

# Dental plaque

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**PARTH M THAKKAR**  
**DENTOMEDIA**

# INTRODUCTION

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- 1 mm<sup>3</sup> of dental plaque, weighing about 1 mg contains more than 200 million bacteria



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# *Definition*

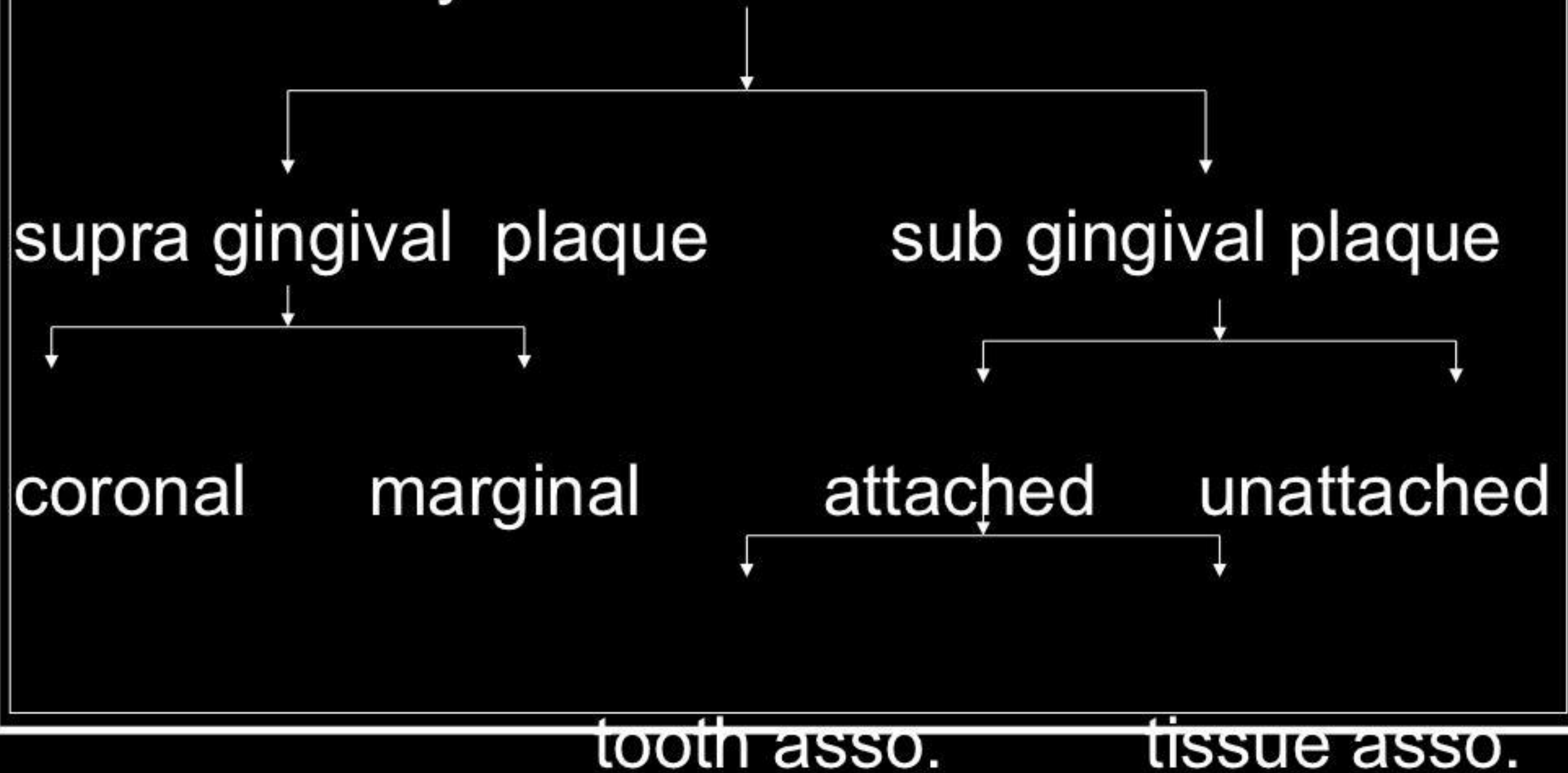
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- IT IS A MICROBIAL ECOSYSTEM OR BIOFILM COMPOSED OF DENSELY PACKED MICROBIAL STRUCTURE INSOLUBLE SALIVARY GLYCOPROTEIN, MICROBIAL INTRACELLULAR PRODUCT & TO SOME EXTENT EPITHELIAL CELLS & DEBRIS ARRANGED IN AN ORGANISED COMPLEX INTER CELLULAR MATRIX.

