

# **MICROBE FLORA AND ORAL MICRIFLORAS**



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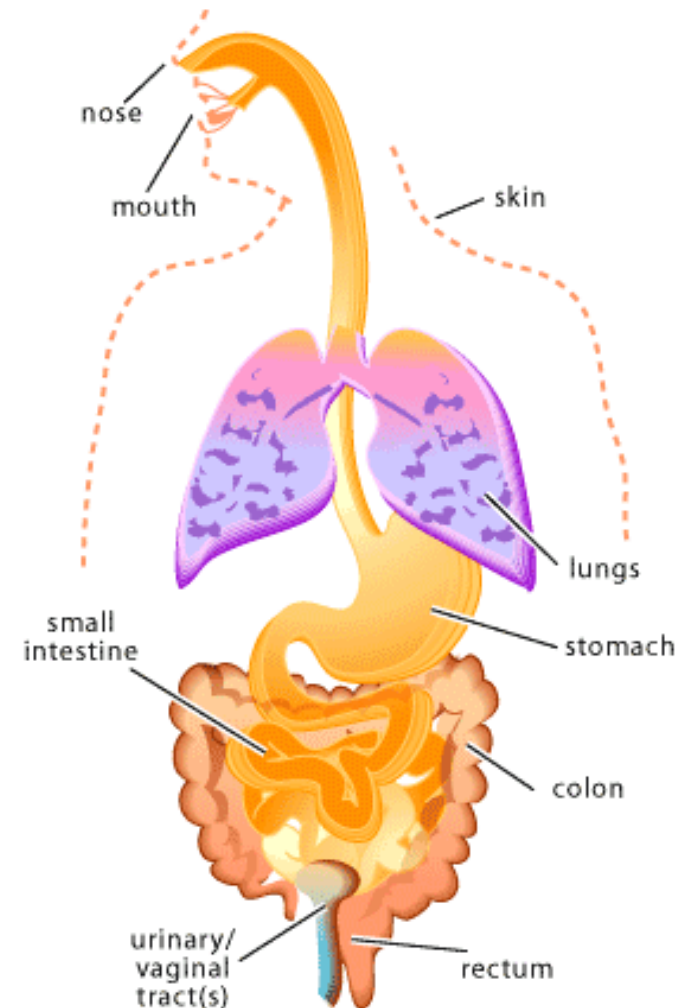
# People, animal and plants continuously contact with microorganism

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## People;

- skin,
- Natural gaps,
- Organs contact with outside,

Sometimes disease can see



# Host -Microorganisms Relations

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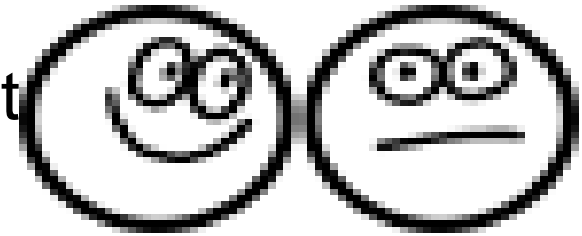
## Mutualism:

Bilateral benefit



## Commensalism:

Benefit to microorganism. Neither benefit nor damage to host



## Parasitism:

Damage to host. This microorganisms '**parasites**'



# NORMAL FLORA

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**Some group of microorganisms that live together with people and benefit to body**



# NORMAL FLORA

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- **M.o. Select a suitable area and stay there**
- Different body pH
  - Different structure of remainder materials
  - Moisture
  - Combination of different secretions
  - Natural inhibitors
- **Thus, m.o balance is supplied and normal formed for that area**



"Say... this looks like a good place!"

