Defense and escape mechanisms of Borrelia against the human immune system and against antibiotics and chemotherapeutics

Please double - click on all underlined and all the blue links

Why Borrelia remains infectious despite intensive antibiotic treatment

http://www.xerlebnishaft.de/trotzantibiosepat.pdf
http://www.erlebnishaft.de/trotzantibiosetier.pdf
http://lymerick.net/Borrelia-history-test-FINAL.pptx

An animated Power Point presentation

Bernt-Dieter Huismans

March 2014

Defense and escape mechanisms of Borrelia

tick spit

A. conventional borrelia

B. pleomorpic forms of Borrelia *

C. biofilms *

D. horizontal gene transfer

E. symbiogenesis

Defense and escape mechanisms of Borrelia

Tick spit is the

Achilles´heel

in vektor-borne diseases.

Salp15 from the tick spit for example inhibits the Complement-system.

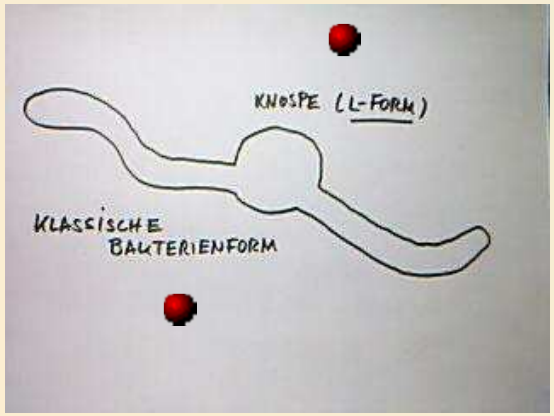
http://www.erlebnishaft.de/tick_spit.pdf

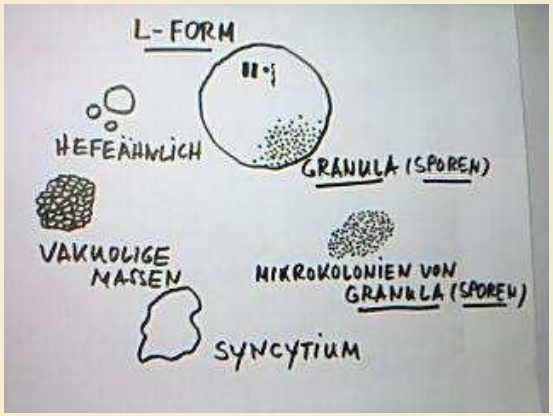
A. Classic Borrelia - forms,
B. Pleomorphic Borrelia forms

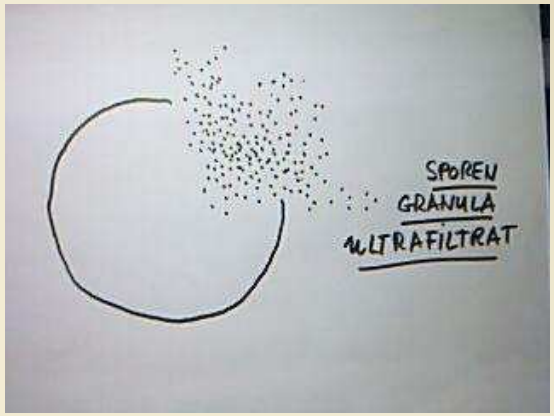
Zell wall defective bacteria – Variants (CWD´s)
L - Forms and bakteria – granulates forms

Stealth – Infektions

Chronic Borreliosis *







Conventional form with bud *

Zell wall defektive variants *

Bakterial – ultrafiltrates *

Images after L.H. Mattman, Cell Wall Deficient Forms, Stealth Pathogens CRC Press 2001 *

Text processing by Dr.med.Bernt - Dieter Huismans Am Haldenberg 24 74564 Crailsheim , 2007

A. Defense and escape mechanisms of Classic Borrelia forms

Borrelia are as classic Borrelia, pleomorphic Borrelia, L-form or as granular ultrafiltrate

increasingly in this order

fat-soluble, i.e. lipophilic,

Borrelia therefore esp. as “liposomes” can easily penetrate cell membranes.