- BY WHO

# CLASSIFICATION

■ by location on tooth







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## By pathogenic effects

```
graph TD; A[By pathogenic effects] --> B[Cariogenic plaque]; A --> C[periodontal ds' producing plaque]; A --> D[calculogenic plaque]
```

Cariogenic  
plaque

periodontal ds'  
producing plaque

calculogenic  
plaque



# COMPOSITION

## ■ PRIMARILY OF MICRO-ORGANISMS

Gram +ve -

s.mutans

s.Sanguis

s.Milleri

s.Salivarius

Gram -ve -

a.Viscosus

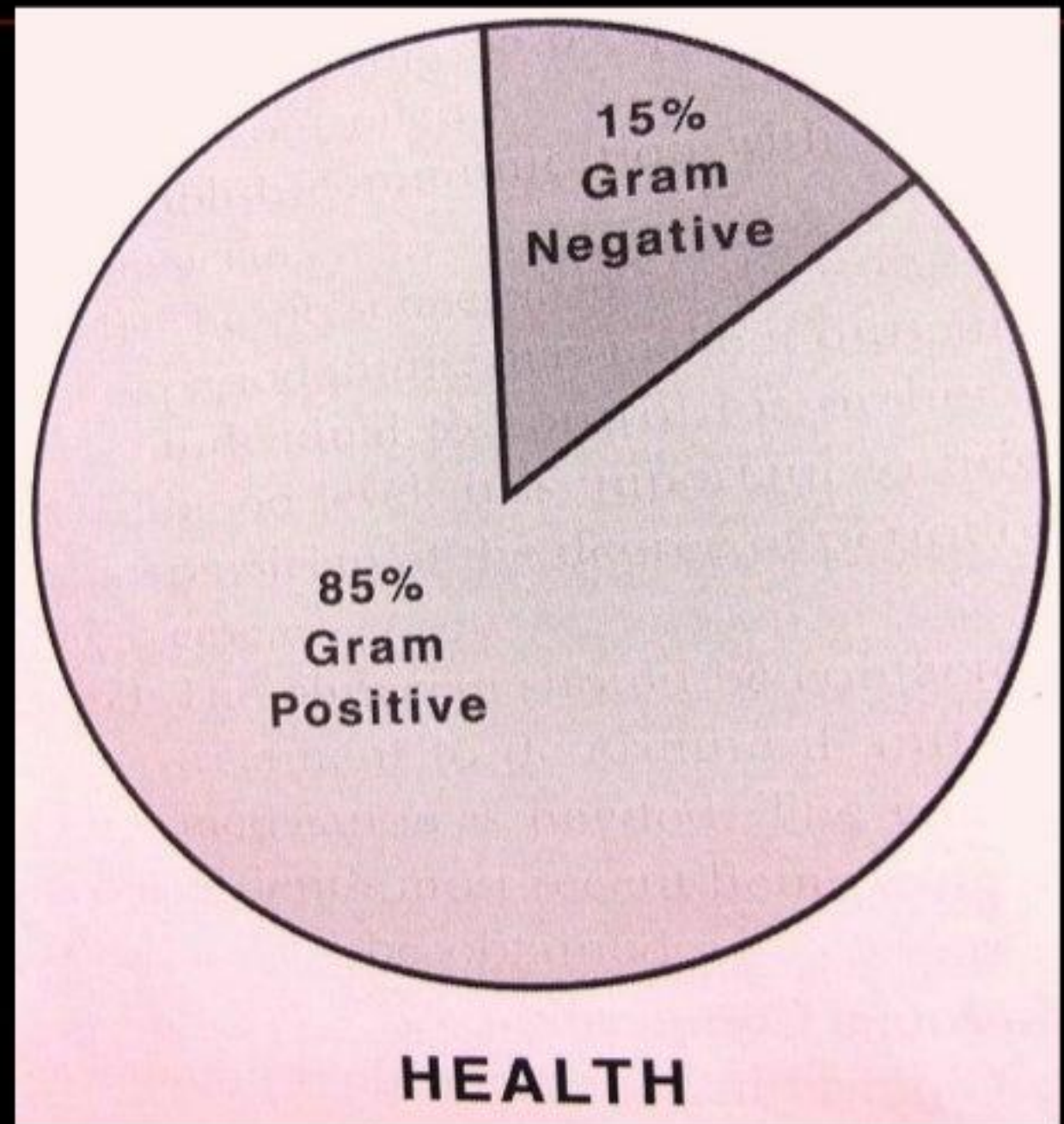
a.Naslundi

a.Israeli

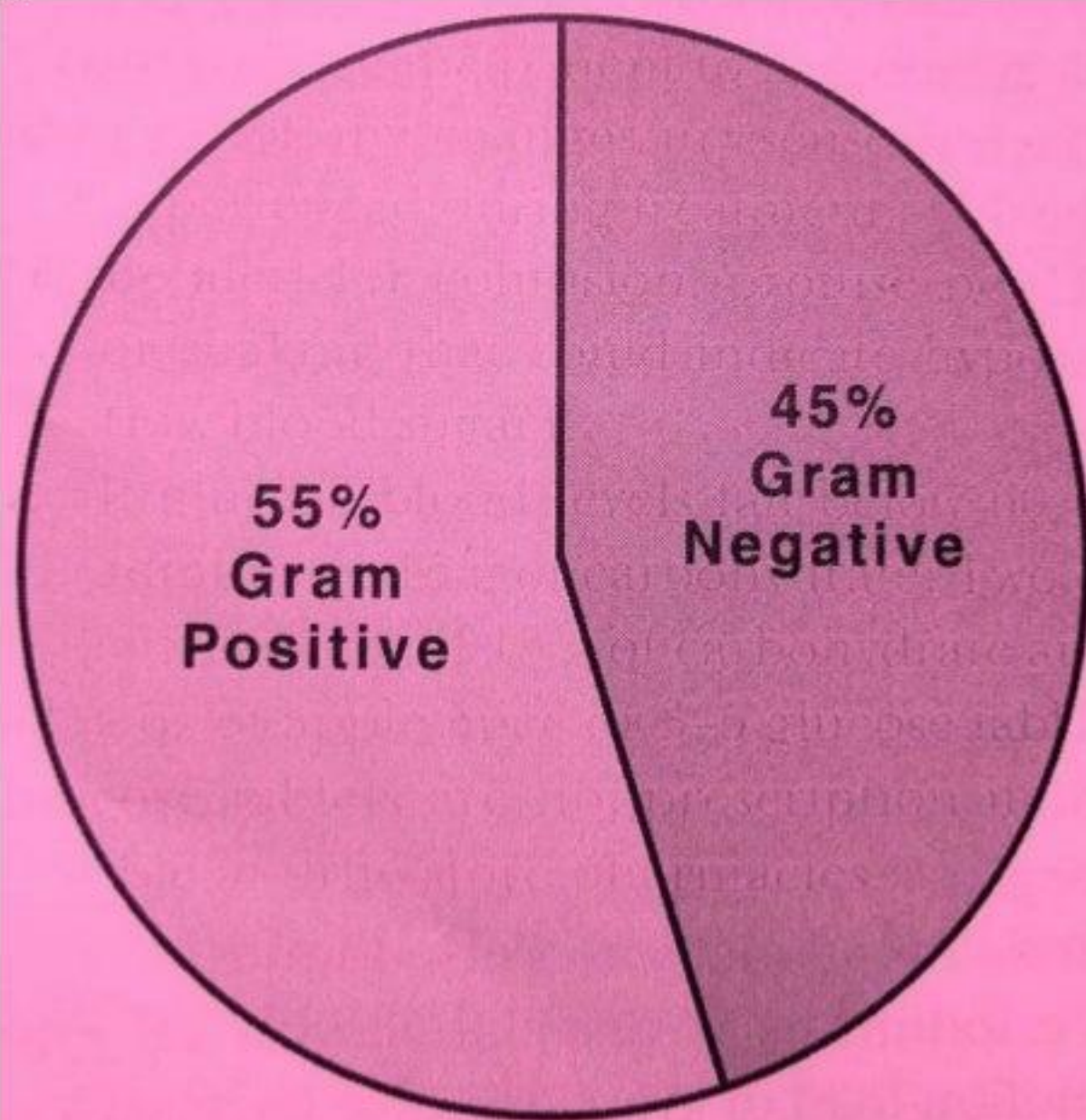
Gram -ve anaerobic cocci -

Vellionellae

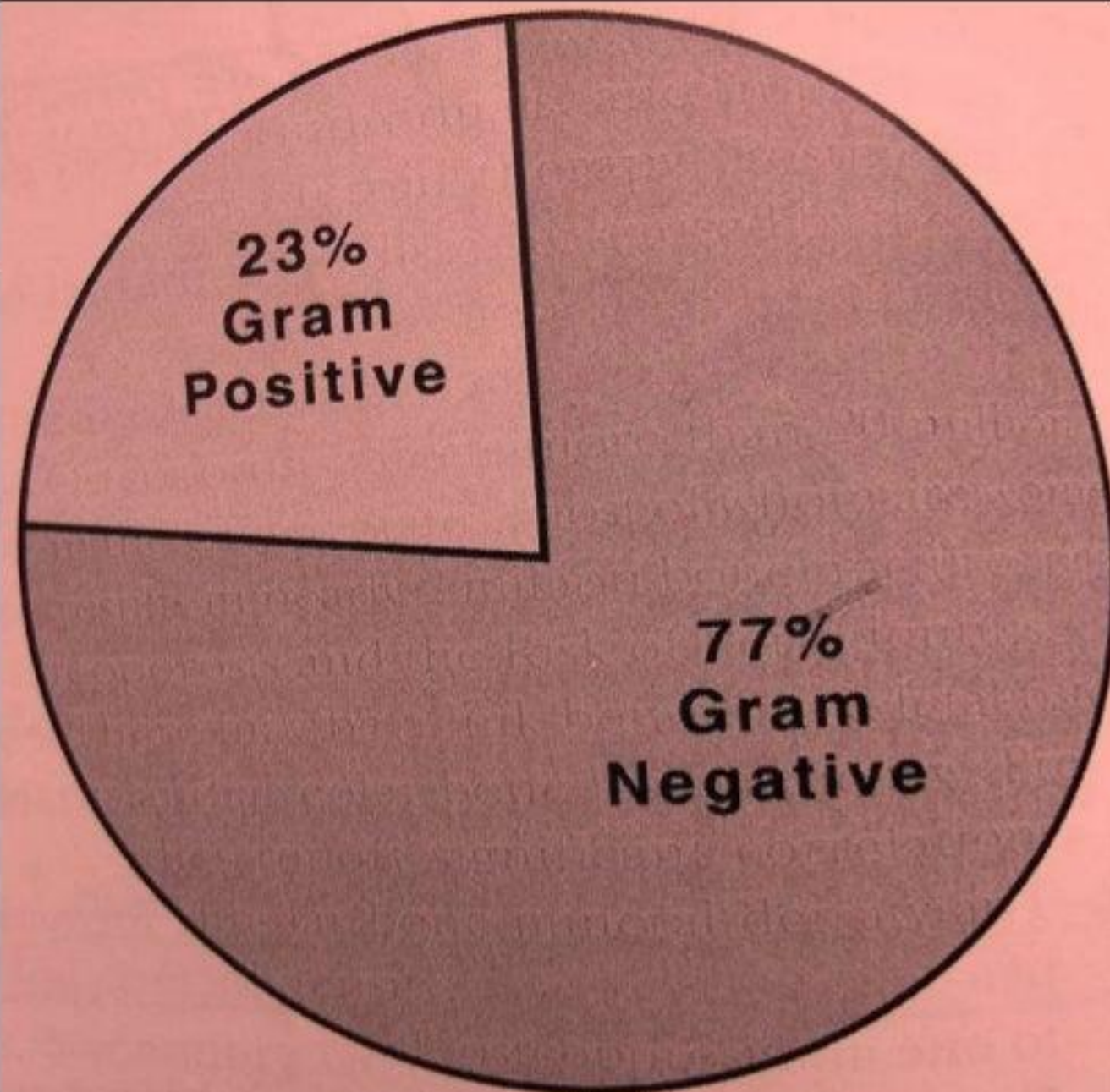
v.parvula







**GINGIVITIS**



**PERIODONTITIS**

■ Organic : -

Polysaccharide

Protein

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Glycoprotein

Lipid

Albumin

■ Inorganic : -

Phosphorous

Sodium

Pottasium

Fluoride

calculus

# PLAQUE MICRO-ORGANISMS

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- DAY :- 1-2

Early plaque is consisted of streptococci which dominates bacterial population include, *S. mutans*, *S. sanguis*

- Day :- 2-4

cocci r still dominate & increase in no of filamentous may be seen. gradually filamentous form grows into cocci layer & replace them.



