KEY POINTS/BOOKMARKS

A. Detection / Recovery (Culture – OMICs)

- Traditional culture methods underestimate significantly the diversity and concentration of microbes present, particularly in wounds, vaginal, and oral samples.
- Future microbiology laboratories will integrate multiple downstream methods, both traditional and nontraditional (culture OMICs), necessitating new culture reports/forms including bioinformatics.
- The importance of fungi (18S) as cohabitants with bacteria (16S) will become more significant as laboratory testing embraces health status of patient via signature of GUT microbiota/mycobiota in health and disease.
- Oral health and dental flora are gaining recognition as key organ systems of super human, recognizing contribution of genetic strength of all microbial components from all anatomic locations.
- 'POC-like' microbiology laboratories will embody the concept promoted by CDC and the FDA that we are entering the "Post Antibiotic Era" and driven by 1) rapid reporting, 2) reduced antibiotic use via stewardship and 3) "restorative microbiology/therapeutic bacteria".
- "Culture-OMICS" will enable the microbiology laboratory to establish both 1) pathogenic detection (Robert Koch) and 2) health/disease status simultaneously (anti-Koch) via "Phylum Classification" linked to a "microbial clock", necessitating

significant changes in laboratory reporting and report forms, incorporating tracking of 4 Phyla:

  - Actinobacteria, (2) Bacteroidetes, (3) Firmicutes, and (4) Proteobacteria.

- The “microbial clock” integrates the human microbiota/metagenomics (gene strength) with aging and selected chronic disease, recognizing a 4-quadrant pattern and key microorganisms. The “microbial clock” also highlights the detrimental impact of antibiotics beyond MDR, establishing the consequences of Rx early and late in human aging and its gut microbiota/mycobiota.

- The use of “restorative microbiology” (probiotics) has expanded beyond implicit alternative Rx via therapeutic bacteria and ‘mini’ (dental) or ‘maxi’ enteral transplants (C. difficile), and now includes anti-tumor and tumor homing options as well as potential immunizations via selected gut probiotics.

- 3-D-printing incorporating therapeutic bioplastic materials as a prebiotic will expand the incorporated use of therapeutic bacteria in shaped gauzes as carriers and biologic barriers (chronic wounds).

- A blood culture isolate (planktonic phenotype) (P) is a “failed organism” susceptible to phagocytosis and elimination via antibiotics. Its biofilm (BF) origin and deposition via hematologic spread is the key in optimal management.