

Spirochetes

Spirochetes are a phylum of fine, spirally wound bacteria . They usually reach a size of 5–250 μm (sometimes up to 500 μm). It does not stain very well with conventional bacteriological techniques.

distinguish the following genera of spirochetes:

- *Borrelia* ;
- *Leptospira* ;
- *Treponema* .

Genus Borrelia

Representatives of the genus Borellia are spiral, motile bacteria that are difficult to cultivate on artificial culture media . It dyes well with aniline dyes. They parasitize on humans and animals and their intermediate hosts are arthropods.

Borrelia hermsii

Borrelia hermsii is the cause of recurrent fever , which is mediated by ticks or lice.

Borrelia burgdorferi

Borrelia burgdorferi

More detailed information can be found on the Borrelia burgdorferi website .

Borrelia burgdorferi is a long, spirally coiled bacterium of 4-30 μm . It causes multiorgan involvement - Lyme disease . Its vectors are infected ticks. Because it is microaerophilic, it requires a complex culture medium (N-acetylglucosamines, amino acids, vitamins, nucleotides). Its generation time is relatively long, namely 12 hours .

Borrelia recurrentis

Borrelia recurrentis is up to 30 μm long, the bacterium is coiled up to 5–10 irregular threads It is the cause of recurrent fever as well as *Borrelia hermsii*. The carrier is infected with lice. The moment it multiplies in the host, a fever develops. The fever subsides after a few days. After about 3-10 days , *recurrence* occurs (hence its name). A suitable antibiotic is tetracycline .

Genus Leptospira

The genus *Leptospira* includes spiral, motile bacteria that feed saprophytically or parasitically. They parasitize mainly on animals, they infect humans exceptionally. If an infection occurs, then it mainly affects people working with animals (anthroponosis).

Leptospira interrogans

Leptospira biflexa

Leptospira biflexa are saprophytic bacteria living in moist soil.

Leptospira interrogans

Leptospira interrogans is a type of bacteria that spreads to all tissues, damages the endothelium , causing hemorrhage and jaundice . It is obligatorily aerobic. Bacteriologists are considering dividing it into 7 species , which would be related to clinical units. Pathogenicity factors probably include bacterial toxins , cytotoxic factors such as phospholipases, etc. *Leptospira icterohaemorrhagiae* is the cause of Weil's disease. It grows well in cultures with bovine albumin . Generation time is long. It lasts approximately 7 to 16 hours .

Affected skin by tropical frambezia

Genus Treponema

The genus *Treponema* includes spiral motile bacteria, which measure 5–20 μm and have regular threads . It includes both pathogenic and non-pathogenic species (anaerobic species). Non-pathogenic species occur, for example, in the oral cavity and can trigger a "false alarm" precisely because of their antigenic relationship to pathogens. It has a very long cultivation time in the range of 10 to 30 hours (the longest of the spirochet strain) .

Treponema pertenue

Treponema pertenue is the causative agent of tropical frambesia. It is characterized by difficult differentiation from *Treponema pallidum* and sensitivity to penicillin treatment .

Treponema carateum

Treponema pallidum

Treponema carateum occurs predominantly in America and causes a chronic skin condition called pint. The disease is treated with penicillin .

Treponema pallidum

See the *Treponema pallidum* page for more information .

Treponema pallidum is indistinguishable in shape and size from other species. It causes a disease called syphilis . It does not grow in culture media or chicken embryos, so intratesticular inoculation (rabbit testes) is used for cultivation. It is very sensitive to external influences.

Leptospira summary video

<mediaplayer width = '450' height = '250'> <https://www.youtube.com/watch?v=tYHbQIy-AFY> </mediaplayer>

Resources

References

- BEDNÁŘ, Marek, Andrej SOUČEK and Věra FRAŇKOVÁ, et al. *Medical microbiology: Bacteriology, virology, parasitology*. 1st edition. Prague: Marvil, 1999. 558 pp. ISBN 8023802976 .
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Reference

1. BEDNÁŘ, Marek, Andrej SOUČEK and Věra FRAŇKOVÁ, et al. *Medical microbiology: Bacteriology, virology, parasitology*. 1st edition. Prague: Marvil, 1999. 558 pp. ISBN 8023802976 .