# PERSISTENT FLORA:

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**At a Specific age, any part of body, generally stable, although dissappear due to many conditions, formed again**

# PERSISTENT FLORA:

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## Microorganisms;

- ❑ Transfer to other places of their original areas,
- ❑ Damaged balance between microbes
- ❑ Weaken host organisms immunity
- ❑ Can cause many diseases
  - ❑ Otherwise do not cause diseases





# PERSISTENT FLORA:

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- Some Normal flora bacteria can cause disease if conditions are suitable-**opportunism**,
- These microbes **opportunistic pathogen**
- Most infections are caused by opportunistic pathogens
- EX: *Staphylococcus aureus*, *C.albicans*
- Less diseases **strict pathogens**
  - Ex: *Mycobacterium tuberculosis*, *Plasmodium vivax*





# TEMPORAL FLORA

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**Different parts of body (skin, mucosas etc)  
Besides persistent flora, group of microorganism  
that stay short time and get lost**

# TEMPORAL FLORA

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- ❑ Never be the same after removal of different effects. A new flora is formed
- ❑ Type of m.o. Depends to environment
- ❑ Generally cause disease with **persistent flora**
- ❑ Can be pathogen if persistent flora disappear
- ❑ Many of them are **apathogen** or **opprtunistic pathogen**



# ROLE OF FLORA IN ORGANISMS

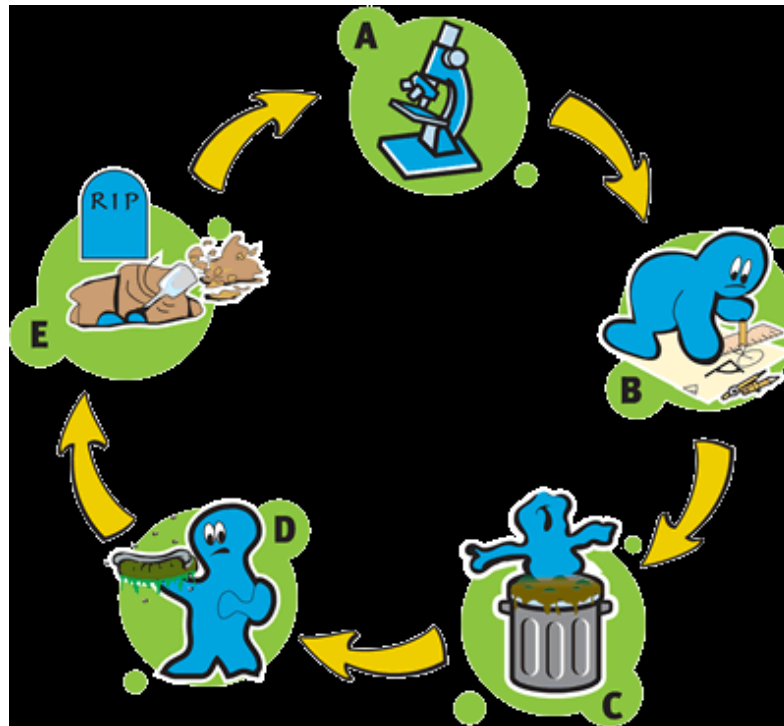
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- **Most are commensal**
  - **Use body temperature, moisture, remainder materials and are not harmful to host**
  
- **Some are mutualistic with host**
  - **Some microorganisms help vitamin synthesis of digestive system**
  - **Prevent pathogen bacteria by competing with normal flora bacteria**
  - (Vaginal lactobacilli make vaginal Ph acidic, so gonococci can not locate in vagina)

# OUTER SURFACE NORMAL FLORA

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- All microorganisms continuously or temporarily found in some regions (**air – Soil – water**)

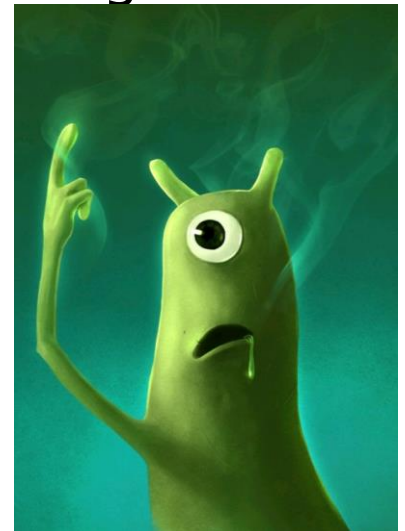


# AIR MICROBE FLORA

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- Air is not a suitable environment for m.o. To grow
- Microbes come to air from other contaminated air via air stream
- Pathogen or nonpathogen microbes that tick to dust and liquids,
  - Durable to dryness
  - together or not together with organic Organic substances,
  - Air Moisture degree
  - Environment tempereture,

