

Culture-demanding bacteria

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Bordatella

- G- aerobic rod
- He is the originator **whooping cough - Pertussis**
- The most common representatives – *B. Pertussis* and *B. Parapertussis*



Whooping Cough (Pertussis)

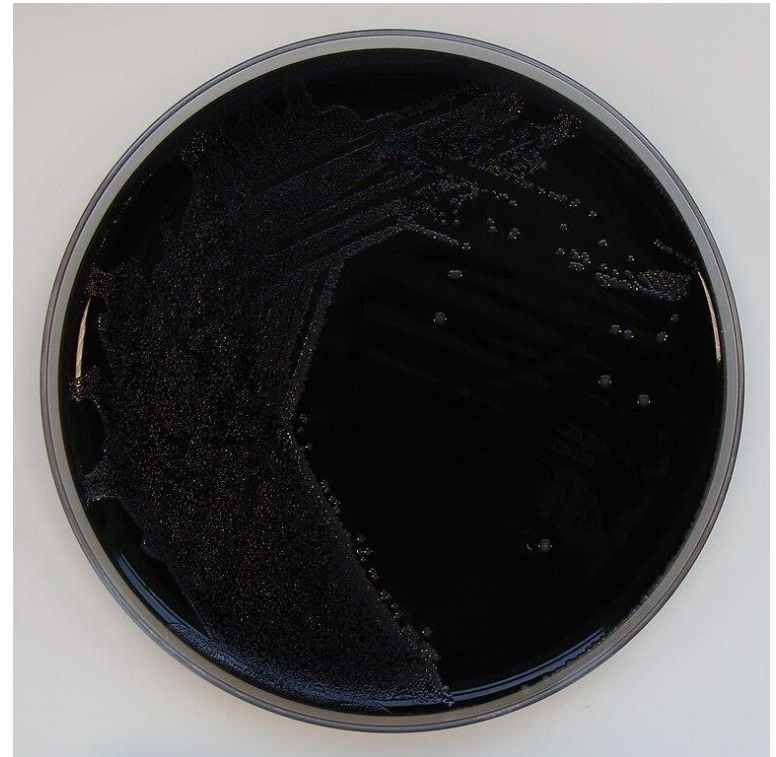
- A highly contagious disease
- It shows a high mortality rate (up to 600 000 death in the world)
- He is vaccinated against pertussis acellular vaccine

Whooping Cough (Pertussis)

- Characteristic **coughing fits**
- Suspicion should be had for an atypically long-lasting cough in the area of epidemic occurrence
- It has 3 stages:
 1. Catarrhal stage (1-2 weeks)
 2. Paroxysmal stage (1 month)
 3. Convalescent stage (1 month)

Diagnosis of Bordatella

- Direct pass
 - **Cultivation** - grows on Bordet-Gengou agar



Diagnosis of Bordatella

- **Direct pass**
 - **Cultivation**
 - DNA detection using **PCR** – compared to culture, it is **very sensitive**
- **Indirect pass**
 - **Serological examination** by ELISA

Therapy

- It is the drug of choice
- **Clarithromycin**(macrolides)
 - Effective only in the catarrhal stage
- An alternative is Cotrmoxazole

Brucella spp.

- G- aerobic coccobacilli, intracellular pathogens
- They attack the monocyte-macrophage system
- It is the causative agent of a zoonosis called **Brucellosis**
- Infectious dose very low - has high infectivity

Brucellosis

- Depending on the species, some of the forms of infection develop
 1. Hepatolienal
 2. Cardiac
 3. Osteomyelitis
- The disease has non-specific symptoms:
 - Fever
 - Perspiration
 - Fatigue
 - Anemia...

Brucella spp

- Diagnostics –**PCR** and **blood culture**
- Treatment – antibiotic combination of doxycycline (tetracycline) with rifampicin

Francisella tularensis

- G- strictly aerobic coccobacillus
- Causes tularemia - "hares disease"
 - It is highly infectious intracellular disease, the main source being hares and rabbits
 - Hunters are most at risk
 - It's a rare disease, hers the pulmonary form can be fatal

Tularemia

- Symptoms depend on the route of transmission
 - Ulceroglandular form - through injured skin
 - Fever, chills, nausea, swollen lymph nodes
 - Pulmonary form — **the most serious**
 - Oropharyngeal and GIT form – after ingestion of meat
 - Typhoid – ulcers, GIT bleeding, sepsis
 - Oculoglandular - getting into the eye. It runs like conjunctivitis

Francisella tularensis

- Diagnostics
 - **Serology**–main method
 - Can be used PCR
- Therapy – drug of choice Doxycycline (Tetracycline)

Legionella spp.

