KEYPOINTS/BOOKMARKS

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I. Biofilms and Oral health: The 3 M's

1. "Ecological Hypothesis" by P.D. Marsh unmasked the shift in commensal populations, still highlighting Robert Koch's "one bug, one disease". Metagenomics highlights population dynamics defines by non-culture techniques, emphasizing gene expression and phylagenetic definitions and population shifts .
2. OMIC's underscores "you are not what you eat, but what your bugs eat " and recognized the functions of metabolites and their interface with the GUT , a secondary brain like organ.
3. Metagenomics (Anti-Koch) redefines the "microbial landscape" that is 'us', our signature cohabitant that shifts with time (Microbial Clock) and has 36 times more bacterial genes than humans.
4. Organisms exist in a "triphasic world", particularly oral plaque: 1) free floating planktonic , to attached to 2) abiotic or 3) biotic surface biofilms and can alternate 'life style' or phenotype in mili-seconds. They are not mutually exclusive.
5. Planktonic 'life style' emphasizes Louis Pasteur's "one bug, one disease" acute infection, whereas biofilms are associated with chronic infections.
6. "Structure" equals "function", encompasses the unique 3-D feature of a biofilm and its ability to withstand SRP. Plaque biofilm is a 'Hydrated Polymer' with elasticity demonstrating rhelogy or liquid-like movement. (chemistry vs. biology)

7. “Pioneering microbes”, attaching first to a tooth surface are usually Gram Positive, whereas secondary colonizers are Gram Negative and subsequently *Candida albicans*, the universal “ co-aggregate.”
8. Yeast biofilms are often associated with dentures and cleaning solutions, but are common unrecognized inhabitants of both oral biofilms and mucosa.
9. Fungi represent an unrecognized target for oral intervention given their equal frequency to oral bacteria and “universal co-aggregate” function of cross-linking to plaque bacteria via free or bridging DNA.
10. The “Super Genome Theory” of biofilm genetics promotes Horizontal Gene Transfer (HGT), highlighting its significant resistant reservoir for oral systemic infections, defines plaque antibiotic resistance and underscores the need for new anti-plaque strategies in the CDC defined “Post Anti-biotic Era”.
11. Metagenomics and “the other” OMICs, will necessitate a new laboratory Report for oral microbial detection, incorporating combined non-culture techniques (OMICs) and a new definition of “pathogen” based upon Phyla (Shannon Index) shifts in entire plaque communities(Phyla based)
12. Metagenomics and corresponding phyla-types highlighted by “systems microbiology” with new non-culture techniques, are highlighting the importance of plaque in such desperate diseases as dementia to osteoarthritis in knees. (Migratory Oral Microbiota causing diseases in extra Oral Sites)
13. The anatomic location of the oral microbiota /mycobiota now includes: middle ear, eustation tube, tonsils, pharynx, esophagus , lungs and nasal passage.

14. Corespondingly, new OMICc molecular methods have unmasked microbiota/mycobiota in Lung and Placenta essentially ruling any sterial site in the human body, redefing the "Super Organism "
15. Of the 15 phyla represented in the oral cavity , 6 represent 96% of the microbes . The HOMD nomenclature of oral flora can be found at : www.homod.org
16. Aging is a complex process often characterized as one of two processes: Genetic and programed vs environmental and non-programed , an accumulation of events . The significance of the microbiota and the Microbial Clock and its change with age is clearly a catalyst with major impact , yet to be determined. Immunity with age , "immune-aging" will be a major component. " How does the microbiome modulate the aging process"
17. The GUT microbiota is now referred to as the "Cardinal System", recognizing it regulatory role in the multiple functions .