**short or long time can stay in air**

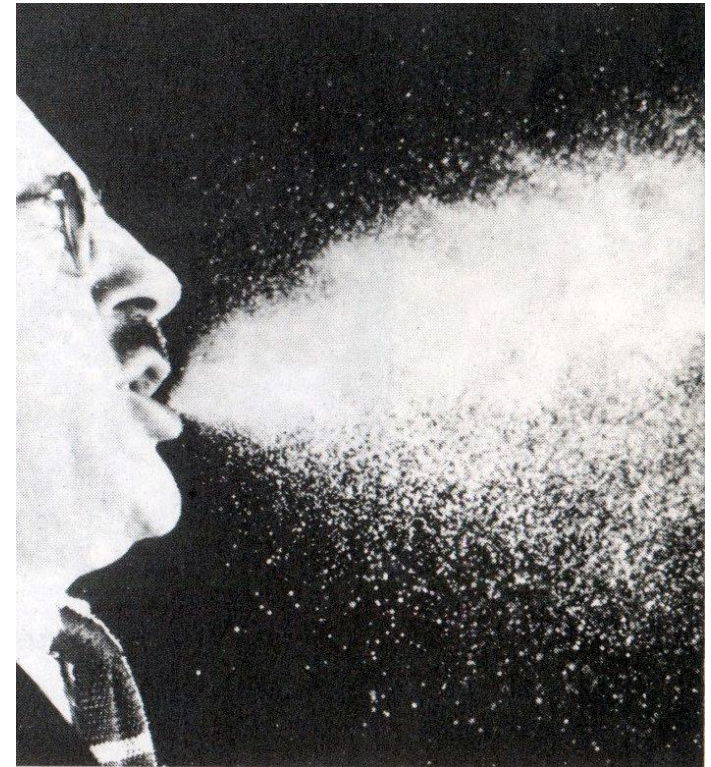
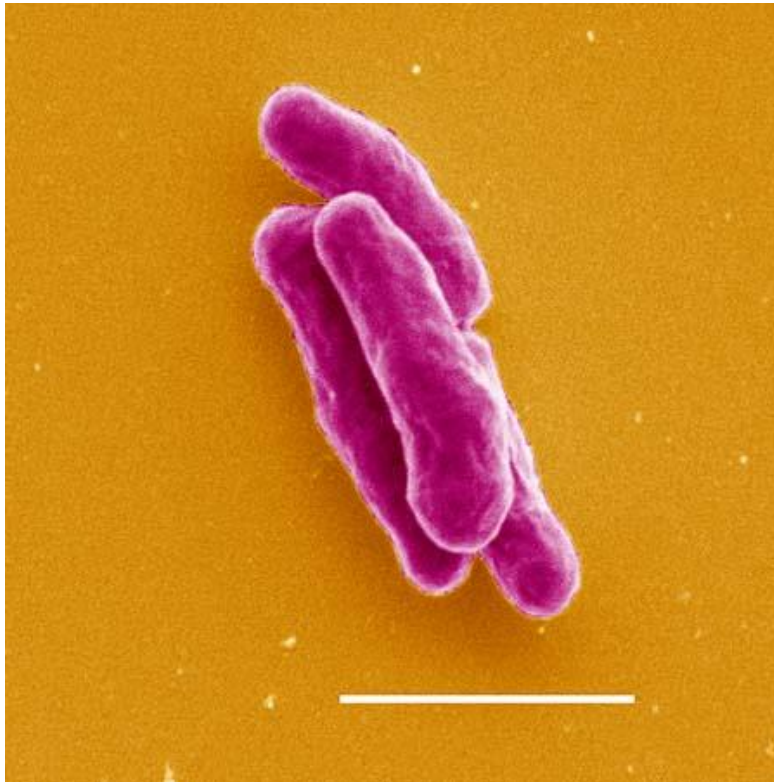


