

Dental plaque

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DENTOMEDIA

INTRODUCTION

- 1 mm³ of dental plaque, weighing about 1 mg contains more than 200 million bacteria



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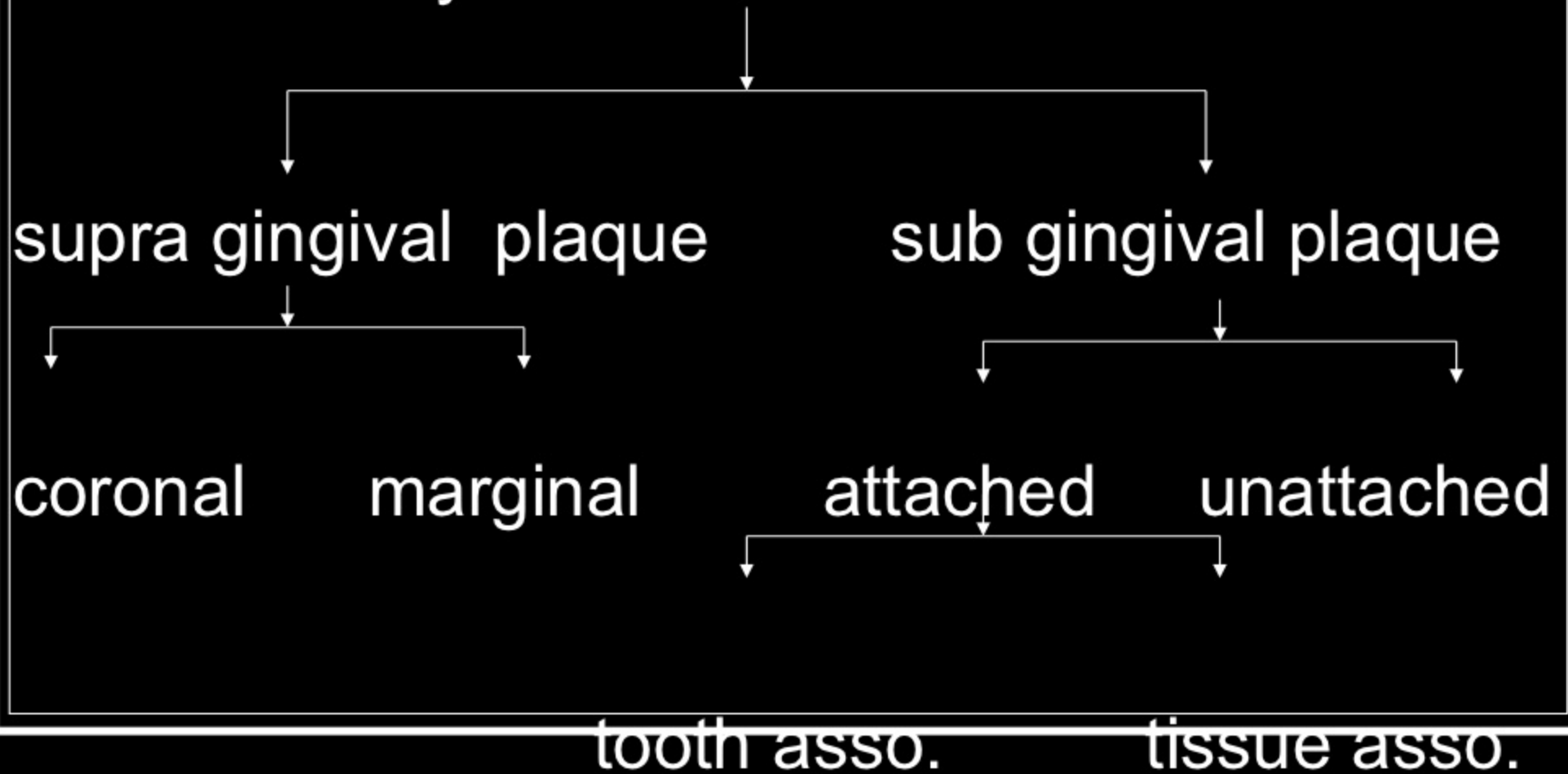
Definition