- G- rod to filament
- Aerosol transmission, survives in water



Legionella spp.

- It causes two clinical forms:
 - Pontiac fever – flu-like disease. The illness lasts 2-5 days, and it passes spontaneously.
 - **Legionnaires' disease**—proceeds as **severe pneumonia, which in 15-20% it ends in death.**
 - There is a damage to the lung parenchyma
 - Then microabscesses form in the lungs
 - Further damage to the kidneys, CNS, GIT

Legionella spp.

- Diagnostics
 - **PCR!** from sputum, nasopharynx. swab or tissue
 - Detection of antigen in urine – very fast and useful utility. But negativity does not rule out illness. It is performed using immunochromatography
 - Cultivation on BCYE agar (buffered charcoal yeast extract agar)



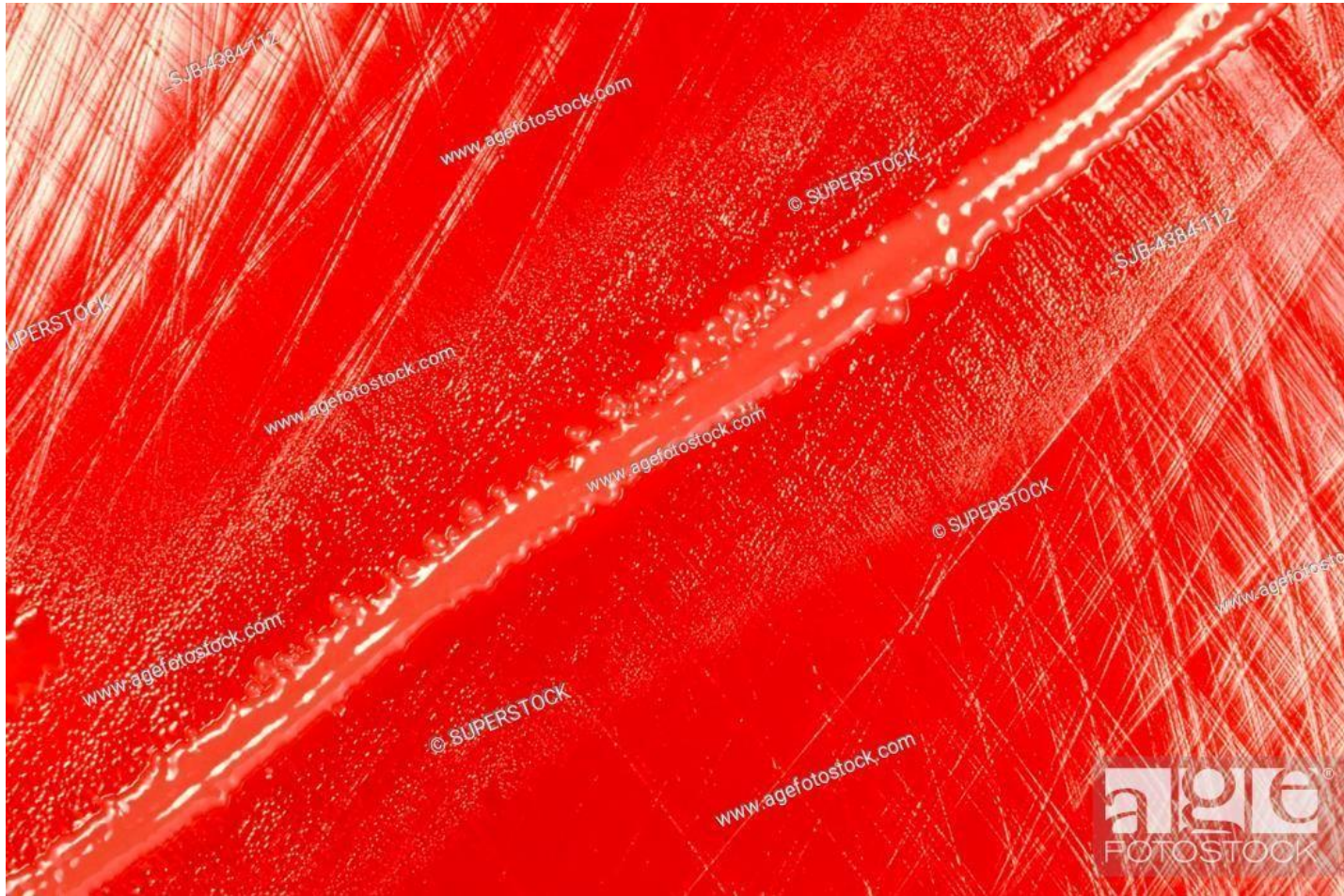
Legionella spp.