Respiratory tract pathogens

ex;

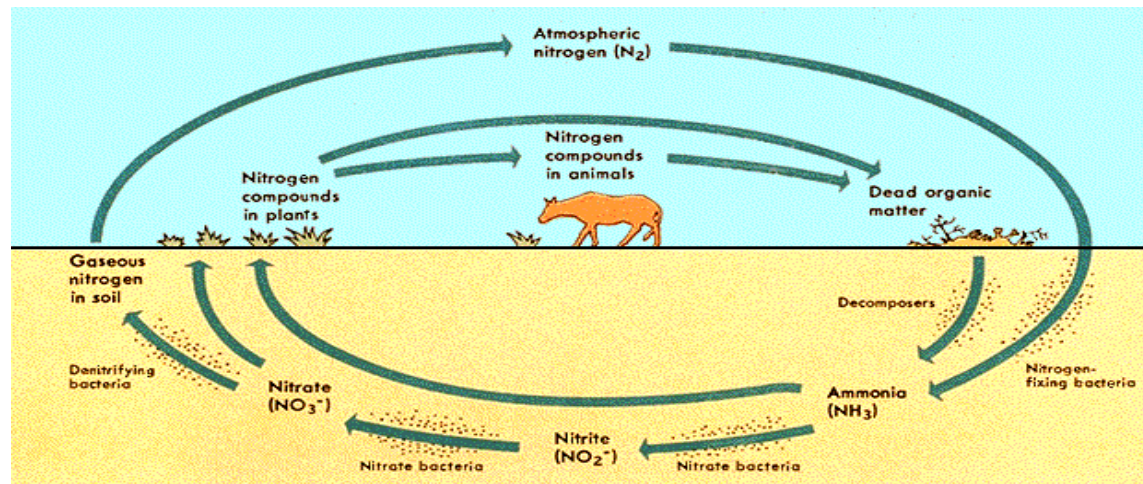
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□ ***Mycobacterium tuberculosis***



# SOIL'S MICROBE FLORA

- Soil is an environment where organic material and water concentrate and transform
- There are many m.o in soil
- M.o in soil is responsible for material exchange over the world
- nitrogen, sulphur, carbon exchange





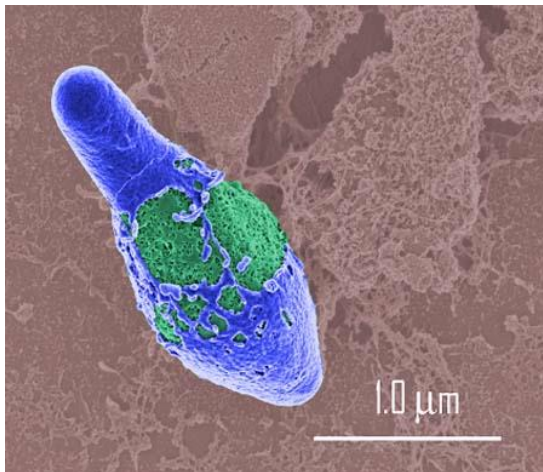
## Important m.o found in soil

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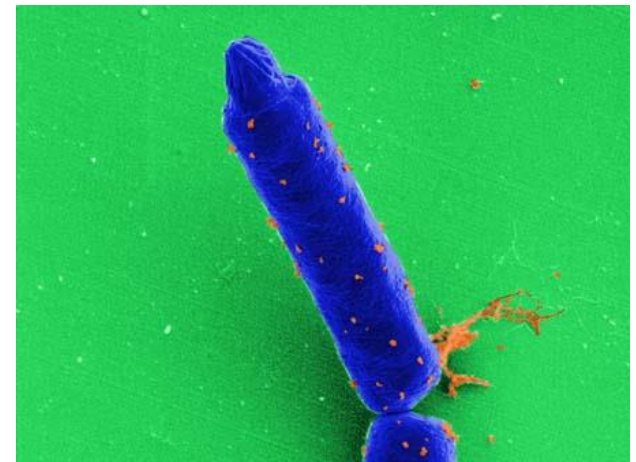
### Clostridium's