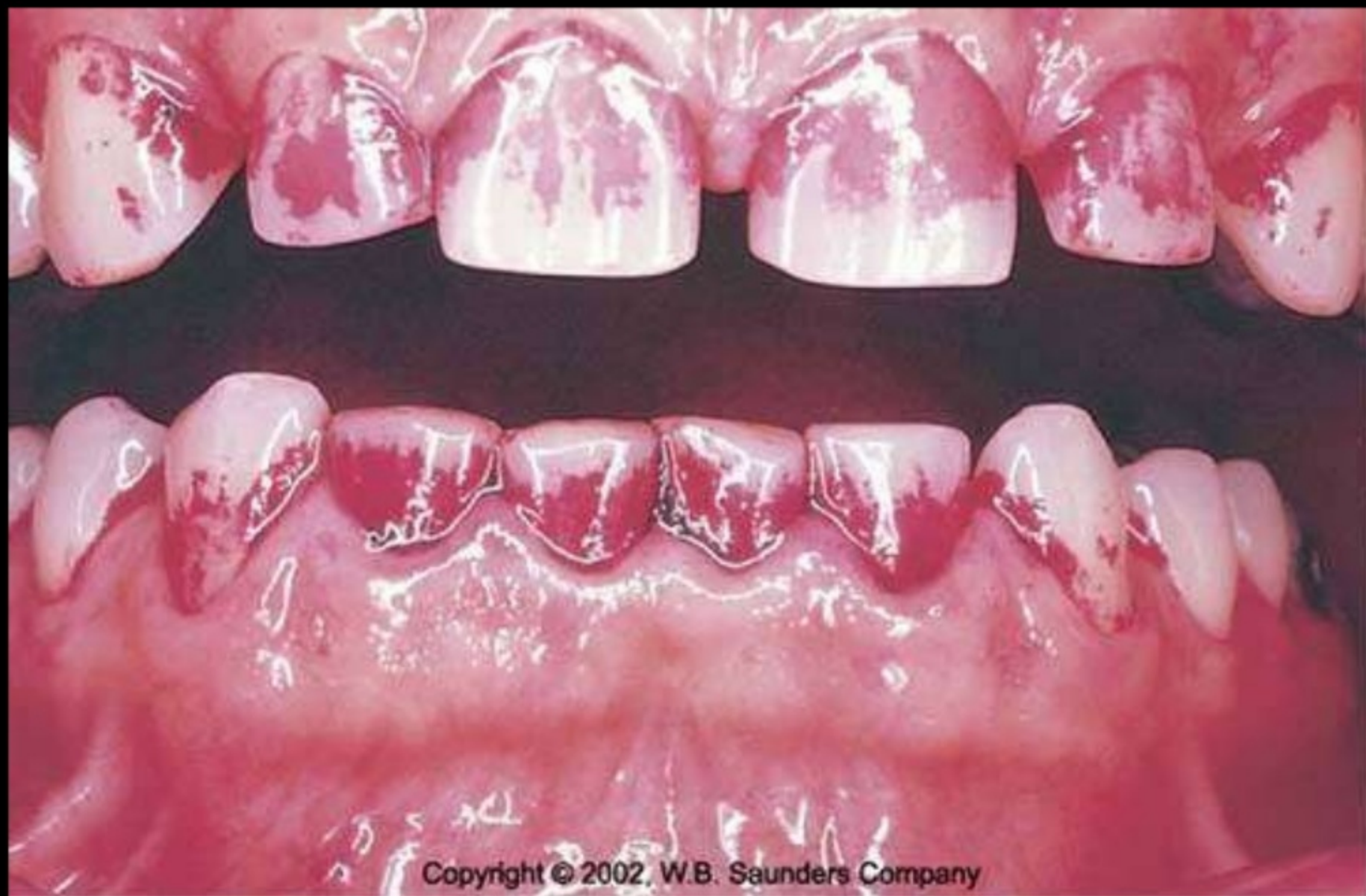
- IT IS A MICROBIAL ECOSYSTEM OR BIOFILM COMPOSED OF DENSELY PACKED MICROBIAL STRUCTURE INSOLUBLE SALIVARY GLYCOPROTEIN, MICROBIAL INTRACELLULAR PRODUCT & TO SOME EXTENT EPITHELIAL CELLS & DEBRIS ARRANGED IN AN ORGANISED COMPLEX INTER CELLULAR MATRIX.

