia pneumoniae* and *Streptococcus* group A. *J Neuroimmunol*, 2002; 129(1-2):168-177.
7. Pählman, et al. Streptococcal M protein: a multipotent and powerful inducer of inflammation. *J Immunol*, 2006; 177:1221-1228.
8. Retnoningrum and Cleary. M12 protein from *Streptococcus pyogenes* is a receptor for immunoglobulin G3 and human albumin. *Infect Immun*, 1994; 62(6):2387-2394.