(*C.tetani*, *C.botulinum*, gas gangren formers)

- *Bacillus anthracis*
- *Coccidioides immitis*
- *Histoplasma capsulatum*
- *Cryptococcus neoformans*



*C.botulinum*



*Bacillus anthracis*



# WATER'S MICROBE FLORASI

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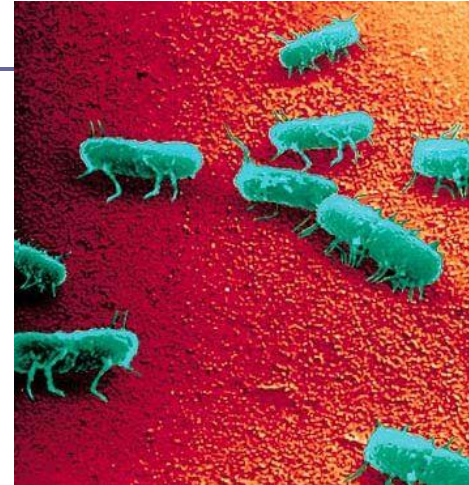
- ❑ M.O are found even in natural spring water
- ❑ M.O can pass form soil to water
- ❑ Most importants are contaminated from **human** and **animal stools** to water



# Most Important Water Pathogens

## Bacteria

- ❑ *Salmonella typhi*, other *Salmonella*'s,
- ❑ *Vibrio cholerae*,
- ❑ *Shigella*'s
- ❑ *Escherichia*'s,
- ❑ Other *Enterobacteriaceae* and *Leptospiras*,