- BY WHO

CLASSIFICATION

■ by location on tooth





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By pathogenic effects

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

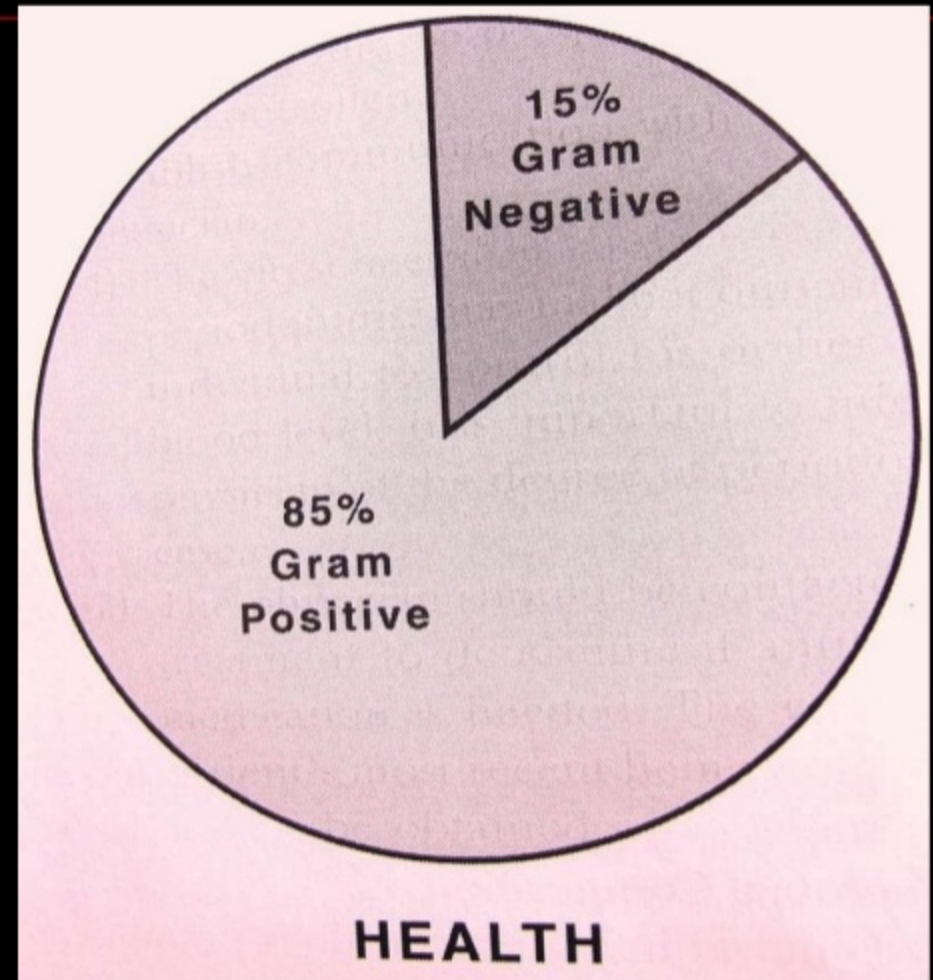
a.Naslundi

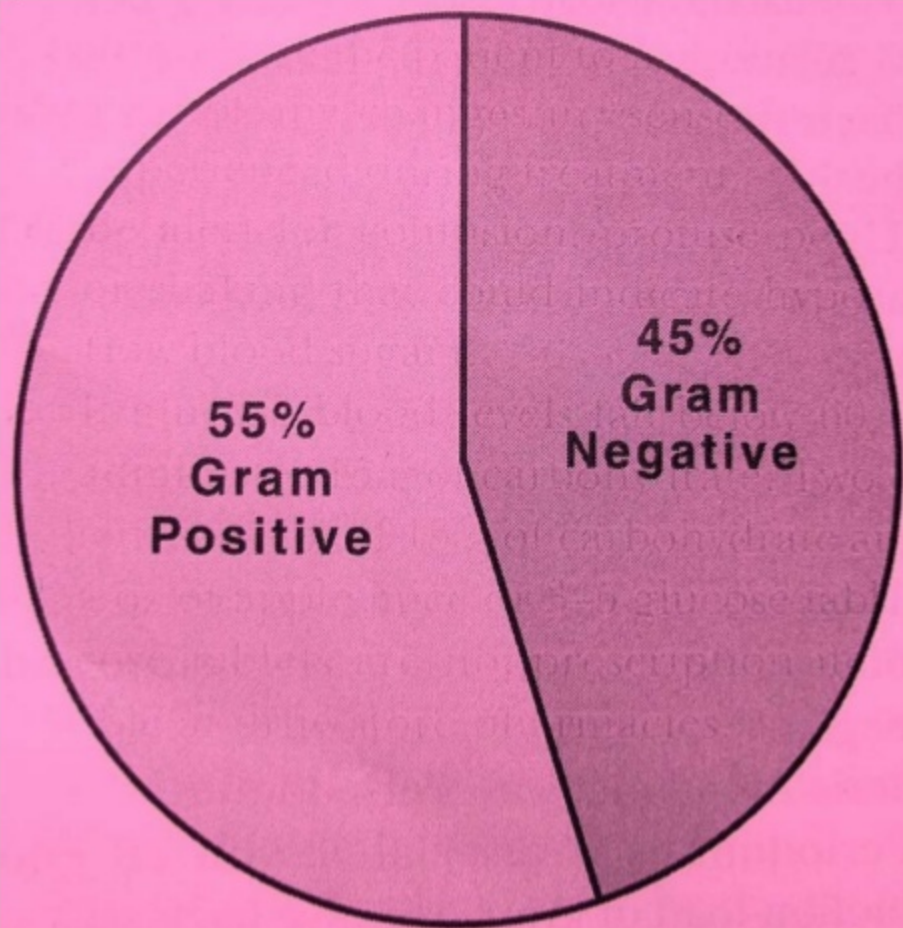
a.Israeli

