

AIOB 2025

Bacteriophage are the New Oral Antibiotics: Have Package, Will Travel

JOHN G THOMAS PHD, PROFESSOR EMERITUS

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THE AIOB.ORG

A. INTRODUCTION/BACKGROUND

“WE LIVE IN A MICROBIAL WORLD ”

“the microbial world laid down the blueprint of life long before humans ever arrived....and that our existence is, in sense, a continuation of an ancient microbial legacy

Microbes have been the dominant force in the evolution of life, creating the conditions necessary for human emergence, much latter
Intricate, mutual relationships have defined life on Eart



Hologenomic Concept of Evolution

- **1928. American ant expert , W. Wheeler**, described a colony of similar species with higher level of organization as a “Superorganism.”
- **1991. L Margulis** ,in a book chapter concerned with superorganism to described symbiosis of different species acting together, coined the term “ Holobionts”.
- **1994. R Jefferson at Cold Spring Harbor Symposium** on PCR, described potential DNA contaminants as part of the whole and used term “Hologenome”
- **2008. E Rosenberg and I Zilber-Rosenberg**, independently derived the term hologenome and Hologenomic Theory of Evolution, a fusion of Lamarckism and Darwinism focusing on bleaching of Coral Reefs via *Vibrio shiloi*.
- **2013. R Brucker and S Bordenstein** reinvigorated the Hologenome Concept with studies of gut microbiomes of wasps, and S Bordenstein and K R. Theis (2015) outlined 10 Principles (I-X) of evidence-based reasoning for Holobionts and Hologenomes and the Theory of Co Evolution for all animals and plants.

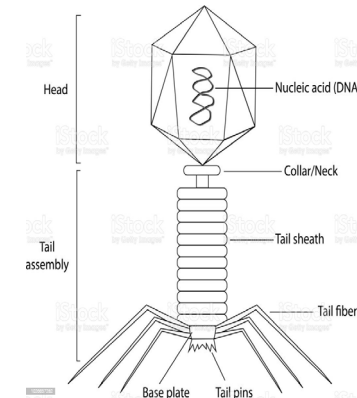
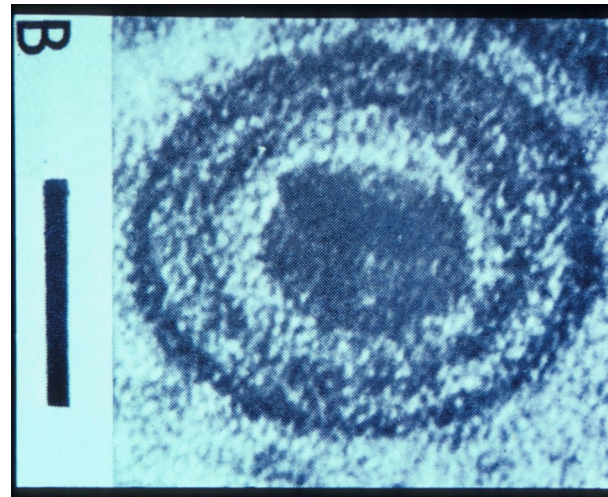
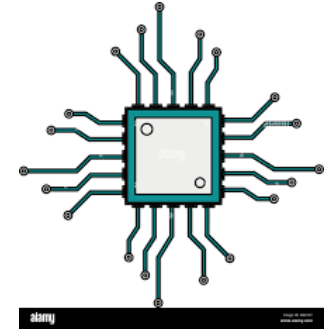
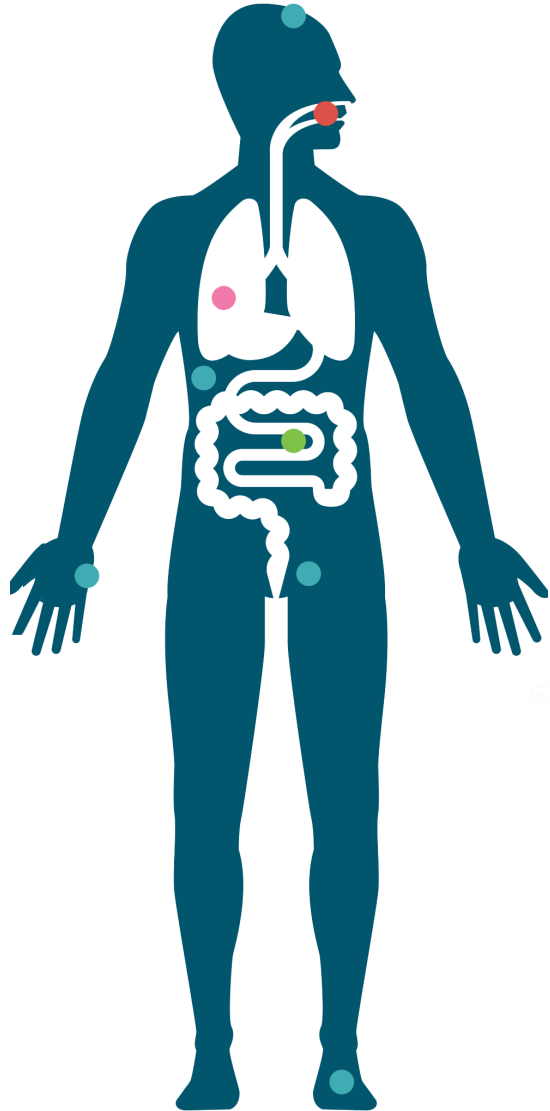
B. THE HUMAN VIROME/PHAGEOME

