

# HACEK organisms

HACEK bacteria are a group of **fastidious** (has complex or particular nutritional requirements) **G-bacteria** that are among the uncommon causative agents of **infective 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**. HACEK organisms are a common component of the human microbiota residing in the **oropharyngeal region**. Bacteria were originally grouped together because they were thought to be important causative agents of infective endocarditis, but recent studies have shown that they are responsible for **only 1.4-3.0% of of infectious endocarditis** ([https://www.wi-kilectures.eu/w/Endocarditis#Infectious\\_endocarditis](https://www.wi-kilectures.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, taxonomic rearrangement has changed the letter A to ***Aggregatibacter* spp.** and the letter H to ***Haemophilus* spp.** Some medical literature uses the older classification of HACEK group organisms, but recent publications respect the new classification.

## List of organisms of the HACEK group

### 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*

## Features and identification

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

They grow slowly when cultured (up to 14 days), prefer an atmosphere with **elevated CO<sub>2</sub> tension**, and share an increased capacity to induce **endocarditis, especially in young children**. Collectively, they are responsible for 5-10% of infective endocarditis cases involving native valve involvement. They are also among the most common **Gram-negative agents of endocarditis among people who do not inject drugs**.

Bývají častým případem kultivačně neprokázané endokarditidy. Negativní kultivace se vztahuje k neschopnosti vytvořit kolonii na běžných agarových plotnách, jelikož tyto bakterie jsou **náročné na kultivaci a vyžadují specifické nutrienty**.

In addition to valve 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.

## Treatment

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)**.