A. Defense and escape mechanisms of Classic Borrelia forms

Borrelia prefer viscous structures, a hyper-osmolar medium, a low-oxygen environment, they are facultative anaerobes, they prefer a slightly acidified environment, ph-values of 6,8 - 7,8 as well as temperatures of 25° to 30° C

A. Defense and escape mechanisms of Classic Borrelia forms

Borrelia can smell.

The infectivity of Borrelia disappears with the loss of this ability.

Sense of smell, Chemotaxis

http://iai.asm.org/content/early/2012/04/11/IAI.00145-12

A. Defense and escape mechanisms of Classic Borrelia forms

Borrelia can quickly move away
e.g. within two minutes
one centimeter.

http://www.youtube.com/watch?v=vpKtC1H5fhc
http://www.youtube.com/watch?v=F9B60gsCg4w
http://www.youtube.com/watch?v=O0y7X5acK8M
http://www.youtube.com/watch?v=N8C-5QkNyhI&list=PLB60F4DDB87FE2DD6

A. Defense and escape mechanisms of Classic Borrelia forms

Borrelien operate an

Efflux mechanism for pollutants,

this is well known for example for Tetrazyklines.

Borrelia produce Betalaktamases * *,

against Penicillins, Cephalosporins.

http://www.erlebnishaft.de/stressvar2.pdf
http://www.xerlebnishaft.de/borsrel_inflam_lymphom_neopl.pdf
http://www.erlebnishaft.de/chronic_fatigue.pdf
http://www.erlebnishaft.de/psychiatric_patients.pdf
Antibiotic resistanze http://www.erlebnishaft.de/staphylococcusaureus.pdf

A. Defense and escape mechanisms of Classic Borrelia forms

VIse (Variable major protein (VMP) sequence expressed) helps Borrelia in masking by continuous change of Borrelia surfaces.

With OspC the Borrelia can be masked and move undetected in the connective tissue of their hosts.

http://www.xerlebnishaft.de/complement.pdf

http://www.xerlebnishaft.de/serollyme.pdf

http://www.borreliose-verschwiegene-epidemie.de/app/download/8931827599/Kraiczy.pdf?t=1389008403

A. Defense and escape mechanisms of Classic Borrelia forms

Preferred Borrelia staying points are blood vessels with the sequence of micro-and macro-angiopathy, tendons and ligaments * and high-fat, lipid-rich organs, such as the nervous system *.

http://www.xerlebnishaft.de/angiopathie.pdf http://www.erlebnishaft.de/arthritiden.pdf
http://www.erlebnishaft.de/alzheimerspirochaetosis.pdf
http://www.erlebnishaft.de/psychiatric_patients.pdf
http://www.erlebnishaft.de/multiplesklerosebborreliose.pdf

A. Defense and escape mechanisms of Classic Borrelia forms

Borrelia

sequester host-antibodies.

Borrelia reduces the number of active natural killer cells from the group

CD57.

http://www.erlebnishaft.de/danger_model.pdf
http://www.erlebnishaft.de/selbst_muster_nano.pdf
http://www.xerlebnishaft.de/bakt_pathogenitaetsfaktoren.pdf

Zellwall Therapeutics for Classic Borrelia forms

With an intact blood-brain barrier cell wall agents (beta-lactams) can not go into the liquor! *

Of the drugs against Borrelia is preferred among the penicillins: Amoxicillin.

Among the cephalosporins are effective only the 3rd generation of cephalosporins:

Ceftriaxon, Cefuroxim, Cefotaxim.

Borrelia produce betalaktamases

Ribosomes Therapeutics for Classic Borrelia forms

Macrolides (eg, azithromycin) and tetracyclines (eg, minocycline) are complementary in effect. In case of "chronic Lyme disease“ you should always use them combined with each other!