THE UNKNOWN

MICROBIOME

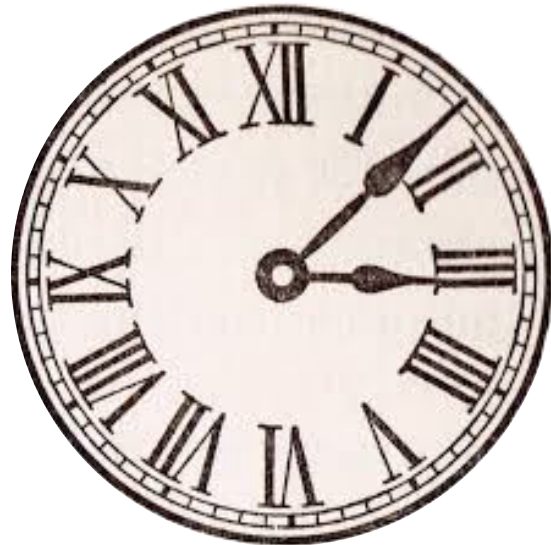
THE

VIROME/PHAGEOME



C. ORAL HEALTH: HOLOBIONT SYNCHRONY CLOCKS

- TIMING IS EVERYTHING. HOLOBIONT CLOCKS. TWO
- EMERGENCE OF CHRONOBIOLOGY/MICROBIOLOGY
- DENTAL TIMED DELIVERY: **IT ISNT “WHAT” YOU DO, IT IS “WHEN” YOU DO IT**



