

# HACEK group bacteria

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HACEK bacteria are a group of **demanding G- bacteria**, which are among the **unusual causes of infectious endocarditis** (inflammatory heart disease due to infection).

HACEK is an abbreviation of the initials of the genera of bacteria belonging to this group: ***Haemophilus*, *Aggregatibacter* (originally *Actinobacillus*), *Cardiobacterium*, *Eikenella*, *Kingella***. HACEK organisms are **a common part of the human microbiota located in the oropharyngeal region**. The bacteria were originally grouped because they were thought to be significant causes of infectious endocarditis, but recent research has shown that they are responsible for only **1,4-3,0% of infectious endocarditis** ([https://www.wikilectures.eu/w/Endocarditis#Infectious\\_endocarditis](https://www.wikilectures.eu/w/Endocarditis#Infectious_endocarditis)).

## Individual organisms

The HACEK group originally referred to *Haemophilus parainfluenzae*, *Haemophilus aphrophilus*, *Actinobacillus actinomycetemcomitans*, *Cardiobacterium hominis*, *Eikenella corrodens*, and *Kingella kingae*.

However, the taxonomic rearrangement changed the letter A to ***Aggregatibacter* spp.** and the letter H to ***Haemophilus* spp.**. Some medical literature uses an older classification of HACEK organisms, but recent publications respect the new classification.

### List of HACEK organisms:

#### Genus *Haemophilus*:

- *Haemophilus haemolyticus*
- *Haemophilus influenzae* – The incidence of endocarditis caused by *H. influenzae* has decreased since the vaccine was placed on the market
- *Haemophilus parahaemolyticus*
- *Haemophilus parainfluenzae*

#### *Aggregatibacter*:

- *Aggregatibacter actinomycetemcomitans* (originally *Actinobacillus actinomycetemcomitans*)
- *Aggregatibacter aphrophilus* (originally *Haemophilus aphrophilus*)
- *Aggregatibacter paraphrophilus* (originally *Haemophilus aphrophilus*)
- *Aggregatibacter segnis*

#### *Cardiobacterium*

- *Cardiobacterium hominis* – the most common species in the genus *Cardiobacterium*
- *Cardiobacterium valvarum*

#### *Eikenella*

- *Eikenella corrodens*

#### *Kingella*

- *Kingella denitrificans*
- *Kingella kingae* – the most common species in the genus *Kingella*

## Properties and identification

All of these organisms are **part of the normal oropharyngeal flora**.

They **grow slowly** during cultivation (up to 14 days, they prefer **an atmosphere with increased CO<sub>2</sub> tension** and share an increased capacity to **induce endocarditis, especially in young children**. Together, they are responsible for 5-10% of infectious endocarditis cases involving native valve involvement. At the same time, **it is one of the most common Gram-negative causes of endocarditis among people who do not use intravenous drugs**.

They were often a case of cultivation-unproven endocarditis. Negative cultivation refers to the inability to form a colony on conventional agar plates, as these bacteria are **difficult to cultivate and require specific nutrients**.

In addition to valvular infections in the heart, these bacteria can cause other diseases such as **bacteremia, abscess, peritonitis, otitis media, conjunctivitis, pneumonia, arthritis, osteomyelitis** ([https://www.wikilectures.eu/w/Causes\\_of\\_Bone\\_and\\_Joint\\_Infections#Acute\\_osteomyelitis](https://www.wikilectures.eu/w/Causes_of_Bone_and_Joint_Infections#Acute_osteomyelitis)) and periodontal infections.

## Therapy

The drug of choice for HACEK organisms in endocarditis is 3rd generation cephalosporin and  $\beta$ -lactam antibiotic ([https://www.wikilectures.eu/w/Beta-lactam\\_antibiotics](https://www.wikilectures.eu/w/Beta-lactam_antibiotics)) **Ceftriaxon** (<https://www.sukl.cz/modules/medication/search.php?data%5Bmaterial%5D=ceftriaxon#data-listing>). Another therapeutic option is **Ampicilin** (<https://www.sukl.cz/modules/medication/search.php?data%5Bmaterial%5D=Ampicilin#data-listing>) combined with low doses of **gentamicin (aminoglycosid)**.

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