- Day : - 6-10

filamentous increase in no.along with rods, spirilia, & fusobacteria.

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Plaque near the gingival margin is thicker & develops more mature flora earlier with spirochete & vibrios

As plaque matures- more gram –ve & anaerobic organism appear. During the period when this is happening, signs of inflammation begin to observe in the gingiva.

- Older plaque :- spirochete & vibrios r prevalent along with cocci & filamentous m.o arranged themselves perpendicular to the tooth surface in a palisade

# FORMATION

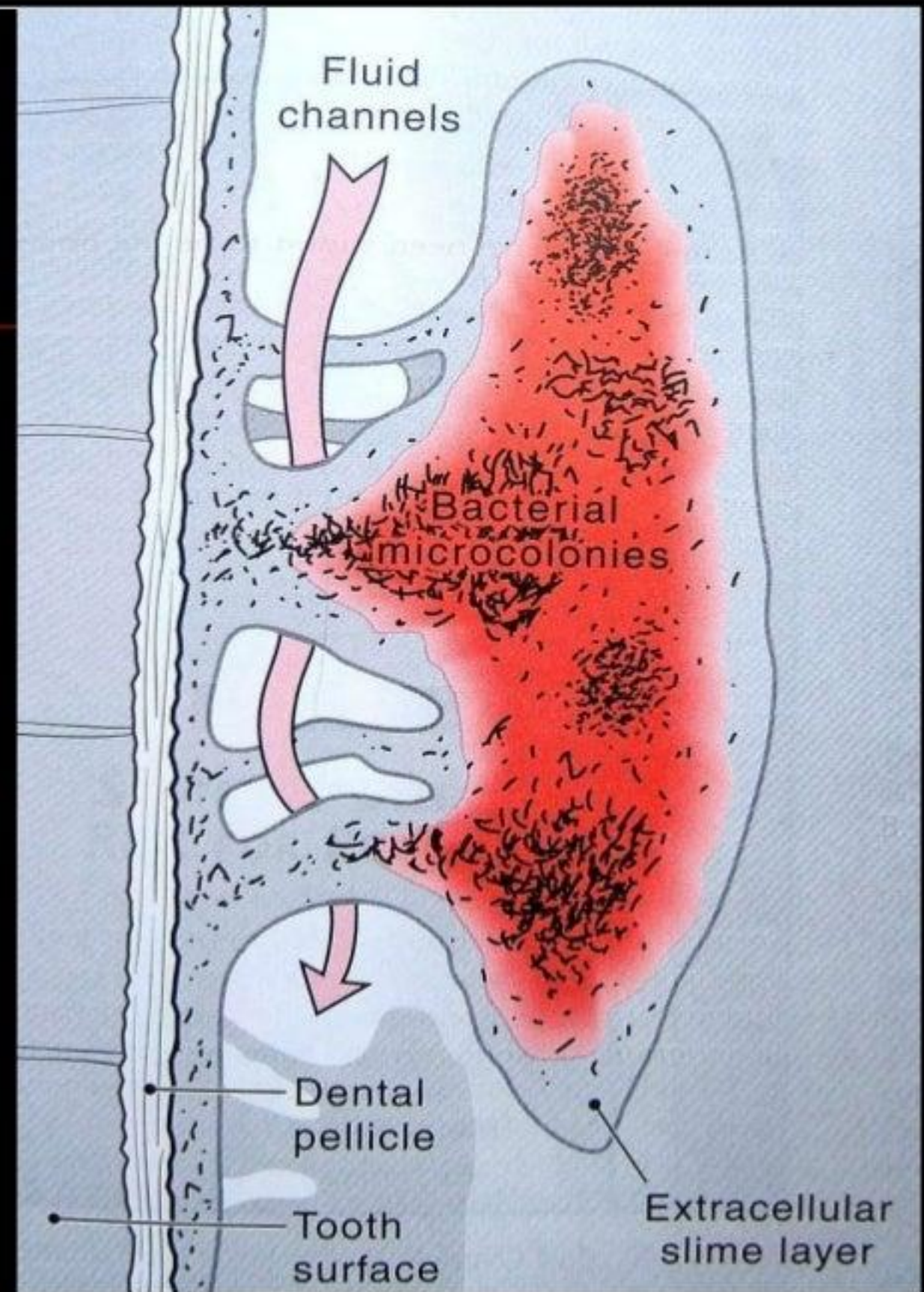
- DENTAL PLAQUE IS A MICROBIAL BIOFILM.
- Biofilms – “ defined as matrix enclosed bacterial populations adherent to each other and/or to surfaces or interfaces.”  
( costerton, 1994 )

- 
- Biofilm can be formed by a single bacterial species or multiple bacterial species as well as other organisms & debris.
  - It can form on any surfaces that is wet.
  - It can exist on any solid surfaces that is exposed to bacteria-containing fluid.



