

Atypical mycobacterias

Template:Infobox - bakterie

These are mycobacteria that are primarily/occasionally pathogenic to saprophytic. Acid-resistant, immobile, non-sporulating aerobic rods.

They cause diseases that are analogous to tuberculosis = **mycobacteriosis**. They occur in between 3-7% - in

water, soil (the usual source of infection). Transmission between humans does not occur.



Representatives

Due to the large number of representatives of mycobacteria, we list only the most important ones.

- *Mycobacterium kansasii*
- *Mycobacterium gordonae*
- *Mycobacterium xenopi*
- *Mycobacterium avium*
- *Mycobacterium intracellulare*
- *Mycobacterium scrofulaceum*
- *Mycobacterium ulcerans*

Atypical mycobacteria grow at temperatures **between 38 and 42 °C**.

Classification of mycobacteria

Classification according to Runyon

1. **Photochromogenic** - mycobacteria are non-pigmented in the dark, when illuminated they have a yellow colour (e.g. *Mycobacterium kansasii*).
2. **Scotochromogenic** - mycobacteria are orange or yellow pigmented even in darkness (e.g. *Mycobacterium gordonae*).
3. **Nonchromogenic** - mycobacteria are not pigmented (e.g. *Mycobacterium avium*).
4. **Fast-growing** - mycobacteria with rapid growth within a maximum of 5 days^[1] (e.g. *Mycobacterium fortuitum*, *Mycobacterium chelonae*).

Clinically important representatives

Complex MAI/MAIS

Mycobacterium avium + *Mycobacterium intracellulare* = (complex **MAI**); + *Mycobacterium scrofulaceum* = (complex **MAIS**)

Occurrence mainly in birds and pigs. In humans, they cause **cervical lymphadenitis** and tuberculosis-like lung disease. When they penetrate tissues, they can cause leprosy-like diseases.

Mycobacterium xenopi

Causes lung disease.



Mycobacterium ulcerans

It causes a so-called **Buruli ulcer**, which is a painless nodular formation that develops into an extensive skin lesion.

Mycobacterium kansasii

A relatively common causative agent of disease, it causes chronic lung disease mimicking tuberculosis.

Diagnosis

Diagnosis of mycobacterial diseases is based on the overall assessment of symptoms, X-ray findings, isolation and identification of mycobacteria. The clinical symptoms of mycobacteriosis are very similar to those of tuberculosis and without species specification of the causative agent, the disease cannot be differentiated.

Significant symptoms:

- general weakness;
- cough;
- shortness of breath;
- loss of appetite;
- weight loss úbytek;
- increased temperature;
- sweating.

In children, the orofacial region is often affected. In adult patients, nodal involvement is rare (mainly immunocompromised patients and patients with HIV infection). Sometimes the skin, bones, soft tissues, digestive tract, liver and spleen are affected.

To identify mycobacteria, we perform **microscopic** and **culture examinations**. Positive culture findings may correspond to infection, asymptomatic colonization or just contamination from the external environment.

At least **two culture-positive findings from separate sputum examinations** or at least one culture-positive finding obtained by bronchial lavage or lavage are required together with clinical and radiological findings. The diagnosis may also be established by transbronchial or other lung biopsy with evidence of granulomatous inflammation or acid-fast bacilli, accompanied by at least one positive sputum culture or bronchial lavage for non-tuberculous mycobacteria.

If we suspect atypical mycobacteria and all basic diagnostic criteria are not met, it is necessary to further monitor the patient clinically, radiographically and microbially.

The basis and gold standard of laboratory testing is the cultivation of mycobacteria on liquid and solid media followed by species identification of the strain. The molecular genetic technique, based on the detection of microbial DNA, is a highly sensitive and rapid method that can be used in the diagnosis of *M. kansasii*, *M. goodii*, *M. abscessus*. BACTEC or biochemical tests (e.g. with niacin) distinguish between tuberculous and non-tuberculous mycobacteria.

Cultivation

Slow growth on special soils. On firm soils (**Lowenstein-Jensen, Ogawa**) it grows in bulky smooth grey-white colonies. In liquid soils (**Šula's soil**) we observe amorphous sediment with milky turbidity.

During cultivation, we evaluate:

- cultivation rate;
- colony size;
- the appearance of the colonies;
- pigmentation;
- enzyme production.

Staining

Due to the high lipid content in the body of mycobacteria, **Gram staining is not possible**. Therefore, we use **Ziehl-Neelsen staining**.

Treatment

Treatment of mycobacterioses is difficult (except for *M. kansasii*). The effect of treatment is often very slow, caverns and sputum culture positives may persist for a long time. Treatment is often initiated with classical antituberculosis drugs, in combination with HRES (isoniazid, rifampicin, ethambutol, streptomycin), and only then is the treatment adjusted according to the sensitivity found.

There is no single treatment regimen for mycobacterial diseases. Different combinations of antituberculosis drugs are used.

The vast majority are **resistant** to a number of antituberculosis drugs.

Links

Related articles

- Repetitorium mikrobiologie

References

1. JULÁK, Jaroslav. *Úvod do lékařské bakteriologie*. 2. edition. 2015. 0 pp. ISBN 978-80-246-3210-0.

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