Gram -ve anaerobic cocci -

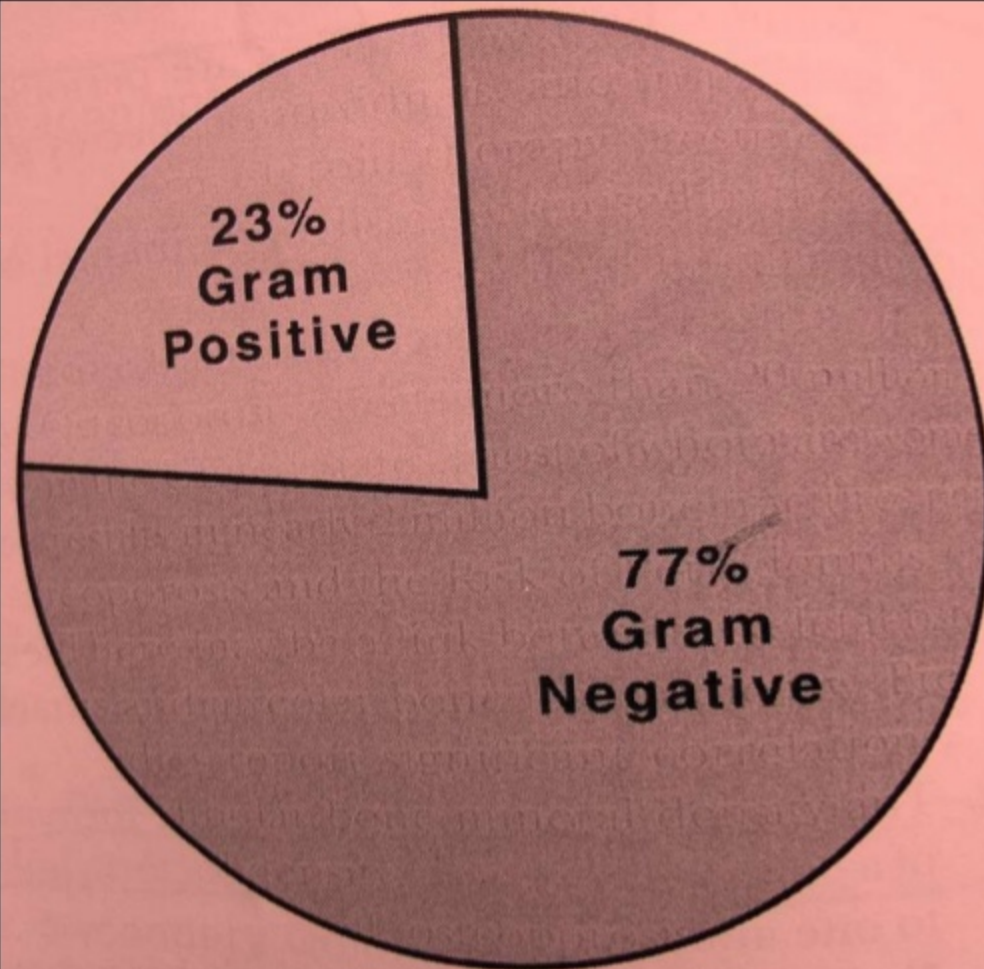
Vellionellae

v.parvula





GINGIVITIS



PERIODONTITIS

■ Organic : -

Polysaccharide

Protein

Glycoprotein

Lipid

Albumin

■ Inorganic : -

Phosphorous

Sodium

Pottasium

Fluoride

calculus

PLAQUE MICRO-ORGANISMS

