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Lab Director: Leslie Douglas, PhD, HCLD(MD), ABB	

Patient: Sample, Sally (1/27/64)	Provider: Jane Doe, MD	Staph & Strep Test
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<u>Sample Collected</u> 02/26/2025	<u>Sample Received</u> 03/03/2025	<u>Sample Tested</u> 03/07/2025	<u>Test Reported</u> 03/10/2025
Sample type: Super Floss – Full Mouth		Test performed by: L. Douglas Test ID: 42979	

Results:
The microbes detected in the submitted sample are indicated below by Present or Absent:

Staphylococcus species	
<i>Staphylococcus aureus</i>	Present
<i>Staphylococcus epidermis</i>	Present
<i>Staphylococcus warneri</i>	Absent

Streptococcus species	
<i>Streptococcus constellatus</i>	Absent
<i>Streptococcus gordonii</i>	Absent
<i>Streptococcus intermedius</i>	Absent
<i>Streptococcus mitis</i>	Present
<i>Streptococcus mutans</i>	Present

The DNA Connexions Strep and Staph Test utilizes the polymerase chain reaction (PCR) technology to detect the presence of targeted microbial DNA. Sensitivity of the test is 1 to 10 microbes with a specificity exceeding 5×10^{18} .

Staphylococcus (staph) is a group of bacteria with over 30 species. A type called *Staphylococcus aureus* causes most infections. Staph infections can range from minor skin problems to life-threatening illness if the bacteria invade deeper into your body, entering your bloodstream, joints, bones, lungs or heart. A growing number of otherwise healthy people are developing life-threatening staph infections.

Streptococcus (strep) are gram-positive aerobic organisms that cause many disorders, including pharyngitis, pneumonia, wound and skin infections, sepsis, and endocarditis. Symptoms vary with the organ infected. In addition to streptococcal pharyngitis (strep throat), certain *Streptococcus* species are responsible for many cases of pink eye, meningitis, bacterial pneumonia and endocarditis.

Staphylococcus aureus is one of the most widespread bacterial pathogens responsible for many infections but its presence does not always indicate infection. *S. aureus* infections can cause an array of diseases from moderately severe skin infections to fatal pneumonia and sepsis. It is also a well-known cause of endocarditis. *S. aureus* is frequently penicillin and methicillin-resistant (Methicillin-resistant *Staphylococcus aureus* or MRSA). Successful outcomes have been achieved in treating antibiotic-resistant strains with oxacillin, flucloxacillin, and gentamicin. (1)

Staphylococcus epidermidis lives on the skin and mucous membranes and is usually harmless. It is a common cause of nosocomial infections, often by forming biofilms on non-native, implanted medical devices. This colonization can result in recurring, seemingly untreatable infections. If an implanted device is contaminated, it should be removed to avoid a dangerous infection like sepsis. *S. epidermidis* is also a recognized cause of endocarditis. Due to the *Staphylococcus* genus' emerging methicillin resistance, infections are often treated with vancomycin. (2)

Staphylococcus warneri rarely causes disease but may cause infections in patients with compromised immune systems. It has been associated with urinary tract infections, meningitis, orthopedic infections, sepsis, septic arthritis, neonatal infections, ventricular shunt infections, and endocarditis. *S. warneri* tends to only affect immune-compromised individuals and even then, very few cases of severe infection have been recorded. It is somewhat antibiotic resistant, most often to penicillin and methicillin. It can be treated with other antibiotics such as vancomycin. (3)

Streptococcus constellatus is part of the normal flora in the oral cavity, urogenital region, and intestinal tract. It can cause abscess formation in the upper body and respiratory tract and is the most common cause of brain and liver abscesses. It has also been found to be involved with pulmonary exacerbations in cystic fibrosis patients. Healthy, non-immune compromised adults rarely get infections. Abscess and infected tissue should be removed if the infection is severe. *S. constellatus* is generally resistant to penicillin but susceptible to other forms of antibiotic treatment such as ceftriaxone. (4)

Streptococcus gordonii is an opportunistic pathogen that can cause local or systemic diseases, such as apical periodontitis, pneumonia, and infective endocarditis. *S. gordonii* shows some antibiotic resistance, but generally is not pathogenic unless it can access the bloodstream. Good oral hygiene can diminish the bacteria's presence in the mouth. Proper care of any open wounds in the mouth will also reduce the risk of infection. When necessary, infections should be treated with ceftriaxone. Amoxicillin, with/without clavulanic acid, and clindamycin in patients who are allergic to penicillin may also be recommended. (5)