BacteriaG +

coke	aerobic	<i>Micrococcus</i>	<i>Micrococcus luteus</i>
		<i>Rhodococcus</i>	<i>Rhodococcus equi</i>
	facultatively anaerobic	<i>Enterococcus</i>	<i>Enterococcus durans</i> • <i>Enterococcus faecalis</i> • <i>Enterococcus faecium</i>
		<i>Streptococcus</i>	<i>Streptococcus agalactiae</i> • <i>Streptococcus mutans</i> • <i>Streptococcus pneumoniae</i> • <i>Streptococcus pyogenes</i> • <i>Streptococcus suis</i> • <i>Oral streptococci</i>
		<i>Staphylococcus</i>	<i>Staphylococcus aureus</i> • <i>Staphylococcus epidermidis</i> • <i>Staphylococcus intermedius</i> • <i>Staphylococcus saprophyticus</i>
anaerobic		<i>Peptococcus</i>	<i>Peptococcus niger</i>
		<i>Peptostreptococcus</i>	<i>Peptostreptococcus anaerobius</i> • <i>Peptostreptococcus prevotii</i> • <i>Peptostreptococcus vaginalis</i>

sticks	aerobic + facultative anaerobic	<i>Arcanobacter</i>	<i>Arcanobacterium haemolyticum</i>
		<i>Bacillus</i>	<i>Bacillus anthracis</i> • <i>Bacillus cereus</i>
		<i>Corynebacterium</i>	<i>Corynebacterium diphtheriae</i> • <i>Corynebacterium jeikeium</i> • <i>Corynebacterium ulcerans</i> • <i>Corynebacterium urealyticum</i>
		<i>Erysipelothrix</i>	<i>Erysipelothrix rhusiopathiae</i>
		<i>Listeria</i>	<i>Listeria monocytogenes</i>
		<i>Nocardia</i>	<i>Nocardia asteroides</i> • <i>Nocardia brasiliensis</i>
		<i>Rhodococcus</i>	<i>Rhodococcus equi</i>
	anaerobic	<i>Actinomyces</i>	<i>Actinomyces israeli</i> • <i>Actinomyces naeslundii</i>
		<i>Bifidobacterium</i>	<i>Bifidobacterium dentium</i>
		<i>Clostridium</i>	<i>Clostridium botulinum</i> • <i>Clostridium difficile</i> • <i>Clostridium novyi</i> • <i>Clostridium tetani</i> • <i>Clostridium perfringens</i> • <i>Clostridium septicum</i> • <i>Clostridium ulcerans</i>
		<i>Lactobacillus</i>	<i>Lactobacillus acidophilus</i>
		<i>Propionibacterium</i>	<i>Propionibacterium acnes</i> • <i>Propionibacterium propionicus</i>

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coke	aerobic	<i>Acinetobacter</i>	<i>Acinetobacter calcoaceticus</i>
		<i>Moraxella</i>	<i>Moraxella catarrhalis</i> • <i>Moraxella lacunata</i>
		<i>Neisseria</i>	<i>Neisseria gonorrhoeae</i> • <i>Neisseria meningitidis</i> • Non-pathogenic species of <i>Neisseria</i>
	anaerobic	<i>Veillonella</i>	<i>Veillonella alcalescens</i> • <i>Veillonella parvula</i>

cocobacilli	aerobic	<i>Rickettsia</i> <i>Rickettsia prowazekii</i> • <i>Rickettsia rickettsii</i> • <i>Rickettsia typhi</i>
	anaerobic	

aerobic	<i>Alcaligentes</i>	<i>Alkaligentes feacalis</i>
	<i>Bartonella</i>	<i>Bartonella bacilliformis</i> • <i>Bartonella henselae</i> • <i>Bartonella quintana</i>
	<i>Bordetella</i>	<i>Bordetella bronchiseptica</i> • <i>Bordetella parapertussis</i> • <i>Bordetella pertussis</i>
	<i>Brucella</i>	<i>Brucella abortus</i> • <i>Brucella canis</i> • <i>Brucella melitensis</i> • <i>Brucella suis</i>
	<i>Burkholderia</i>	<i>Burkholderia cepacia</i> • <i>Burkholderia mallei</i> • <i>Burkholderia pseudomallei</i>
	<i>Francisella</i>	<i>Francisella tularensis</i>
	<i>Legionella</i>	<i>Legionella pneumophila</i>
	<i>Kingella</i>	<i>Kingella denitrificans</i> • <i>Kingella kingae</i> • <i>Kingella oralis</i>
<i>Pseudomonas</i>	<i>Pseudomonas aeruginosa</i> • <i>Pseudomonas fluorescens</i>	
<i>Stenotrophomonas</i>	<i>Stenotrophomonas maltophilia</i>	