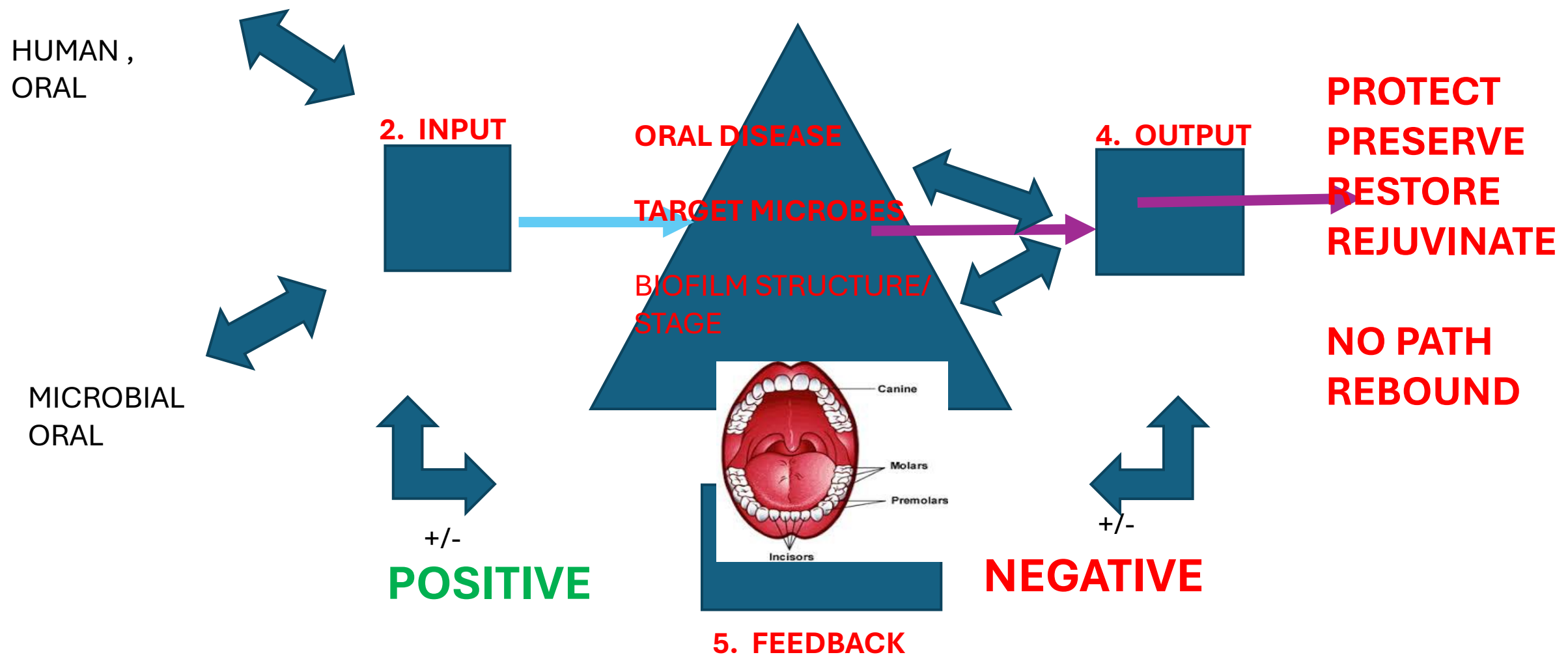
C-1 HOLOBIONT REVOLUTION. MANAGING 2 KINGDOMS. KEYS

- MICROBIAL RHYTHMS. 10-15% of GUT microbes show daily fluctuations in abundance and activity
- MAMMALIAN GENES. CLOCK, BMAL1, PER AND CRY regulate rhythmic gene expression in GUT epi cells
- METABOLITE CYCLING. Microbes influence the timing of mammalian metabolic production (amino acids, SCFAs)
- DIET FEEDING TIME. Time-restricted feeding enhances microbial rhythmicity while improving metabolic health
- DISRUPTION EFFECTS. Jet lag, shift work, and Western diets desynchronize microbial and circadian clocks, leading to inflammation and metabolic syndromes

DENTAL TOOL KIT A. GENERAL SYSTEMS THEORY APPLIED TO HOLOBIONAT

Elements that are Interactive: **SYSTEMIC/MICROBIAL**

1. **MOUTH : LOCATION**



B. AI. ORAL HOLOBIONT CLOCKS AND RHYTHMS: CIRCADIAN AND MICROBIAL

SYSTEMIC



TIC HOURLY

- **SALIVARY FLOW AND COMPOSITION.** Varies across the 24 hr day, affecting nutrient access and ABX peptides
- **TEMPERATURE AND PH.** Fluctuates with eating, sleeping and hydration cycles
- **IMMUNE SYSTEM ACTIVITY.** Follows a circadian rhythm, modulating microbial survival and colonization

MICROBIAL



TOC MINUTE

- **GENE EXPRESSION.** Highlights metabolism, motility and biofilm formation
- **REPLICATION TIMING.** Stress response
- **VIRULENCE FACTOR PRODUCTION.** Peaking during mammalian vulnerability (sleep)

ALICE IN WONERLAND MADD HATTER, RABBIT

AI. ROADMAP AND DASHBOARD.

