

List of microorganisms identified from the Liquid Colony™ using clinical positive blood cultures

BACKGROUND

Qvella has in development the FAST™ Instrument (not approved for diagnostic use), an automated centrifugal sample preparation system, in conjunction with the FAST™ PBC Prep Cartridge, that rapidly produces a Liquid Colony™ (LC) directly from a positive blood culture (PBC). The LC consists of a purified, concentrated, viable cell suspension of bacteria which can then be used for various downstream microbiology applications, including microorganism identification (ID) and antimicrobial susceptibility testing. This white paper is to share a list of the bacteria that were identified to date in several external beta-testing clinical studies using the FAST™ System.

METHODOLOGY

The FAST™ System was evaluated in 6 clinical laboratories worldwide that used either the BACTECT™ FX (Becton Dickinson), BacT/Alert® Virtuo® (bioMérieux) or the BacT/Alert® (3D) (bioMérieux) as blood culture systems. Prospective PBCs from clinical samples were run on the FAST™ System and Matrix-Assisted Laser Desorption/Ionization Mass Spectrometry (MALDI-TOF MS) was used to identify microorganisms present in the LC. Different MALDI-TOF MS systems were used; MALDI Biotyper® (Bruker) and VITEK® MS (bioMérieux). ID results were compared to the results from overnight subculture or microculture using the same PBC. An ID from the LC was considered correct when it matched the genus and species identification from the isolated colony.

RESULTS/DISCUSSION

A total of 89 microorganisms were identified via MALDI-TOF MS using the LC obtained from clinical PBCs. The line listing of microorganisms identified is found in Table 1.

This list includes the most prevalent pathogens to cause blood stream infection (Diekema et al., 2019) and pathogens of the ESKAPE group (*Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter species*).

In summary, during the beta-testing studies, 89 microorganisms were successfully identified via MALDI-TOF MS using the LC generated by the FAST™ System.

Diekema DJ, Hsueh PR, Mendes RE, Pfaller MA, Rolston KV, Sader HS, Jones RN. The Microbiology of Bloodstream Infection: 20-Year Trends from the SENTRY Antimicrobial Surveillance Program. *Antimicrob Agents Chemother.* 2019 Jun 24;63(7)

Table 1: List of microorganism successfully identified by MALDI-TOF MS starting from the Liquid Colony™

Bacterial group	Identified microorganisms
<i>Staphylococcus sp.</i>	<i>Staphylococcus aureus</i> <i>Staphylococcus capitis</i> <i>Staphylococcus caprae</i> <i>Staphylococcus epidermidis</i> <i>Staphylococcus haemolyticus</i> <i>Staphylococcus hominis</i> <i>Staphylococcus lugdunensis</i> <i>Staphylococcus petrasii</i> <i>Staphylococcus pettenkoferi</i> <i>Staphylococcus schleiferi</i> <i>Staphylococcus warneri</i>
<i>Streptococcus sp.</i>	<i>Streptococcus agalactiae</i> <i>Streptococcus anginosus</i> <i>Streptococcus canis</i> <i>Streptococcus constellatus</i> <i>Streptococcus dysgalactiae</i> <i>Streptococcus gallolyticus</i> <i>Streptococcus gordonii</i> <i>Streptococcus mitis</i> <i>Streptococcus mitis group</i> <i>Streptococcus oralis</i> <i>Streptococcus parasanguinis</i> <i>Streptococcus pneumoniae</i> <i>Streptococcus pyogenes</i> <i>Streptococcus salivarius</i>
<i>Enterococcus sp.</i>	<i>Enterococcus avium</i> <i>Enterococcus faecalis</i> <i>Enterococcus faecium</i> <i>Enterococcus gallinarum</i>
Anaerobes	<i>Actinomyces oris</i> <i>Bacillus cereus</i> <i>Bacillus circulans</i> <i>Bacteroides fragilis</i> <i>Bacteroides ovatus</i> <i>Bacteroides thetaiotaomicron</i> <i>Bacteroides vulgatus</i> <i>Clostridium perfringens</i> <i>Clostridium ramosum</i> <i>Clostridium tertium</i> <i>Cutibacterium acnes</i> <i>Parabacteroides distasonis</i> <i>Peptoniphilus harei</i> <i>Prevotella melaninogenica</i>

Enterobacterales	<i>Citrobacter freundii</i> <i>Citrobacter freundii complex</i> <i>Citrobacter koseri</i> <i>Enterobacter aerogenes</i> <i>Enterobacter bugandensis</i> <i>Enterobacter cloacae</i> <i>Enterobacter cloacae complex</i> <i>Enterobacter sp.</i> <i>Escherichia coli</i> <i>Klebsiella aerogenes</i> <i>Klebsiella oxytoca</i> <i>Klebsiella pneumoniae</i> <i>Klebsiella variicola</i> <i>Kluyvera ascorbata</i> <i>Morganella morganii</i> <i>Proteus hauseri</i> <i>Proteus mirabilis</i> <i>Providencia stuartii</i> <i>Salmonella species</i> <i>Serratia marcescens</i>
Other Gram positive	<i>Aerococcus Viridans</i> <i>Brevibacterium ravenburgense</i> <i>Cardiobacterium hominis</i> <i>Corynebacterium afermentans</i> <i>Corynebacterium imitans</i> <i>Corynebacterium minutissimum</i> <i>Corynebacterium striatum</i> <i>Dermabacter hominis</i> <i>Dermabacter vaginalis</i> <i>Listeria monocytogenes</i> <i>Micrococcus luteus</i> <i>Rothia aeria</i> <i>Rothia dentocariosa</i> <i>Rothia mucilaginosa</i>
Other Gram negative	<i>Achromobacter xylosoxidans</i> <i>Acinetobacter baumannii</i> <i>Acinetobacter courvalinii</i> <i>Burkholderia cenocepacia</i> <i>Moraxella catarrhalis</i> <i>Nosocomiicoccus massiliensis</i> <i>Paraburkholderia tropica</i> <i>Pseudomonas aeruginosa</i> <i>Psychrobacter sanguinis</i> <i>Raoultella ornithinolytica</i> <i>Stenotrophomonas maltophilia</i>