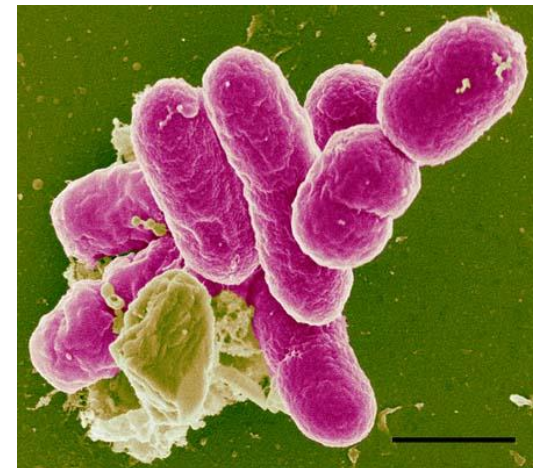
Salmonella

## Viruses

- ❑ Polio virus,
- ❑ Hepatitis A virus,
- ❑ Other enteroviruses,

## Protozoons

- ❑ *Entamoeba histolytica*



Shigella

# RESPIRATORY TRACT FLORA

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## Pharynx

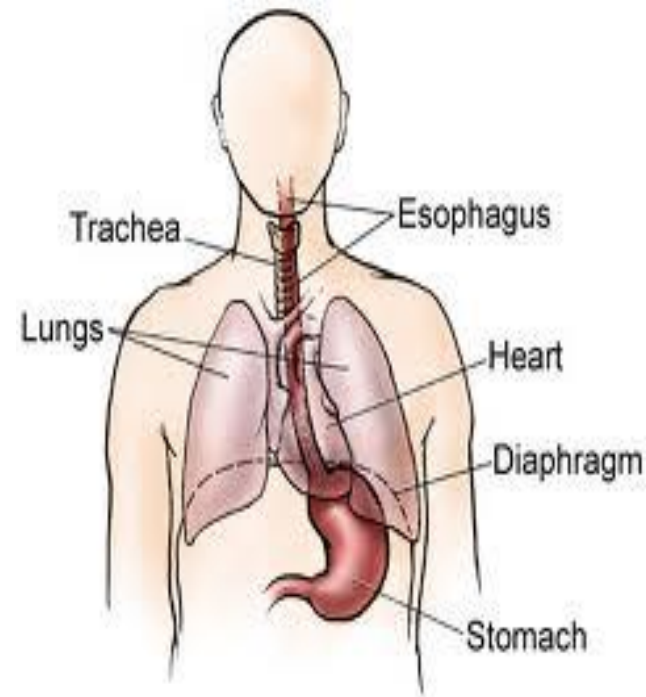
A rich flora like mouth flora

**Nonhaemolytic** and **alpha haemolytic streptococci**

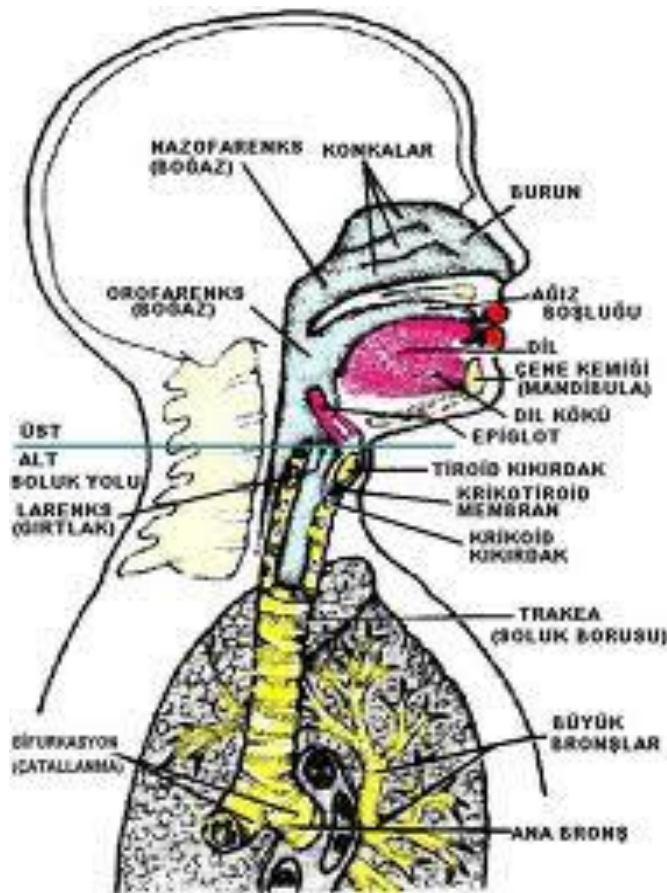
- *Neisseria, Haemophilus*
- *Stafilococci, Corynebacterium*
- *Peptostreptococci!!!*

## Oesophagus

- Normal flora is less
- Transfer to Saliva and foods  
(**temporal flora**)



# RESPIRATORY TRACT FLORA



## Nose and Upper Respiratory Tract

***Streptococci*** (alpha haemolytic and nonhaemolytic)

- ***Stafilococci*** (*S. epidermidis* and *S. aureus*)
- ***Corynebacterium***
- ***Neisseria***

## Lower Respiratory Tract

From Larynx to trachea, number of bacteria decreases

- Lower Respiratory Tract is **sterile**, no bacteria!!!

