Center for Hologenomic Clinical Studies

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BACKGROUND

1. It began with the Human Genome project (EU and US) (2007), the integration of molecular tools defining who we are, genetically (MARCO), followed shortly by who our microscopic partners are, genetically. (MICRO).(REF)
2. We found our co-habitants or microbiota were more diverse and complicated than imagined, encompassing the microbial spectrum, both bacterial (16S) and recently fungal (18S)(REF), with representation of potentially 10,000 species more functionally divided into 10 phyla on a taxonomy scale. More importantly, the total number of microorganisms (10 to 12 vs 10 to 14 were essentially 200 times in greater number, representing approximately 8 million genes vs 25,000 (REF),providing a combined genetic pool 330 times larger than humans, which could be envisioned as a non-structured 'organ system'.
3. These findings unmasked the importance of our microbiota/mycobiota in health and disease. Tracking changes in the microbiota over time, particularly for chronic and metabolic diseases, allowed us to formulate a 'Microbial Clock' that defined time and 6-8 phylotypes in association with 10 diseases (REF), unmasking the significance of missing microbes with age ; this echoing the challenge described my Martin Blaser, MD, of diminishing microbiota with age and disease (REF) , a possible reflection of ONE Health: Animals, Humans and Earth.(REF)
4. Simultaneously, the emerging, global (REF) use of probiotics as "therapeutic bacteria" (TB) and Germ Therapy was astounding, where WHO described 1/3 of population used them at an expenditure of $85 billion in 2015(REF).This highlighted our terms, "dual citizenship" and "organ transplants" , catalyzing us to provide increased education via our searchable probiotic data base (Probiotic Solutions) (Bac-2-Health)(2013) and the use of "Partners-4-Life" Concept (www.globalbugs.org)(2016). It also forced us to recognize the limits, perhaps consequences, of miss-used antibiotics, so eloquently described by Dr. Stewart Levy in 2002.(REF) and the importance of "stewardship" for our microbiota as well as antibiotics ("Microbes Matter") ; hence, we focused our chronic wound research and tissue engineering on "reconstructive microbiology", employing the 'disruption:reconstruction' Hypothesis with, initially, silver followed by TB in a contour fitting gauze.(SMarT I,II, III).
5. In 1992 (REF), a new description of our beneficial synergistic relationship was introduced, Hologenomics, describing the human-microbial interaction in evolutionary terms as a central hallmark of all life on earth ; it highlighted 3 key features (REF) and scientifically outlining the inter-dependence of the healthy Holobiont upon its total hologenome via the combination of both Macro and Micro synbionts. It was a parodyme shift from Pasterurs' recognition of pathogenic bacteria, and according to the 2011 Pulitzer award winner, Dr S Mukherjee, MD, a calling for humans to reconsider what was 'self' and 'who' we were. It also provided an umbrella under which the manipulation of the microbial gene pool and co-evolution had credibility and a scientific hypothesis for interventional strategies with probiotics, while renewing the need for diagnostic studies (Clinical Microbiology) in missing or shifting microbial phylotypes. (Anti- Koch)

6. Hence, the timely evolution of designing, developing, and integrating a "Center (of Excellence) for Hologneomic Clinical Studies" emphasizing probiotic as gene pools, integrating our expertise in Biofilms, Education (Partners-4-Life) (www.gloalbugs.com) and Clinical Microbiology with a defined Mission and Goals, addressing 3 key questions. It reflects the growing scientific interest and increased publication aligning the Hologenomics (REF) and probiotics as major contributors towards better health, decreasing the use of antibiotics, while highlighting One Health: Humans, Animals and Globe(REF).

HYPOTHESIS: The use of Probiotics can,

1. **Restore/replace via Restorative Microbiology (naturally Or artificially), the historical balance via Co-evolution of Microbes and Man (Hologenomic Theory) and the combined genetic strength, signaling and beneficial interface between the two (Hologenomics).**
2. **Address with intervention the missing microbiota in selected metabolic, chronic diseases from birth to death, including the aging process and associated cognitive impairment (AD).**
3. **Reverse the pathogenic process of selected infectious diseases associated with a microbial imbalance without the use of antibiotics (C. diff.) , recognizing evolution (patient relatives) (EnteroType I, II, III)**