- Therapy
 - Potiac fever – symptomatic treatment
 - **Legionnaires' disease** – ATB treatment.
Primarily **clarithromycin**(macrolides),
possibly can levofloxacin

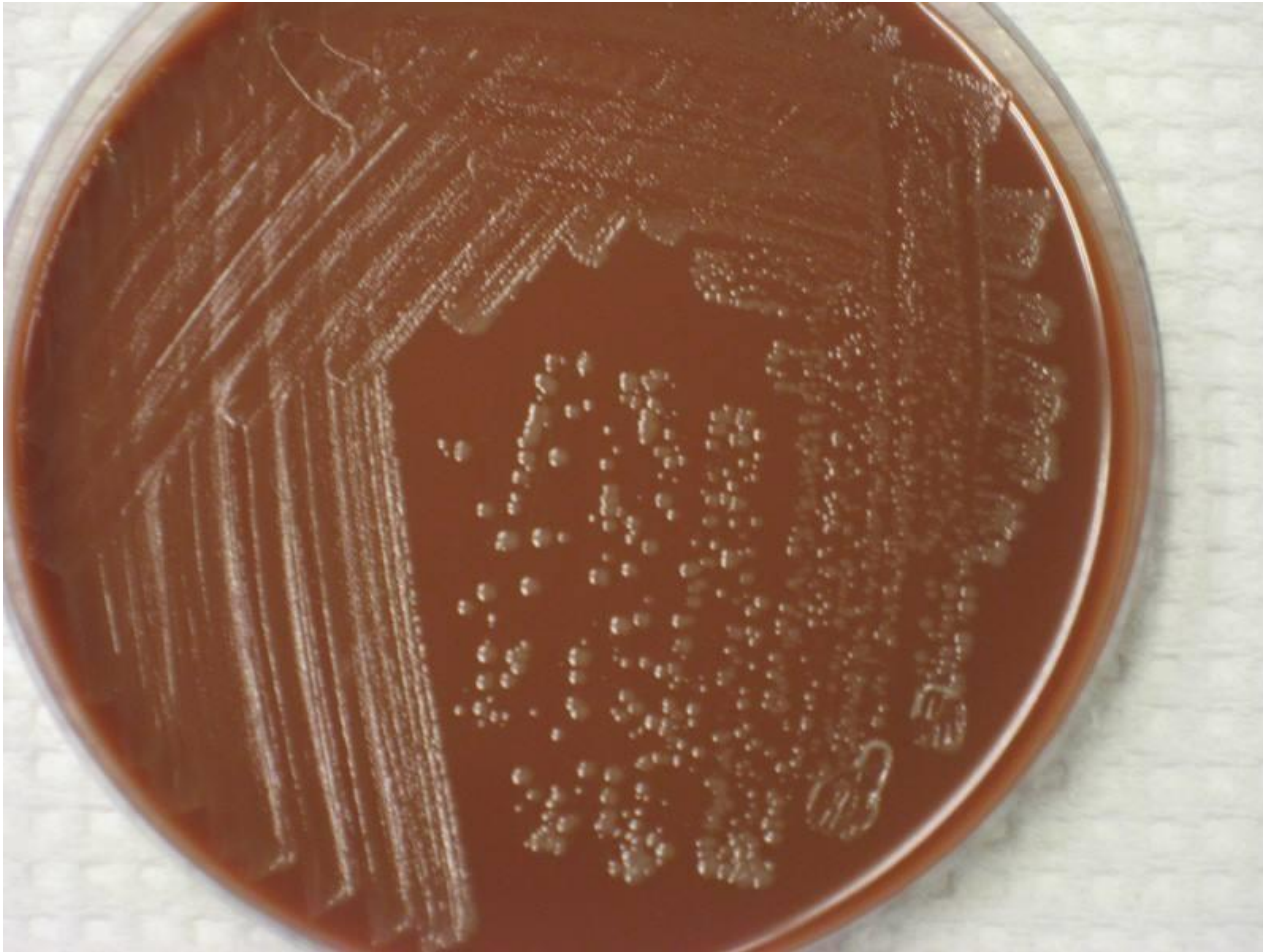
Haemophilus influenzae

- G- facultatively anaerobic rod
- Grows on chocolate agar or on blood agar
- S. aureus – **Satellite phenomenon**