MODELING: Timing /rhythums

SYSTEMIC STATE

- 7-9. High salivary flow, immune uptick
- 12-13. Postprandial acidity peak
- 18-19. Pre-dinner baseline
- 22-23. low flow; immune trough

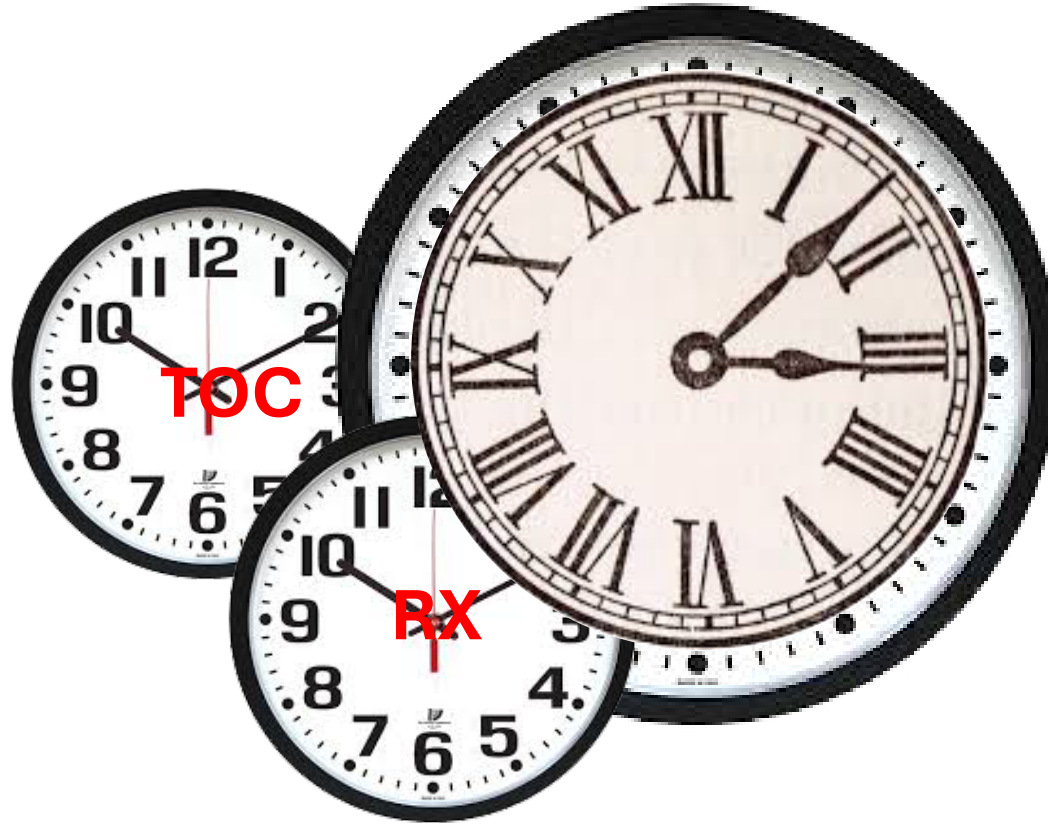
MICROBIAL ACTIVITY

- Dispersal of overnight biofilm fragments
- Acidogenic surge (Strep mutans bloom)
- Early colonizer adhesion
- Late colonizer biofilm maturation

RECOMMENDATIONS

Probiotic rinse+
brushing
pH-modulating
lozenge
Phage mouth spray
vs Fusobacterium
Overnight-release
chlorp gel or phage
gel

