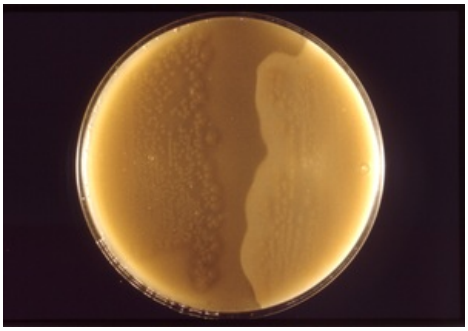
Clostridium perfringens

Clostridium perfringens
Clostridiaceae
Clostridium



Colony of Clostridium Perfringens

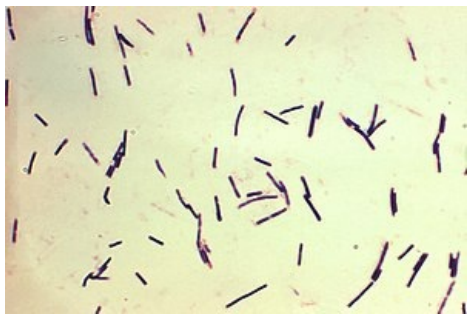
Morphology	Gram-positive rods , sporulating
Relation to oxygen	aerotolerant
Cultivation	blood agar , yolk agar
Virulence factors	toxin α, thermolabile toxin (types A, B, D)
Transmission	alimentary route
Occurrence	soil, waste, contaminated food, intestinal tract of herbivores and carnivores
Incubation time	8-14 hours
Disease	gas scab, cellulitis, colic, watery diarrhea , enteritis, enterotoxemia, soft tissue infections, early infection
Diagnostics	clinical picture, microscopic finding of clostridia
Therapy	crystalline penicillin with clindamycin, chloramphenicol, imipenem, metronidazole with clindamycin, surgery
MeSH ID	D003016

Template:Infobox - bakterie *Clostridium perfringens* is a gram-positive , sporulating , aerotolerant bacterium .

Occurence

The vegetative cell has the **shape of a rod** , the thickness of which is over 1 µm and the length ranges from 2 to 10 µm. **Spores** are **oval** , **thermoresistant** , paracentral, occur commonly in our environment, such as soil, waste and easily contaminate food (especially meat). **Sporulation** takes place **in the intestine** , never in the affected tissue. *Clostridium perfringens* produces many biologically active substances, including toxins and enterotoxin. According to the type of toxin produced, it is divided into five groups (A-E). *Clostridium perfringens* is **part of the normal intestinal microflora** of humans and animals.

Toxins



Clostridium Perfringes

All types of *Clostridium perfringens* produce α toxin (phospholipase C, lecithinase), which has lethal and necrotizing effects. Other effects of toxins include:

- cytotoxicity
- cell membrane lysis and hemolysis
- increase capillary permeability
- lowering blood pressure
- damage to enterocytes and leukocytes , as well as the heart , kidneys and blood vessels

Types A, B, D form a **thermolabile enterotoxin** in food , the spores of which are thermoresistant and can survive even boiling.

Pathogenesis

Clostridium perfringens is one of the most common human pathogens . Presence in the human body can cause histotoxic infections, gas gangrene, cellulitis. However, *Clostridium perfringens* is most often the cause of intestinal diseases (colic, watery diarrhea, enteritis, enterotoxemia). In colic and watery diarrhea, the incubation period is 8-

14 hours after eating contaminated food, the symptoms (diarrhea, convulsions, abdominal pain) persist for about 24 hours. Nausea, fever and vomiting are present minimally.

Cultivation

Due to the fact that *Clostridium perfringens* belongs to aerotolerant bacteria, its cultivation is relatively easy. **It hydrolyzes gelatin** due to a number of saccharolytic and proteolytic enzymes . Type A forms **a double zone of hemolysis**, while the outer one (with incomplete hemolysis) is given by the action of phospholipase C (toxin α). **A zone of opalescence** is evident on the yolk agar , which is also caused by phospholipase C.

Diagnostics

To diagnose diseases caused by *Clostridium perfringens* , clinical signs, an epidemiological history and microbiological examination must be assessed. In the case of soft tissues, excision is taken from the wound, exudate or part of the damaged tissue.

Summary

<mediaplayer width='500' height='300'>https://www.youtube.com/watch?v=h_A8yVY1kBg</mediaplayer>

Links

References

1. BENEŠ, Jiří, et al. *Infectious medicine.* 1st edition. Galén, 2009. 651 pp. 269-270. ISBN 978-80-7262-644-1 .

References

- BEDNÁŘ, Marek. *Medical microbiology: bacteriology, virology, parasitology.* 1st edition. Prague: Marvil, 1996. ISBN 80-2380-297-6 .
- VOTAVA, Miroslav. *Medical microbiology special.* 1st edition. Brno: Neptun, 2003. ISBN 80-902896-6-5 .