# Biofilm structure

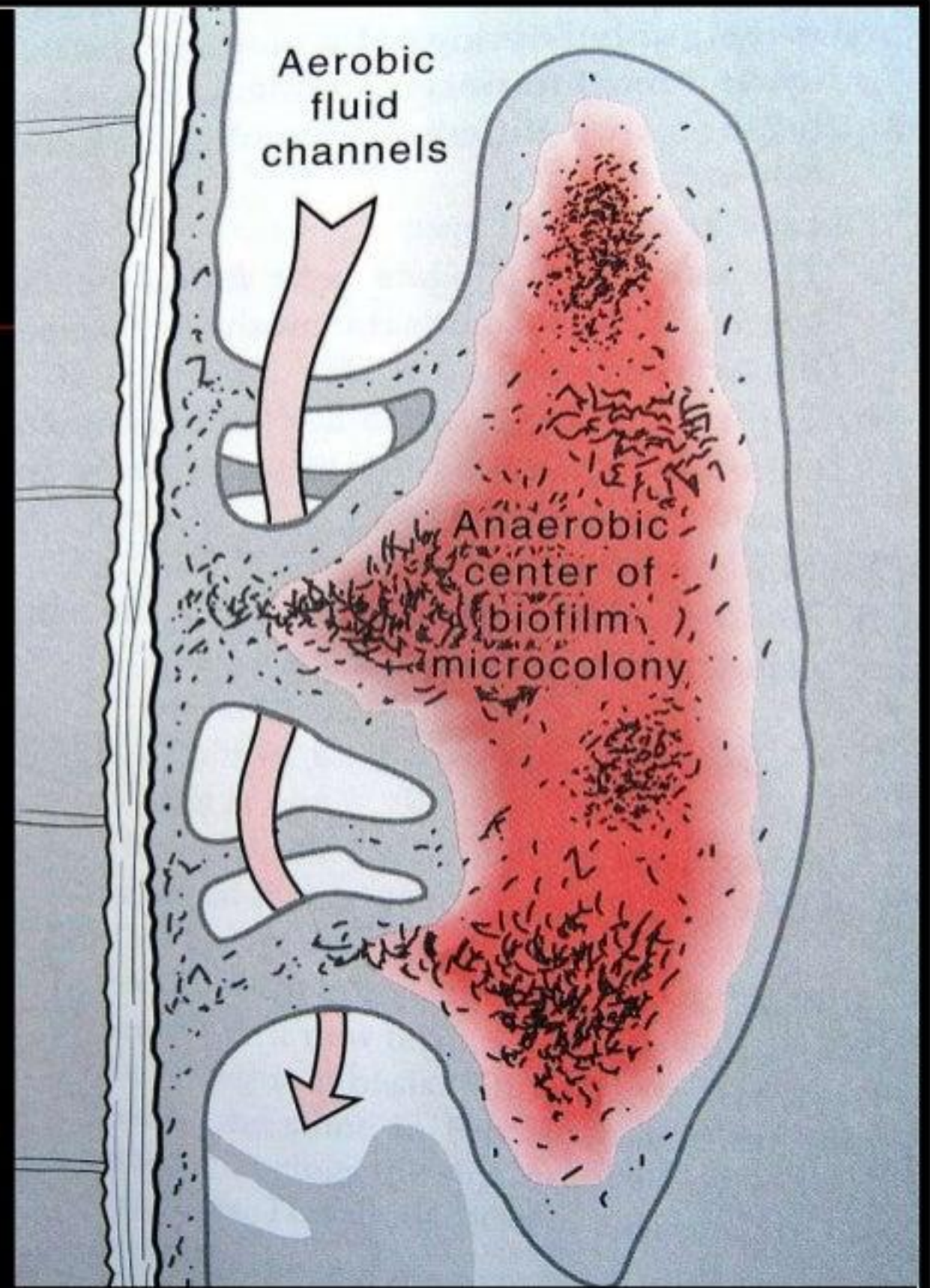
- The bacteria in a biofilm are not distributed evenly, they cluster together to form sessile mushroom shaped microcolonies.
- ↓
- Each microcolony is an independent community with its own customised living environment.