C. CHRONO-BIOLOGY: TIME BASED INTERVENTION



**SCHEDULE
AM RESTORE**

PRESERVE

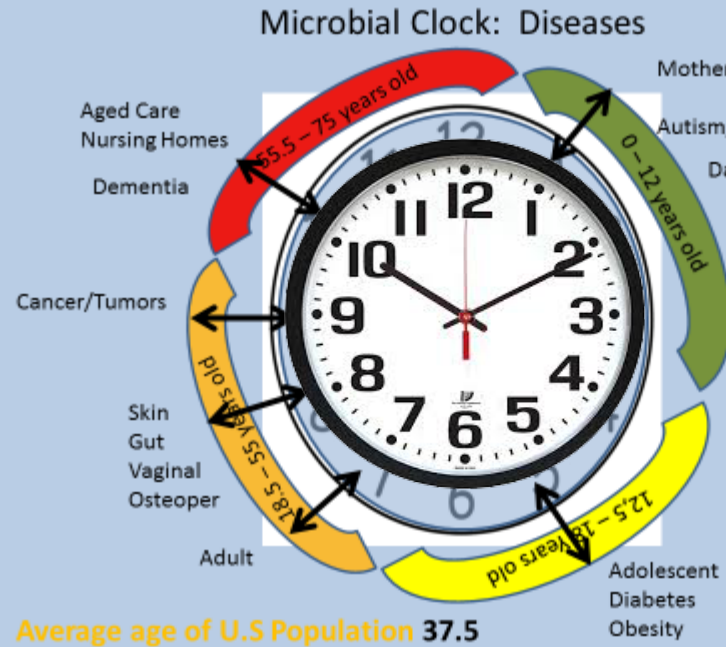
**PM PROTECT
REJUVINATE**

SYNCHRONY

HOLOBIONT 2 CIRCADIAN Clocks. Health in Synchrony

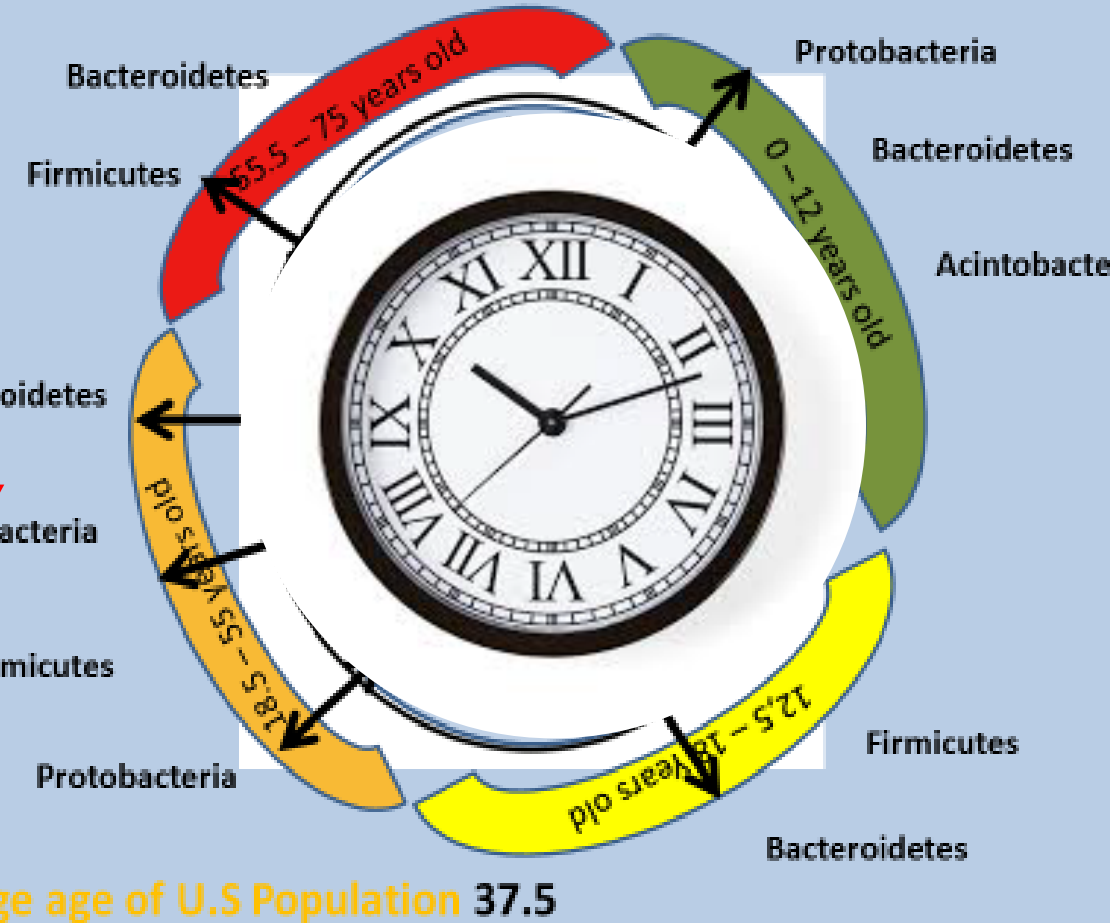
COPARTNER HUMAH/KINGDOME

HOST MICROBIOME /KINGDOME
Microbial Clock: Microbes and Phyla



DISEASE

SYNCHRONY



IT IS NOT “WHAT”,
BUT “WHEN”

TOC

. CHROMO-DENTISTRY: DASHBOARD PERSONALIZED/PERCISION ORAL MICROBIAL CARE

- TIMED DELIVERY OF ANTIMICROBIALS AND PROBIOTICS
 - PHAGE THERAPY ALIGNED TO BIOFILM CYCLES
 - LDD AS ADJUNCTIVE THERAPY
 - “CLOCK MANAGEMENT”
-
- TOOLS 1. Bioadhesive Gels with timed Release. 2. Microencapsulated Probiotics/Synbiotics. 3. pH responsive Nanocarriers 4. Timed tooth brushes and salivary flow measurements over 24 hrs

CHRONO-DENTISTRY

AGE 18
GENDER
FEMALE
Q-3



WEALTH
RECOVERY
GAIN

MICROBES/**IMMUNO**

SHORT
INTERMEDIATE
LONG

WEALTH
DISRUPTIVE
LOSS

SHORT
INTERMEDIATE
LONG

MICROBES/IMMUNO



REPLACE, REPAIR, PROTECT, REJUVINATE
REESTABLISH SYNCHRONY
CHRONOBIOLOGY. "WHEN"

**MICROBIOME FIRST MEDICINE
/DENTISTRY**