Streptococcus intermedius is one of the most common pathogens associated with liver and brain abscesses, thoracic empyema, and infective endocarditis. Infections are rare in adults with normally functioning immune systems, however, *S. intermedius* and liver abscesses have been frequently reported in patients who have recently had dental procedures. *S. intermedius* is highly resistant to many antibiotics including penicillin, ampicillin, and related drugs, but shows general susceptibility to ceftriaxone or a combination of ceftriaxone and metronidazole. (6)

Streptococcus mitis is a commensal bacterium frequently found in the mouth. It most often colonizes the outer surface of teeth as well as mucous membranes. *S. mitis* has been implicated in numerous diseases including dental caries, eye infections, meningitis, pneumonia, odontogenic infections, and endocarditis. While healthy people rarely contract infections, there is evidence that inflammation caused by *S. mitis* may result in cardiac complications even in normal individuals. Good oral hygiene helps prevent infections, including those of the cardiovascular system. *S. mitis* is often penicillin-resistant but shows susceptibility to clindamycin and chloramphenicol. (7)

Streptococcus mutans is found in the oral cavity and is a significant contributor to tooth decay, which it accomplishes by producing lactic acid. Cavities in the tooth are the most common signs of infections. It has been implicated in certain cardiovascular diseases such as extirpated heart valve tissues and atheromatous plaques. Good oral hygiene should prevent most infections. The growth and spread of *S. mutans* can also be reduced by the consumption of certain foods such as green tea, nutmeg, and various herbs. It responds to clindamycin and chloramphenicol if a serious infection needs treatment. (8)

Interpretation of Results Disclaimer: DNA Connexions is not a clinical diagnostic laboratory and cannot provide a diagnosis for disease and/or subsequent treatment. These results are from DNA PCR testing, and indicate the presence of targeted foreign DNA. The information is supplied as a courtesy to health care providers to aid in an overall assessment. This information alone should not be used to diagnose and/or treat a health problem or disease. All reported results are intended for research purposes only and consultation with a qualified health care provider is required.

References

1. Gordon Y. C. Cheung, Justin S. Bae & Michael Otto (2021) Pathogenicity and virulence of *Staphylococcus aureus*, *Virulence*, 12:1, 547-569, DOI: 10.1080/21505594.2021.1878688
2. Lee E, Anjum F. *Staphylococcus epidermidis*. [Updated 2022 Sep 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK563240/>
3. Karam, B. R. S., & Ribeiro, P. M. A. P. (2022). *Staphylococcus warneri*: brief literature review / *Staphylococcus warneri*: breve revisão da literatura. *Brazilian Journal of Health Review*, 5(2), 4358–4364. <https://doi.org/10.34119/bjhrv5n2-043>
4. Jinyan Lin, Yu Zhang, Chongxi Bao, Huasong Lu, Yun Zhong, Chuanfeng Huang, Qiuping Huang, Dezhen Wang, Jing Luo, Ke Wang & Jinliang Kong (2022) The Clinical Features and Management of Empyema Caused by *Streptococcus constellatus*, *Infection and Drug Resistance*, 15:, 6267-6277, DOI: 10.2147/IDR.S382484
5. Marquez AKL, Meester I, Yamada JR, Quevedo TDJM, Najera RIS, Delgadillo RH, González GIM, Ramirez MST, Soto JMS. *Streptococcus gordonii*: An updated review. *International Journal of Applied Dental Sciences*. 2023;9(1)
6. Issa E, Salloum T and Tokajian S (2020) From Normal Flora to Brain Abscesses: Review of *Streptococcus intermedius*. *Front. Microbiol.* 11:826. doi: 10.3389/fmicb.2020.00826
7. Victoria S. Byrd, Attila S. Nemeth, "A Case of Infective Endocarditis and Spinal Epidural Abscess Caused by *Streptococcus mitis* Bacteremia", *Case Reports in Infectious Diseases*, vol. 2017, Article ID 7289032, 3 pages, 2017. <https://doi.org/10.1155/2017/7289032>
8. Nomura R, Matayoshi S, Otsugu M, Kitamura T, Teramoto N, Nakano K. Contribution of Severe Dental Caries Induced by *Streptococcus mutans* to the Pathogenicity of Infective Endocarditis. *Infect Immun.* 2020 Jun 22;88(7):e00897-19. doi: 10.1128/IAI.00897-19. PMID: 32312765; PMCID: PMC7309618