- 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.

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

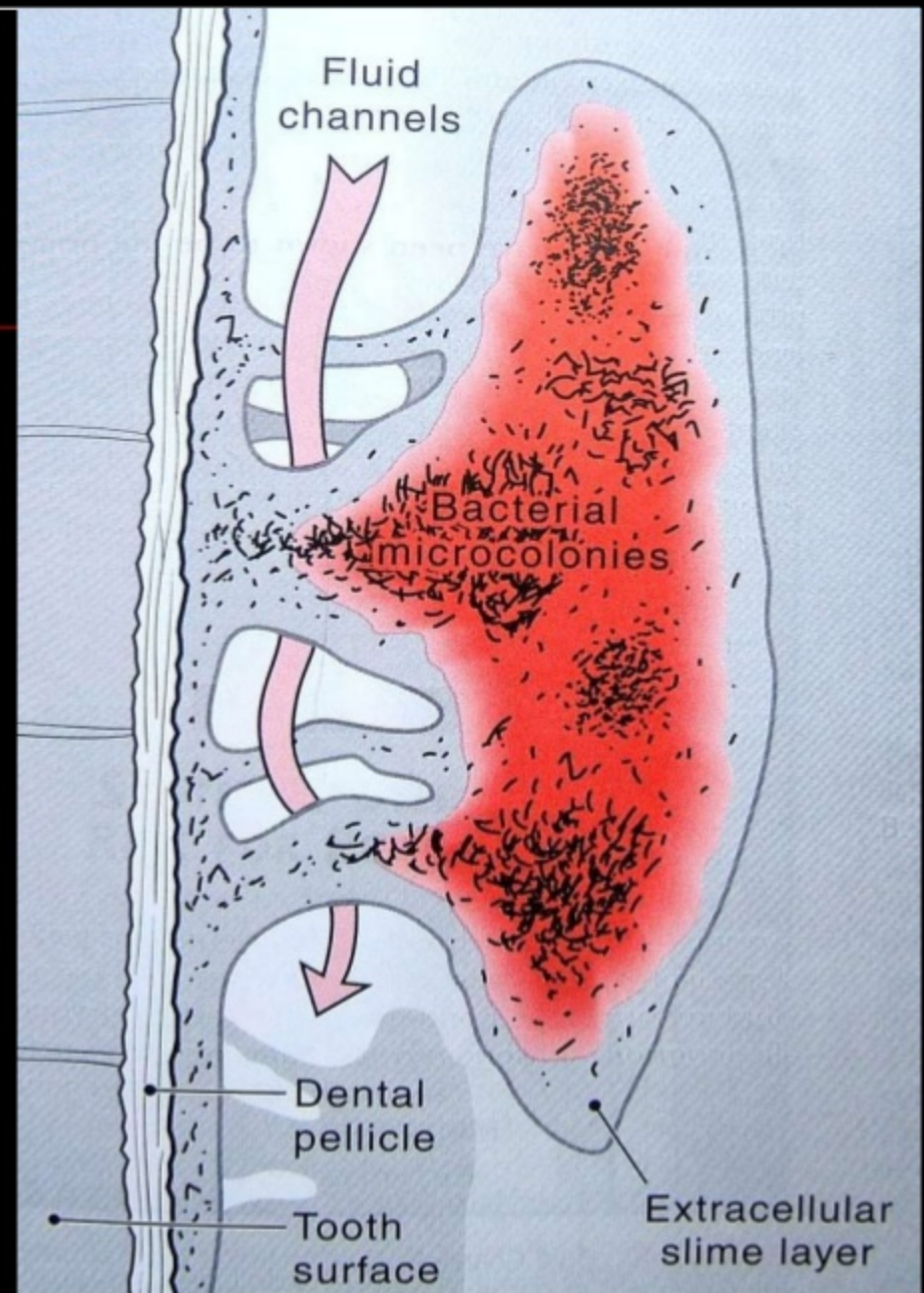
- DENTAL PLAQUE IS A MICROBIAL BIOFILM.
- Biofilms – “ defined as matrix enclosed bacterial populations adherent to each other and/or to surfaces or interfaces.”