CHRONO-THERAPY: NOT “WHAT”, BUT “WHEN” 2 CLOCKS. Z1 (SHORT)/Z2 (LONG)

GOAL: SHANNON INDEX

PROTECT
PRESERVE
RESTORE
REJUVINATE



WHEN
CHRONOTHERAPY
CHRONO-DENTISTRY
TREATMENT PLAN

Z. RESTORE BALANCE
ADJUNCTIVE INTERVENTION
LDD

PHAGE/PROBIOTIC
ALIGNED W DAILY
HYGIENCE RITUALS

TIMED TO LOW
HOST IMMUNITY,
EVENING OR
CIRCADIAN
TROUGH

THEME. DON'T
HURT THE HOST
MICROBIOTA

E. CONCLUSION/THM/WHY??? UN-INDOCRINATE

- PUT SCIENCE/AI INTO YOUR TRAINING...ROBOTS WILL DO SOME OF YOUR WORK????
- “0” TOLERANCE FOR ABX RESISTANCE
- CHRONOBIOLOGY
- CHRONO-DENTISTRY: SYNCHRONY OF TWO KINGDOMS IN A HOLOBIONT, THROUGH CLOCK MANAGEMENT OF EACH
- FUTURE: IT ISNT “WHAT” YOU DO, BUT “WHEN” YOU DO IT!!!



“We Live in a Microbial World: Head to Toe”



“The distinction between dental and medical microbiology is a man-made fabrication via our simplistic attitude of a very complex total body ecosystem that is just now being uncovered”



ORAL SYSTEMIC MICROBIOLOGY

NEW WEBSITE

<https://globalmicrobiologyconsulting.com>

- “THE FUTURE OF HEALTH HAS ALWAYS BEEN MICROBIAL”
- “MICROBES BUILT US. THEY HAVE BEEN HERE ALL ALONG. NOW THEY CAN SAVE US”
- “WE LIVE IN A MICROBIAL WORLD”