# ORAL FLORA

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## New borne

New bornes have mother vaginal flora



***Streptococcus salivarius* (numerically much)**

- ❑ ***S. agalactiae* (dissappear after 4 months)**
- ❑ ***Veillonella, Neisseria*, coagulase (-) staphylococci**
- ❑ ***E.coli, Lactobacillus, Bifidobacterium***
- ❑ ***Actinomyces, Peptostreptococcus, Bacteroides***
- ❑ ***Candidas***
  - Fusiform 4-8. months
  - *S. sanguis* 6. months
  - *S. mutans* 12. months

**Important:** Up to 1 years old **98% streptococci**

# ORAL FLORA

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## Children

Most important change starts with milk teeth at 6 months

- Appear at  $O_2$  free areas
- These are; **teeth's approximal surfaces yüzeyleri and gingiva**
- **Number of Anaerobe bacteria increases**

**Important:** *S.sanguis* and *S. mutans* make up an important part of persistent flora after 1 years old

# ORAL FLORA

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## Adults

Population of microorganisms increases due to appearance of  
permanent teeth

Growth area for anaerobes increases

Bacteria that found very low or never found in childhood

***Bacteroides, Leptotrichia, Fusobacterium species, Spirochete***

- On surface plaque;
  - ***S.sanguis, S.mitis ve S.mutans***

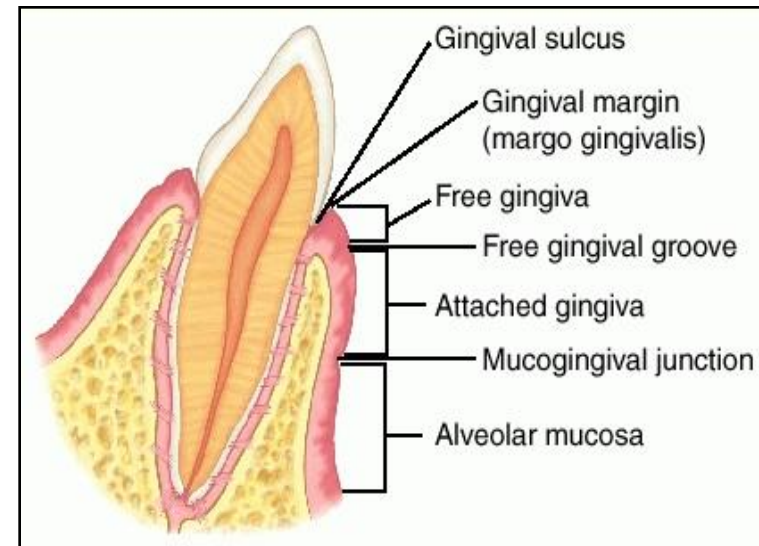
**Important: ~300 bacteria types in mouth, ~ 10.000 variant!!!**



# ORAL FLORA

## Important!!!

- Half number of bacteria in microorganism, **2/3'ü** anaerobe in gingiva
- Agents of Root canal infections **90-94% anaerobe**
- Total number of bacteria in saliva **43 million-5.5 billion/ml**
- 1 ml saliva contains **750 million bacteria**
- Gingival sulcus and tooth plaque **200 billion bacteria/gr**



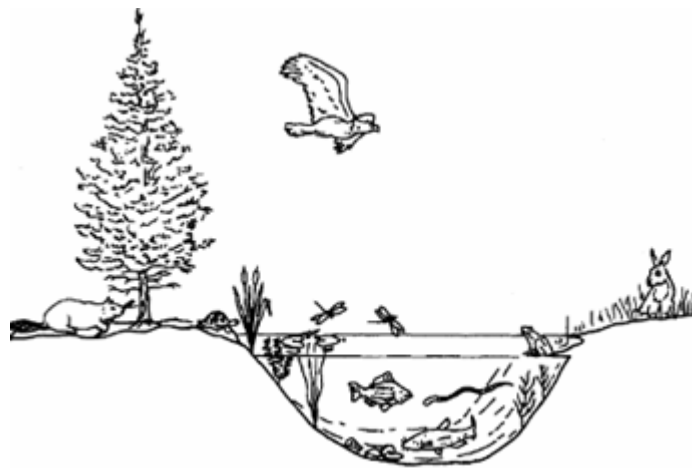


# ORAL FLORA – Ecologic Faktors

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“**ecologic determinants**” are factors that determine which m.o will be on flora. These are;