(costerton,1994)

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- 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.

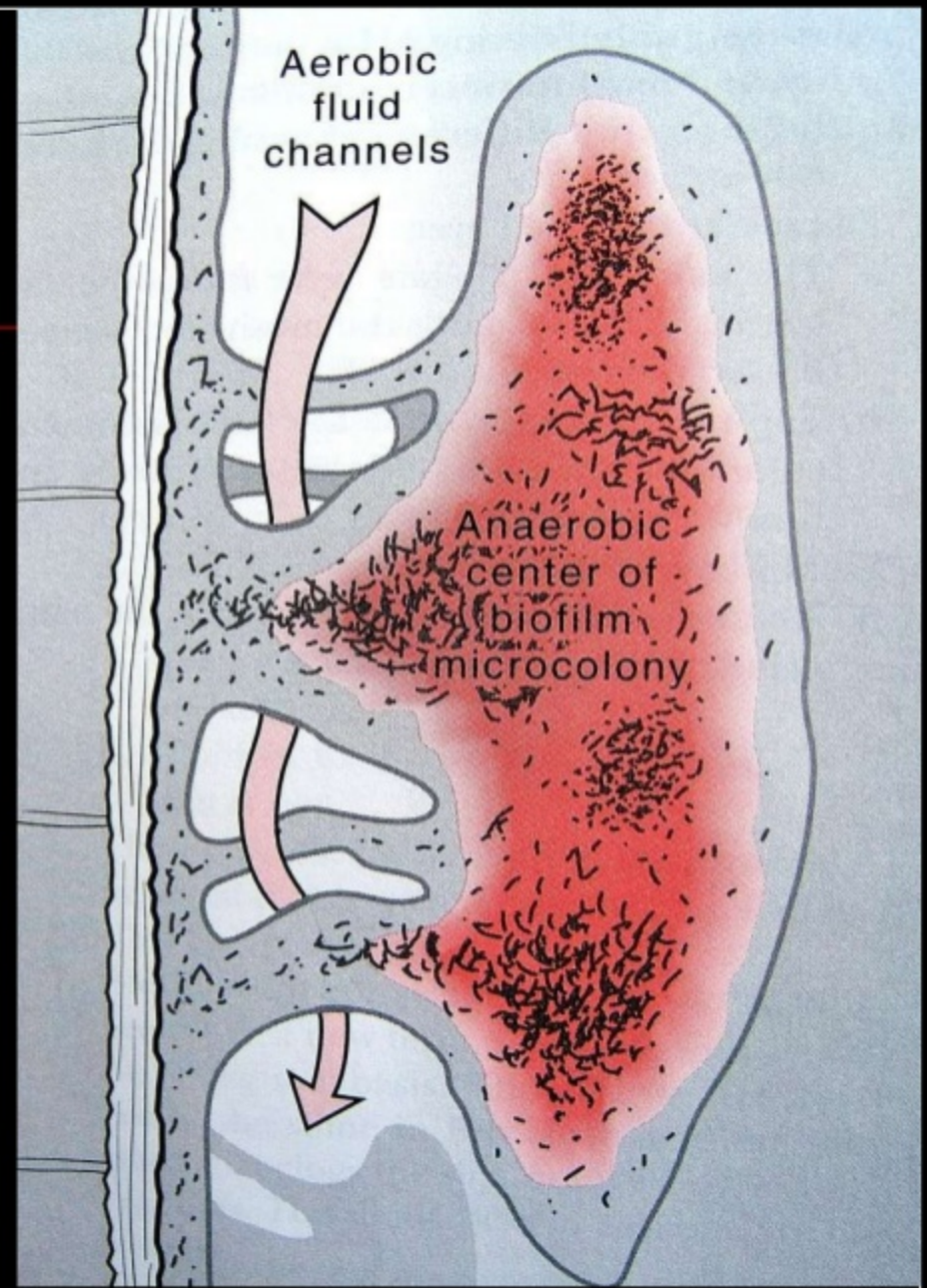
Biofilm structure

- 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.