- 
- A protective extra cellular slime layer surrounds the microcolonies.
  - A series of fluid channels penetrate the slime layer & facilitate the movement of nutrients & bacterial products throughout the biofilm
  - A primitive communication system of chemical signals allows communication bt. the bacterial microcolonies.

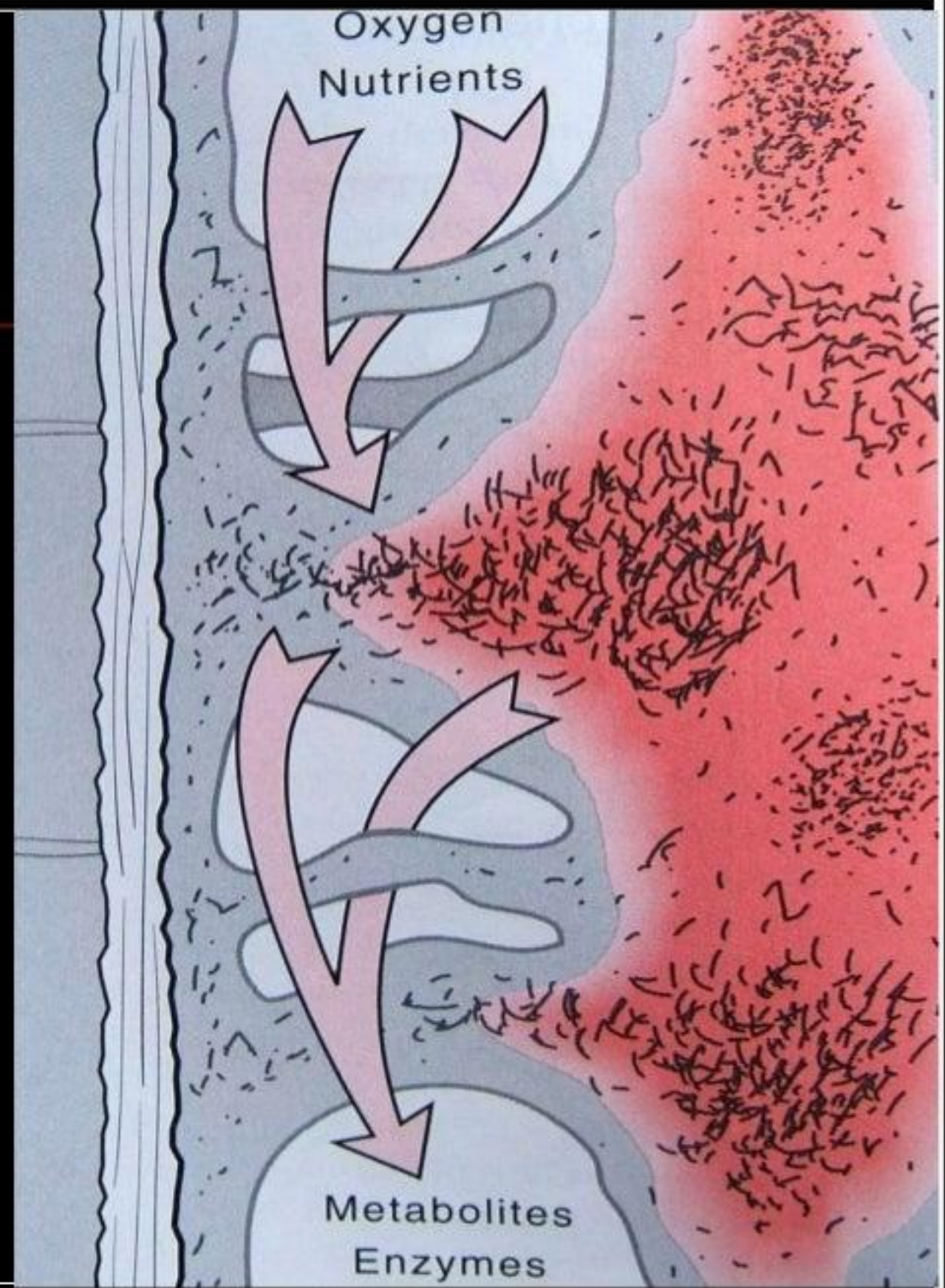


- Bacteria in the center of a microcolony may live in a strict anaerobic environment, while other bacteria at the edges of the fluid channel may live in an aerobic environment.