- ❑ **Host selectivity**
- ❑ **Acidity**
- ❑ **Temperature**
- ❑ **Nutrition**
- ❑ **Smoking**
- ❑ **Saliva**
- ❑ **Gingiva fluid**
- ❑ **Bad habit**



# ORAL FLORA – Ecologic Factors

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## Host Selectivity

- **Bacillus species bacteria in oral flora** ∅
  - because require many O<sub>2</sub>
  - Same for ***Brucella, Francisella, Pseudomonas*** ∅
- **Proteus species**
  - **Upper respiratory tract or oral flora** ∅, commonly cause urinary tract infections

## pH

- Some bacteria prefer slightly basic Ph
- Some can not damage from low pH, contraru grow well
- **Ex: *Lactobasilli streptococci and bakteroides***

# ORAL FLORA – Ecologic Factors

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## Temperature

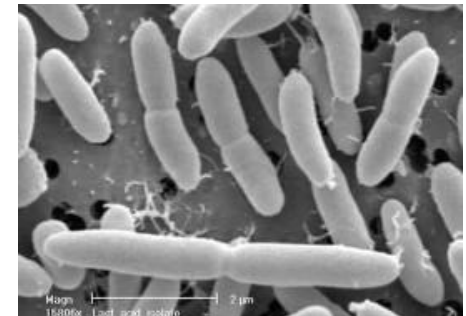
### □ Some m.o have temperature selectivity

- Bacteroides pneumosintes prefer upper respiratory tract where temperature is lower than that of mouth
- Most Lactobacilli can not grow at low temperature

## Nutrition

### □ Carbohydrate rich diet

- Lactobacillus and Streptococcus are more



# ORAL FLORA – Ecologic Factors

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## Smoking

According to studies smokers comparing to non smokers;

More **gingivitis, periodontitis** and **mouth cancers**

- **Neisseria and Lactobacilli** inhibition in oral flora
- Important risk for **Periodontal diseases**



# ORAL FLORA – Ecologic Faktors

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## Saliva

- Wash, dilution, buffering, antibacterial, immun defence effects
- Keep number of bacteria and variety constant
- Antimicrobial substances **(inhibin);**
  - **Lysozyme enzyme: Effective especially Gram (+)**  
**Lactobasidin: Inhibit Laktobacilli**
  - **Immunoglobilins**
    - Especially **IgA**, fewer IgG, fewest IgM

# ORAL FLORA – Ecologic Factors

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## Gingiva Fluid

- presence, decrease or absence affect **infection ratio**
- Its content likes plasma
- During infection contains **lysozyme, antibody, leucocyte, lenfocyte**
- Antibodies are especially **IgA**
- **Bad Habits**
- Pencil biting, putting foreign materials into mouth, thumb sucking

# Flora of Different Regions's of Mouth

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## Lips

- *S.epidermidis*, *skin micrococcus* and **streptococci**

## Cheeks

- *S.mitis*, *S.sanguis*, *S.salivarius*. Rarely *Haemophilus* and *Neisseria* species

## Dentures

- *Streptococci*, *Haemophilus*, *Actinomyces*, *Lactobacillus* species dominant
- In prosthesis users *Candida* and *Lactobacillus*

# Flora of Different Regions's of Mouth

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## Tongue

- ***S.salivarius* 20-50 %, *S.mitis* and *Haemophilus* species**  
dominant
- **Anaerobes around 15%**
- ***C.albicans***

## Gingival canal

- Maximum m.o in the mouth
- **$10^{10}$ - $10^{11}$  bacteria/gr**
- Fakultative gram (+) cocci, anaerobe gram (-) basili, anaerobe gram (+) basilli, fakültative gram (+) basili, anaerobe gram (+) cocci, anaerobe gram (-) cocci respectively



# Flora of Different Regions's of Mouth

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## Teeth

- All teeth contain m.o on their surface called “**dental plaque**”
- Bacteria variation is present on plaque
- However **Gram (+) basilli and gram (-) anaerobes** always present