Micropathology Ltd
Tel 24hrs: +44 (0) 24 - 76 – 323222
Fax / Ans: +44 (0) 24 - 76 - 323333
University of Warwick Science Park, Venture Centre, Sir William Lyons Road, Coventry CV4 7EZ
Website: www.micropathology.com E-mail: info@micropathology.com

Group A *Streptococcus* (*S. pyogenes*) testing

Streptococcus pyogenes, also known as Group A *Streptococcus* (GAS) is a bacterium responsible for a spectrum of infections ranging from a sore throat (Strep throat), impetigo, cellulitis, pneumonia and scarlet fever (fever; scarlatiniform rash) to sepsis, toxic shock syndrome and necrotizing fasciitis which has a mortality of ~10%[1,2]. There are also a number of associated post-infection immunological disorders such as rheumatic fever, post-streptococcal glomerulonephritis and PANDAS (Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections) which may cause considerable morbidity[3]. This organism can reside in the upper respiratory tract as a commensal of ~3-5% of adults and up to 10% of children with some people becoming carriers and others going on to suffer associated disease. Transmission is mainly through droplet spread from these individuals however acquisition can also be through breaks in the skin/wounds. As GAS can be very infectious and severe, patients with invasive disease (iGAS) require immediate isolation and often rapid treatment with implemented infection prevention and public health measures[4,5].

Group A streptococci are facultative anaerobes, which tend to form long chains of Gram-positive cocci and smooth colonies on blood agar. Lancefield grouping/MALDI-TOF and sensitivity to bacitracin are most often used to identify this organism once it has been grown on agar or in blood culture bottles[6]. Clients may want to send specimens for molecular detection of GAS when a very rapid detection is required; where there is clinical suspicion of infection but no organism has grown e.g. where antibiotics have been given prior to specimen collection; or where clarification of the identification of an organism is sought.

At Micropathology Ltd, we run two single round PCR assays to detect GAS. The first targets the *S. pyogenes* specific protein DNase B (*sdaB*) and the second is less specific, amplifying the C5a peptidase region (*scpB*) in GAS, Group B *Streptococcus* and Group G *Streptococcus* (*S. dysgalactiae*). These tests are run in conjunction to ensure all GAS organisms can be detected.

UKAS accredited sample types are CSF, EDTA whole blood, tissue, joint fluid and pleural fluid. Unaccredited specimen types may be tested and reported along with an appropriate caveat stating that the assay is not UKAS accredited for testing of alternative sample types.

References

[1] Carapetis JR, Steer AC, Mulholland EK, Weber M. (2005) The global burden of group A streptococcal diseases. Lancet Infect Dis.; 5(11):685-94.

[2] Walker, M.J., Barnett, T.C., McArthur, J.D., Cole, J.N., Gillen, C.M. Henningham, A., Sruprakash, K.S., Sanderson-Smith, M.L, Nizet, V., 'Disease manifestations and pathogenic mechanisms of group A streptococcus', *Clinical microbiology reviews,* 2014; 27:2.

[3] Martin WJ, Steer AC, Smeesters PR, Keeble J, Inouye M, Carapetis J, Wicks IP. (2015) Post-infectious group A streptococcal autoimmune syndromes and the heart. Autoimmun Rev.; 14(8):710-25.

[4]Avire NJ, Whiley H, Ross K. (2021) A Review of *Streptococcus pyogenes*: Public Health Risk Factors, Prevention and Control. Pathogens. 22;10(2):248.

[5] UK guidelines for the management of contacts of invasive group A streptococcus (iGAS) infection in community settings v.2 UK guidelines for the management of contacts of invasive group A streptococcus (iGAS) infection in community settings (publishing.service.gov.uk)

[6] UK Standards for Microbiology Investigations Identification of Streptococcus species, Enterococcus species and morphologically similar organism v.4 UK SMI ID 4: identification of Streptococcus species, Enterococcus species and morphologically similar organisms (publishing.service.gov.uk)