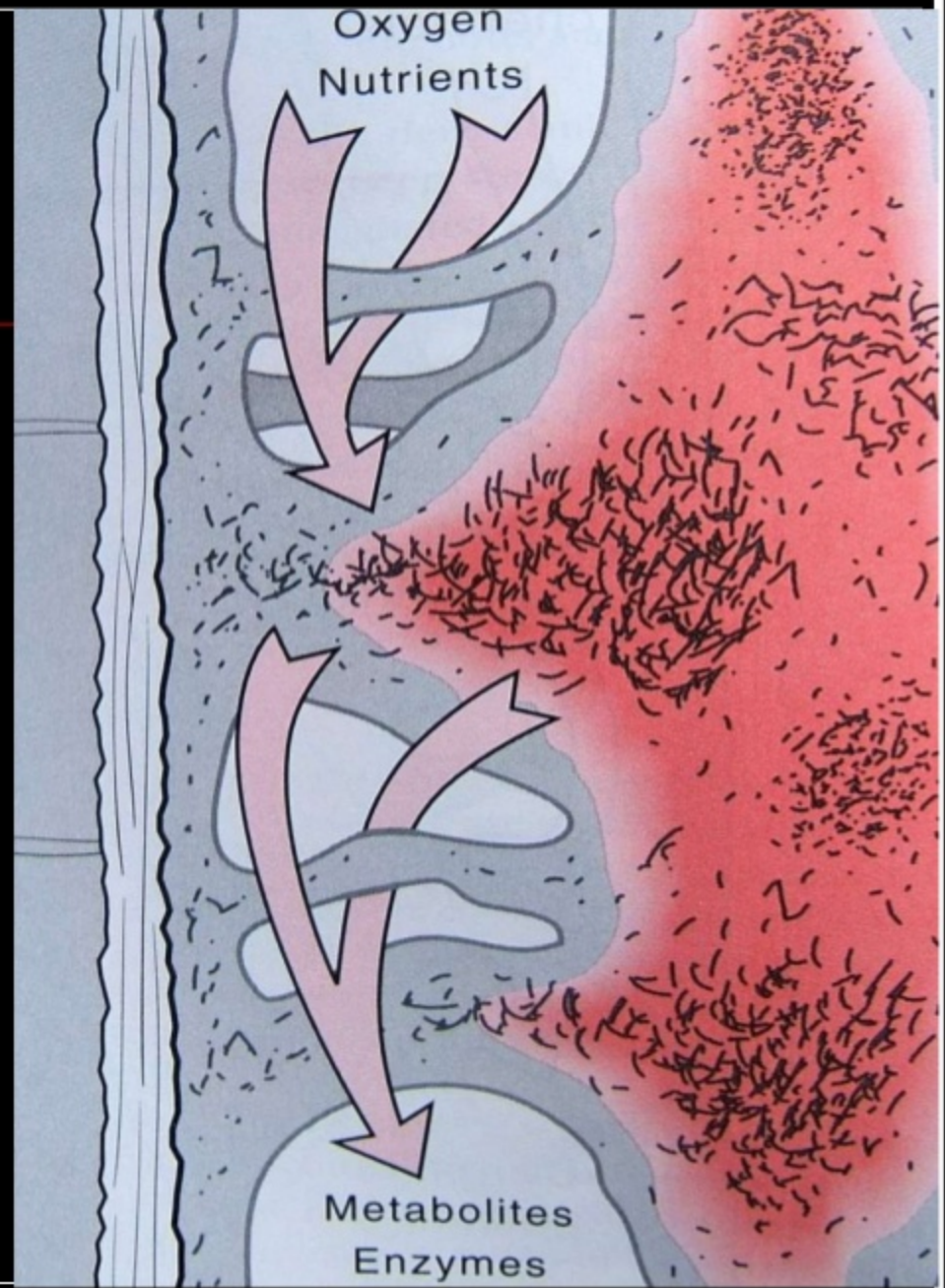


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- A protective extra cellular slime layer surrounds the microcolonies.
 - A series of fluid channels penetrate the slime layer & facilitate the movement of nutrients & bacterial products throughout the biofilm
 - A primitive communication system of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