Haemophilus influenzae



Haemophilus influenzae



Haemophilus influenzae

- Causes:
 - Purulent meningitis
 - Otitis
 - Epiglottitis
 - Sinusitis
 - Pneumonia

Haemophilus influenzae

- The case resists the immune system
- Type b is the most virulent

Haemophilus influenzae - disease

- **Purulent meningitis**—the most common causative agent before the introduction of the vaccine
- **Epiglottitis**—a **life-threatening disease**, swelling of the epiglottis can cause suffocation. In the Czech Republic, since the introduction of the vaccine, the incidence has been practically zero.
- **Respiratory infection**—pneumonia often occurs after a previous viral infection

Haemophilus influenzae - diagnosis

- **If epiglottitis is suspected, throat swabs are contraindicated**

Haemophilus influenzae - diagnosis

- If epiglottitis is suspected, throat swabs are **contraindicated**—there is a **risk of laryngospasm and suffocation**
- Biological material is taken: throat swab, conjunctiva, cerebrospinal fluid, blood culture...
- Cultivation on **Chocolate agar** and **Blood agar** with a Staphylococcal line
- You can also use PCR

Haemophilus influenzae - therapy

- In less serious ones disease - **Amoxicillin**
- Severe cases - **III generation cephalosporins**

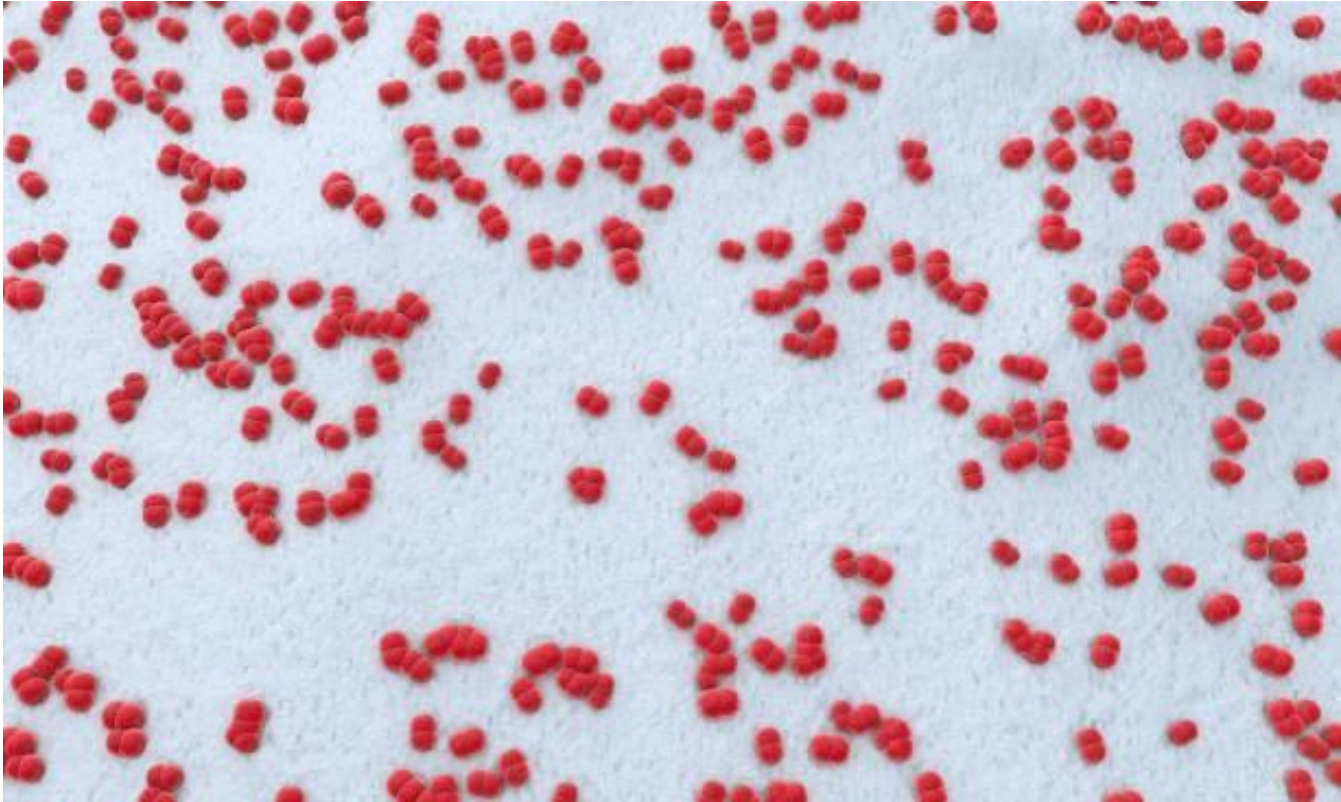
Neisseria meningitidis



Neisseria meningitidis

- G- aerobic diplococcus
- It can cause fatal diseases - meningitis and sepsis
- However, it is often a common part of the microbiota of the pharynx
- Under the microscope it appears as **coffee beans**

Neisseria meningitidis



Neisseria meningitidis

- Up to 10% of the human population are asymptomatic carriers, they have meningococcus on the mucous membrane of the pharynx.
