

## Microbiology

Dr. Zainab Al zubaidy

### Lec.1

## Fusobacteria

**Fusobacteria** , are non-sporing, anaerobic, non-motile, , spindle-shaped bacilli .

They are normal inhabitants of the oral cavity, colon and female genital tract and are sometimes isolated from pulmonary and pelvic abscesses.

**Fusospirochaetal infections**, which they cause in combination with spirochaetes, are noteworthy.

### ***Fusobacteria* :**

***Fusobacterium nucleatum*** (the type species), *Fusobacterium*

*periodonticum* and *Fusobacterium simiae* are isolated mainly from periodontal

disease sites, and others such as *Fusobacterium alocis* and *Fusobacterium sulci*

are sometimes found in the healthy gingival sulcus.



Fusospirochetosis causing necrotic oral ulcers in patients with HIV infection - ScienceDirect

## Fig.(1) : Fusospirochetes infection in HIV infected patients

### *Fusobacterium nucleatum*

#### Habitat and transmission

Several subspecies of *F. nucleatum* have been identified in different habitats. These include *F. nucleatum* subsp. *polymorphum*, **found in the healthy gingival crevice**, and *F. nucleatum* subsp. *nucleatum*, recovered mainly from periodontal pockets.

Fusobacterium can be transmitted from human-to-human by bite wounds · There is also some evidence that Fusobacterium can be transferred in bodily fluids ·

#### Characteristics :

**Gram-negative, strictly anaerobic**, cigar-shaped bacilli with pointed ends (Fig..2).



Fig. 2 :Gram stain for *Fusobacterium nucleatum*

Cells often have a central swelling.

A Gram-stained smear of deep gingival debris obtained from a lesion of acute ulcerative gingivitis is a simple method of demonstrating the characteristic **fusobacteria, together with spirochaetes and polymorphonuclear leukocytes.**

#### **Culture and identification**

Grows on blood agar as dull, granular colonies with an irregular rhizoid edge.

Biochemical reactions and the acidic end products of carbohydrate metabolism help in identification. As fusobacteria can remove sulphur from cysteine and methionine to produce odoriferous hydrogen sulphide and methylmercaptan, they are thought to be associated with **halitosis**

#### **Pathogenicity :**

The **endotoxin** of the organism appears to be involved in the pathogenesis of periodontal disease.

It possesses remarkable **adherence** properties and the fusobacterium **adhesin A (FadA)**, which confers this property, has recently been isolated. *F. nucleatum* is usually isolated from polymicrobial infections; it is rarely the sole pathogen.

Thus, in combination with oral spirochaetes (*Treponema vincentii* and others), it causes the classic **fusospirochaetal infections**. These are:

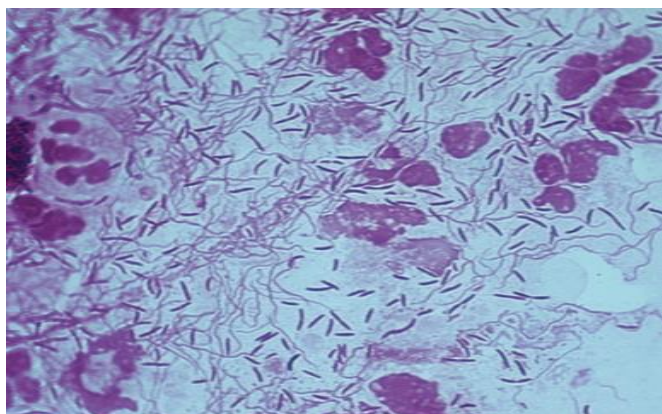
- acute (necrotizing) ulcerative gingivitis or trench mouth.**

- **Vincent's angina**, an ulcerative tonsillitis causing tissue necrosis, often due to extension of acute ulcerative gingivitis
- **cancrum oris or noma.**



**Noma** (also known as **gangrenous stomatitis** or **cancrum oris**) is a rapidly progressive and often fatal [gangrenous](#) infection of the mouth and face. Noma usually begins as an ulcer on gums and rapidly spreads into the jawbone, cheek, and soft tissues of the face. This is followed by [death of the facial tissues](#) and fatal [sepsis](#)

As fusobacteria coaggregate with most other oral bacteria, they are believed to be important bridging organisms between early and late colonizers during plaque formation



**A photomicrograph of fusobacteria showing characteristic Gram-negative, cigar-shaped cells with pointed ends.**

So , the pathogenicity of Fusobacterium nucleatum bacteria , as one of the resident members of the oral microorganisms, and **plays a significant role in the pathogenesis and progression of periodontitis**. In addition the Long-term of infection with Fusobacterium . nucleatum may lead to the development and progressive of oral cancer