

### Oral Ecosystem:

- Specific microbial species demonstrating tropism for specific tissues
- Microbial interaction with each other as well as with the oral environment

### Formation of an Ecosystem:

<b>Indigenous Microbiota:</b>	Most numerous, Compatible with host
<b>Supplemental Microbiota:</b>	Potentially pathogenic, Can become invasive
<b>Transient Microbiota:</b>	Don't have mechanisms for persisting in the host

### Oral Ecosystems:

<b>Buccal epithelium:</b>	Gram-positive cocci
<b>Lingual epithelium:</b>	Gram-positive filaments
<b>Supragingival tooth surface:</b>	Facultative G+ rods and cocci
<b>Subgingival tooth surface:</b>	Anaerobic G- rods and cocci

### Microenvironments:

#### Supragingival:

- Bathed in saliva
- Facultatively anaerobic
- Increased mechanical disruption (swallowing, abrasion)

#### Subgingival:

- Bathed in crevicular fluid
- Anaerobic
- Reduced mechanical disruption (anatomy of gingival sulcus)

### Environmental Factors:

<b>Oxygen tension:</b>	pO <sub>2</sub> , partial pressure of oxygen, mmHg
<b>Redox Potential:</b>	Eh, tendency to acquire electrons and thus be reduced, mV

### Environmental Factors: (cont)

<b>pH:</b>	controlled by exogenous materials carbohydrate fermentation buffering capacity of plaque and saliva
<b>Temperature:</b>	variations
<b>Availability of Nutrients:</b>	carbohydrates, amino acids (salivary glycoproteins), hemin (plasma)

### Host Fluids:

#### Antagonists

**Synergistic:** Nutrients from saliva and GCF

**slgA:** Interferes with colonisation

**Glycoproteins:** Aggregation and removal

**Lactoperoxidase:** Inactivation of glycolytic enzymes - death

**Lactoferrin:** Binds iron limiting bacterial growth

**Lysozyme:** Degrades bacterial peptidoglycan

#### Host Susceptibility:

- Geographic location
- Ethnicity and culture
- Diet
- Health and social status

### Microbial Factors:

#### Adherence:

- Contact: proximity
- Dose: quantity of bacteria
- Frequency of exposure (eg newborns)
- Absorption: initial reversible association with oral tissues

#### Retention:

- Ability to accumulate at entry site
- Adaption
- Resist host defenses
- Competition from other species
- Changing environments

### Co-Aggregation:

**Different species, or different strains of a single species, have distinct sets of coaggregation partners**

Streptococcus spp. and Actinomyces spp., two of initial colonizing general on enamel surfaces

Fusobacterium coaggregate w/ other human oral bacteria

Veillonella spp., Capnocytophaga spp. bind to streptococci/ actinomyces

**Each coaggregation is mediated by one or more complementary sets of adhesin-receptor pairs**

### Coaggregation:

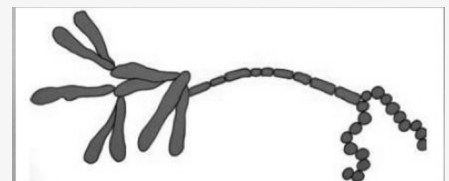


Fig. 7. Model depicting *Prevotella loeschii* PK1295 (red cells) acting as a coaggregation bridge between two non-coaggregating cell types, *Actinomyces israelii* ATCC 10048 (blue cells) and *Streptococcus oralis* 34 (purple cells).

### CoAggregation Competition:

- Competition occurs when multiple cell types recognize the same coaggregation indicator mediator on the common coaggregation partner

### Ecological Succession:

Process by whereby a microbial population undergoes a continuous series of changes in composition as different species colonise and become established at the expense of others.

As conditions change, the dominant m/o's will either adapt and be retained or will be superseded by a new species better equipped to survive the altered environment.