sticks	facultatively anaerobic	<i>Actinobacillus</i>	<i>Actinobacillus equi</i> • <i>Actinobacillus lignieresii</i>	
		<i>Aeromonas</i>	<i>Aeromonas caviae</i> • <i>Aeromonas hydrophila</i> • <i>Aeromonas sobria</i>	
		<i>Afipia</i>	<i>Afipia felis</i>	
		<i>Citrobacter</i>	<i>Citrobacter freundii</i> • <i>Citrobacter koseri</i>	
		<i>Eikenella</i>	<i>Eikenella corrodens</i>	
		<i>Enterobacter</i>	<i>Enterobacter aerogenes</i> • <i>Enterobacter cloacae</i>	
		<i>Escherichia</i>	<i>Escherichia coli</i>	
		<i>Haemophilus</i>	<i>Haemophilus ducreyi</i> • <i>Haemophilus haemolyticus</i> • <i>Haemophilus influenzae</i> • <i>Haemophilus parainfluenzae</i>	
		<i>Klebsiella</i>	<i>Klebsiella granulomatis</i> • <i>Klebsiella oxytoca</i> • <i>Klebsiella pneumoniae</i>	
		<i>Pasteurella</i>	<i>Pasteurella haemolytica</i> • <i>Pasteurella multocida</i> • <i>Pasteurella ureae</i>	
	<i>Plesiomonas</i>	<i>Plesiomonas shigelloides</i>		
	<i>Proteus</i>	<i>Proteus mirabilis</i> • <i>Proteus vulgaris</i>		
	<i>Salmonella</i>	<i>Salmonella</i> Enteritidis • <i>Salmonella</i> Typhi • <i>Salmonella</i> Paratyphi		
	<i>Serratia</i>	<i>Serratia marcescens</i>		
	<i>Shigella</i>	<i>Shigella boydii</i> • <i>Shigella dysenteriae</i> • <i>Shigella flexneri</i> • <i>Shigella sonnei</i>		
	<i>Vibrio</i>	<i>Vibrio cholerae</i> • <i>Vibrio parahaemolyticus</i>		
	<i>Yersinia</i>	<i>Yersinia enterocolitica</i> • <i>Yersinia pestis</i> • <i>Yersinia pseudotuberculosis</i>		
microaerophilic	<i>Campylobacter</i>	<i>Campylobacter coli</i> • <i>Campylobacter fetus</i> • <i>Campylobacter jejuni</i>		
	<i>Helicobacter</i>	<i>Helicobacter pylori</i>		
anaerobic	<i>Bacteroides</i>	<i>Bacteroides fragilis</i> • <i>Bacteroides vulgatus</i>		
	<i>Fusobacterium</i>	<i>Fusobacterium necrophorum</i> • <i>Fusobacterium nucleatum</i> • <i>Fusobacterium stabile</i>		
	<i>Leptotricha</i>	<i>Leptotricha buccalis</i>		
	<i>Mobiluncus</i>	<i>Mobiluncus curtisii</i> • <i>Mobiluncus mulieris</i>		
	<i>Prevotella</i>	<i>Prevotella melaninogenica</i>		
	<i>Porphyromonas</i>	<i>Porphyromonas gingivalis</i>		

acid resistant

sticks	aerobic	<i>Mycobacterium</i>	<i>Atypical mycobacteria</i> • <i>Mycobacterium tuberculosis</i> • <i>Mycobacterium leprae</i>

non-stainable G +/-

spiral		
	strictly aerobic	<div> <i>Leptospira</i> <i>Leptospira biflexa</i> • <i>Leptospira interrogans</i> • <i>Leptospira parva</i> </div>
	microaerophilic	<div> <i>Borrelia</i> <i>Borrelia burgdorferi</i> • <i>Borrelia hermsi</i> • <i>Borrelia recurrentis</i> • <i>Borrelia vincenti</i> </div>
	strictly anaerobic	<div> <i>Treponema</i> <i>Non-pathogenic treponems</i> • <i>Treponema carateum</i> • <i>Treponema pallidum</i> • <i>Treponema phagedenis</i> • <i>Treponema pertenue</i> </div>