Source

- PubMed: Toxin plasmids of Clostridium perfringens (https://www.ncbi.nlm.nih.gov/pubmed/23699255)
- Nejm: Bacterial Diarrhea (https://login.ezproxy.is.cuni.cz/login?qurl=http://www.nejm.org%2fdoi%2fpdf%2f10.1056%2fNEJMcp0904162)
- NCBI:Clostridia: Sporeforming Anaerobic Bacilli (https://www.ncbi.nlm.nih.gov/books/NBK8219/)

Bacteria

G +	coke	aerobic	*Micrococcus* — *Micrococcus luteus* *Rhodococcus* — *Rhodococcus equi*
		facultatively anaerobic	*Enterococcus* — *Enterococcus durans* • *Enterococcus faecalis* • *Enterococcus faecium* *Streptococcus* — *Streptococcus agalactiae* • *Streptococcus mutans* • *Streptococcus pneumoniae* • *Streptococcus pyogenes* • *Streptococcus suis* • *Oral streptococci* *Staphylococcus* — *Staphylococcus aureus* • *Staphylococcus epidermidis* • *Staphylococcus intermedius* • *Staphylococcus saprophyticus*
		anaerobic	*Peptococcus* — *Peptococcus niger* *Peptostreptococcus* — *Peptostreptococcus anaerobius* • *Peptostreptococcus prevotii* • *Peptostreptococcus vaginalis*
	sticks	aerobic + facultative anaerobic	*Arcanobacter* — *Arcanobacterium haemolyticum* *Bacillus* — *Bacillus anthracis* • *Bacillus cereus* *Corynebacterium* — *Corynebacterium diphtheriae* • *Corynebacterium jeikeium* • *Corynebacterium ulcerans* • *Corynebacterium urealyticum* *Erysipelothrix* — *Erysipelothrix rhusiopathiae* *Listeria* — *Listeria monocytogenes* *Nocardia* — *Nocardia asteroides* • *Nocardia brasiliensis* *Rhodococcus* — *Rhodococcus equi*
		anaerobic	*Actinomyces* — *Actinomyces* israeli • *Actinomyces naeslundi* *Bifidobacterium* — *Bifidobacterium dentium* *Clostridium* — *Clostridium botulinum* • *Clostridium difficile* • *Clostridium novyi* • *Clostridium tetani* • *Clostridium perfringens* • *Clostridium septicum* • *Clostridium ulcerans* *Lactobacillus* — *Lactobacillus acidophilus* *Propionibacterium* — *Propionibacterium acnes* • *Propionibacterium propionicus*

Go

coke

aerobic

Acinetobacter	*Acinetobacter calcoaceticus*
Moraxella	*Moraxella catarrhalis* • *Moraxella lacunata*
Neisseria	*Neisseria gonorrhoeae* • *Neisseria meningitidis* • Non-pathogenic species of Neisseria

anaerobic

Veillonella	*Veillonella alcalescens* • *Veillonella parvula*

cocobacilli

aerobic

Rickettsia	*Rickettsia prowazekii* • *Rickettsia rickettsii* • *Rickettsia typhi*

aerobic

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

sticks

facultatively anaerobic

Actinobacillus	*Actinobacillus equli* • *Actinobacillus lignieresii*
Aeromonas	*Aermonas caviae* • *Aeromonas hydrophila* • *Aeromonas sobria*
Afipia	*Afipia felis*
Citrobacter	*Citrobacter freundi* • *Citrobacter koseri*
Eikenella	*Eikenella corrodens*
Enterobacter	*Enterobacter aerogenes* • *Enterobacter cloacae*
Escherichia	*Escherichia coli*
Haemophilus	*Haemophilus ducreyi* • *Haemophilus haemolyticus* • *Haemophilus influenzae* • *Haemophilus parainfluenzae*
Klebsiella	*Klebsiella granulomatis* • *Klebsiella oxytoca* • *Klebsiella pneumoniae*
Pasteurella	*Pasteurella haemolytica* • *Pasteurella multocida* • *Pasteurella ureae*
Plesiomonas	*Plesiomonas shigelloides*
Proteus	*Proteus mirabilis* • *Proteus vulgaris*
Salmonella	*Salmonella* Enteritidis • *Salmonella* Typhi • *Salmonella* Paratyphi
Serratia	*Serratia marcescens*
Shigella	*Shigella boydii* • *Shigella dysenteriae* • *Shigella flexneri* • *Shigella sonnei*
Vibrio	*Vibrio cholerae* • *Vibrio parahemolyticus*
Yersinia	*Yersinia enterocolitica* • *Yersinia pestis* • *Yersinia pseudotuberculosis*

microaerophilic

Campylobacter	*Campylobacter coli* • *Campylobacter fetus* • *Campylobacter jejuni*
Helicobacter	*Helicobacter pylori*

anaerobic

Bacteroides	*Bacteroides fragilis* • *Bacteroides vulgatus*
Fusobacterium	*Fusobacterium necrophorum* • *Fusobacterium nucleatum* • *Fusobacterium stabile*
Leptotricha	*Leptotricha buccalis*
Mobiluncus	*Mobiluncus curtisii* • *Mobiluncus mulieris*
Prevotella	*Prevotella melaninogenica*
Porphyromonas	*Porphyromonas gingivalis*

acid resistant	sticks	aerobic	*Mycobacterium*	*Atypical mycobacteria* • *Mycobacterium tuberculosis* • *Mycobacterium leprae*
non-stainable G +/-	spiral	strictly aerobic	*Leptospira*	*Leptospira biflexa* • *Leptospira interrogans* • *Leptospira parva*
		microaerophilic	*Borrelia*	*Borrelia burgdorferi* • *Borrelia hermsi* • *Borrelia recurrentis* • *Borrelia vincenti*
		strictly anaerobic	*Treponema*	*Non-pathogenic treponems* • *Treponema carateum* • *Treponema pallidum* • *Treponema phagedenis* • *Treponema pertenue*

Portal: Microbiology

Kategorie:Mikrobiologie Kategorie:Bakterie Kategorie:Články s videem