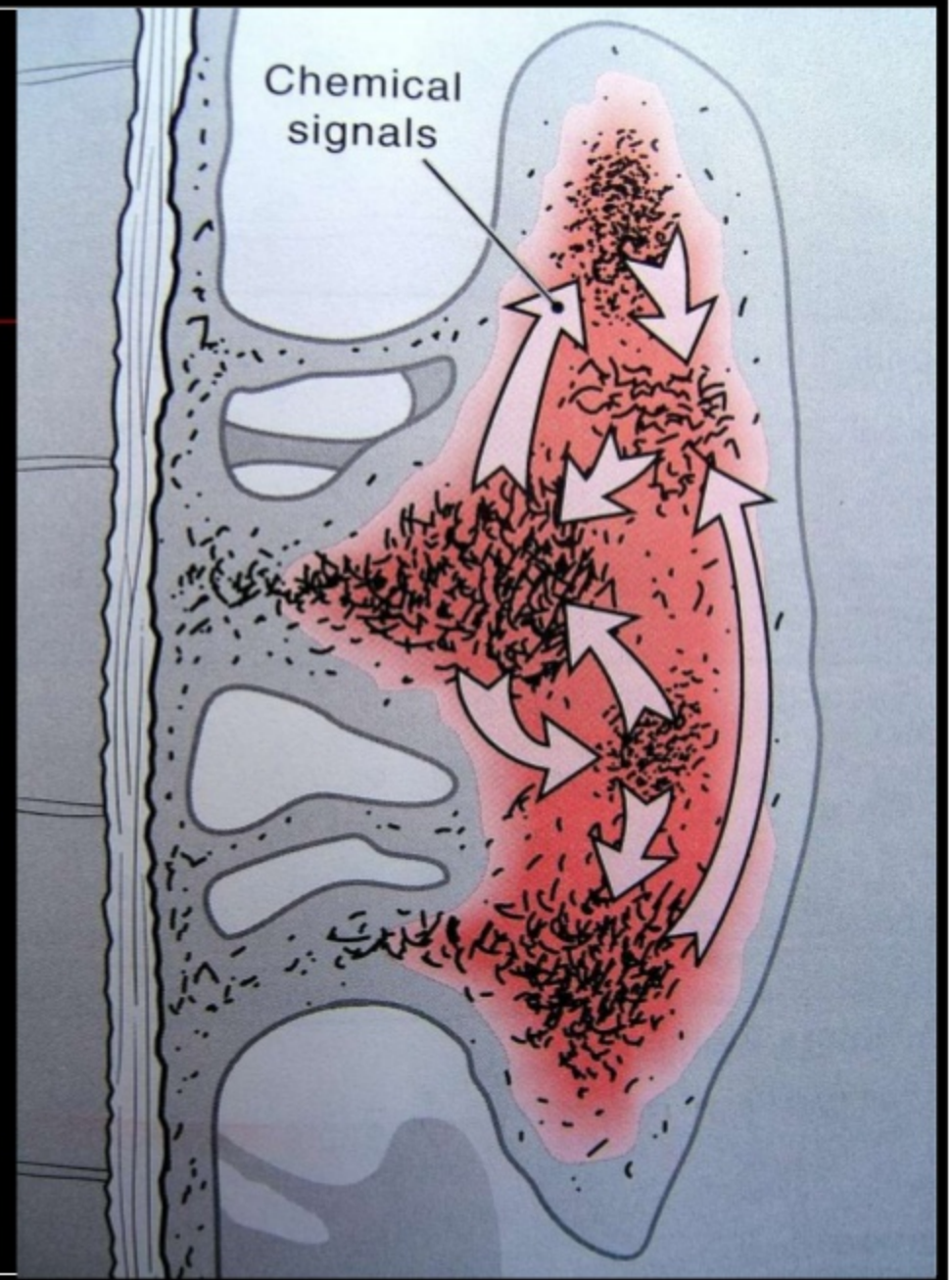
- Bacteria in the center of a microcolony may live in a strict anaerobic environment, while other bacteria at the edges of the fluid channel may live in an aerobic environment.



- 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.