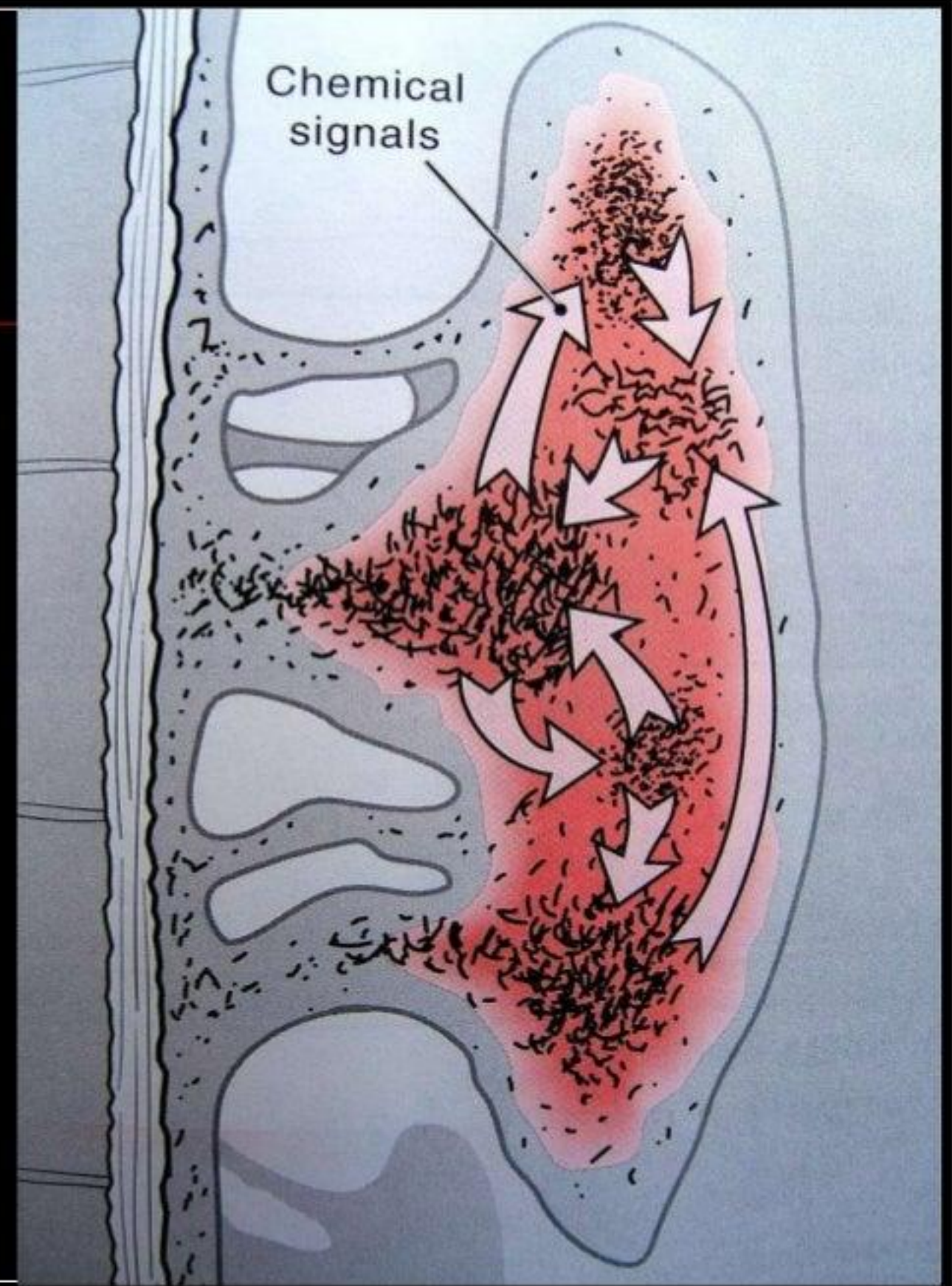


- Fluid channels provide nutrients & oxygen for the bacterial microcolonies, waste products & enzymes within the biofilm structure





- The bacterial microcolonies use “chemical signals” to communicate with each other.



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- Bacterial microcolonies r protected by one another or by extracellular slime layer & r usually resistant to antibiotics & antimicrobials, & the body's defense system.
  - Can be destroyed by simply wiping off them.