- Neisserie can cause uncomplicated infections, such as pharyngitis.
- **Purulent meningitis**—typical for children and adolescents

Neisseria meningitidis

- **Purulent meningitis**
 - **Symptoms**
 - **Meningeal symptoms**
 - **Petechiae**
 - **Septic shock** in severe condition
 - When sepsis develops **mortality up to 20%**
 - Important is **submit ATB as soon as possible** (sometimes even in an ambulance)

Neisseria meningitidis

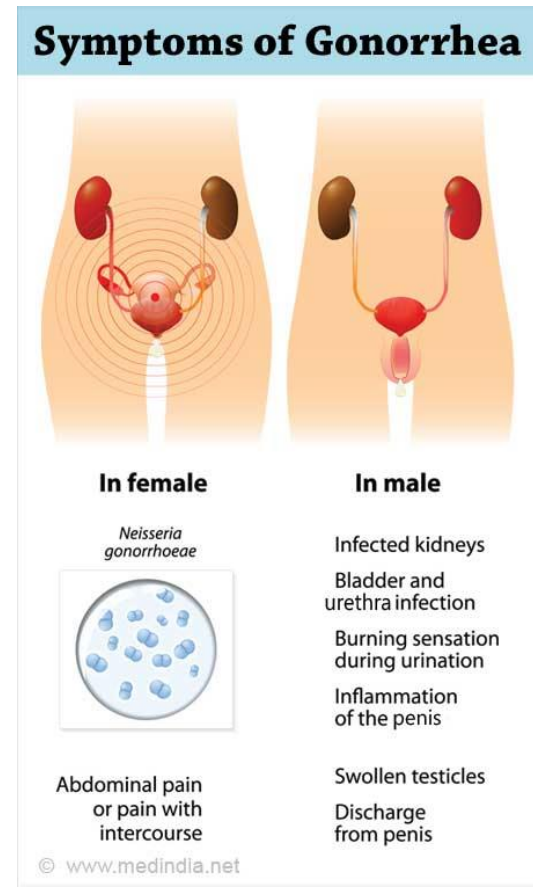
- Diagnostics
 - Microscopy
 - Cultivation
 - PCR

Neisseria meningitidis - Therapy

- In acute cases –**cephalosporins III** generation

Neisseria gonorrhoeae

- G- aerobic cocci
- Causes **gonorrhoea** – it is a sexually transmitted disease (STD)



Gonorrhea

- It runs like **invasive inflammation of the urogenital mucosa**. There is typically a urethral/vaginal discharge.
- In children during childbirth, it can cause **keratoconjunctivitis** (after birth, children are given eye drops)
- In women, untreated disease can develop into PID – pelvic inflammatory disease, which is purulent inflammation of the internal genital organs (can cause infertility)

Neisseria gonorrhoeae

- Diagnostics - microscopy, cultivation, PCR.
- Therapy – Ceftriaxone, or according to the antibiogram

Moraxella



Moraxella

- G- aerobic non-fermenting diplococcus to short rods
- It is a common commensal of the respiratory tract
- Can cause sinusitis and otitis (respiratory infection)
- In the immunocompromised - bronchitis and bronchopneumonia

Moraxella

- Diagnostics - cultivation
- Therapy:
 - Often resist to β -lactamases
 - Choices are the cure **potentized aminopenicillins**
 - Amoxicillin/clavulanate, ampicillin/sulbactam