Prokaryonts (bacteries and archaeae)

Minocycline is to 40% in the cerebrospinal fluid, doxycycline to 16% only.

Ribosome	Subunit	
70 S	50 S	Makrolide Lincosamide
	30 S	Tetracycline Glycylcycline

act specifically in the division phase of the bacteria

Remember the „Efflux Mechanism“: Check the serum levels

Clindamycin instead of Acithromycin in cardiac patients, and/or protozoa such as Babesia

Eukaryonts (animals, plants, fungi, protozoa)

Ribosome	Subunit
80 S	60 S
	40 S

Makrolide http://www.kabilahsystems.de/azithromycin_and_lyme.pdf
Tetracycline http://www.kabilahsystems.de/minocyclin.pdf
Clindamycin http://www.kabilahsystems.de/clindamycin.pdf

B. Defense and escape mechanisms of pleomorphic Borrelia

Pleomorphie or Pleiomorphie is the diversity of microorganisms or cells of multicellular organisms, including tumor cells.

The pleomorphie is from the ground up different from the theory of

Pleomorphism

http://www.wwwarchiv.de/wwwarchiv/anfang/texte/umweltkl00.html

http://dict.leo.org/englisch-deutsch/Pleomorphie.html
: „Sorry, we found no matches for your search term(s) Pleomorphie"

B. Defense and escape mechanisms of pleomorphic Borrelia

Pleomorphic forms

are diverse varieties of bacteria, eg of Borrelia or fungi with altered cell wall, grown in mycoplasma-like colonies.

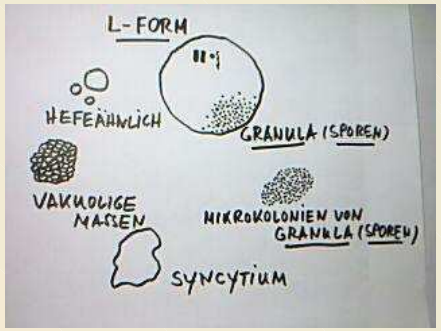
http://www.erlebnishaft.de/stressvar1.pdf
http://www.erlebnishaft.de/stressvar2.pdf

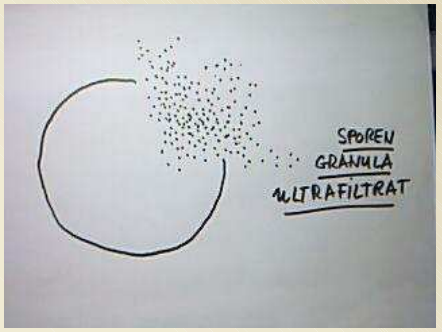
Mycoplasma-like colonies are hydrogels of bacteria, fungi and other microbes, so-called biofilms

B. Defense and escape mechanisms of pleomorphic Borrelia

Namings

- L – Formen , L1–Forms , L–Phase Variants , (E. Klieneberger – Nobel , 1935)
- Sphaeroplasten , Symplasten , Protite , Somatite , Sporen , („Grey Goo“) ,Granula
- Protoplasten , Plasmodien
- Transitionals, Rauhformen
- Blebs (dormante Formen)
- Ultrafiltrierbare Bakterienformen
- Pleomorphe Bakterien
- Bakterien - Induktions – Formen
- Gymnoplasten , Bakterien - Reversions – Formen
- Elementarkörperchen (EK) , Paschensche Körperchen (1932) , Persister
- Zysten – Formen * , Round bodies, Ca-Protozoen (A. Weber , 1968)
- Tarnkappen – Krankheitserreger , Stealth Pathogens (L.H. Mattman)
- Zellwanddefekte Bakterien , CWDs , L - Formen (L.H. Mattman , 2001)
- L = little , large , lipoidal , lithe , Lister
- (E.B. Almquist , E. Friedberger , F. Löhnis , E. Klieneberger-Nobel , L. Dienes)
- Haftungsausschluss





B. Defense and escape mechanisms of pleomorphic Borrelia

little (virus size)

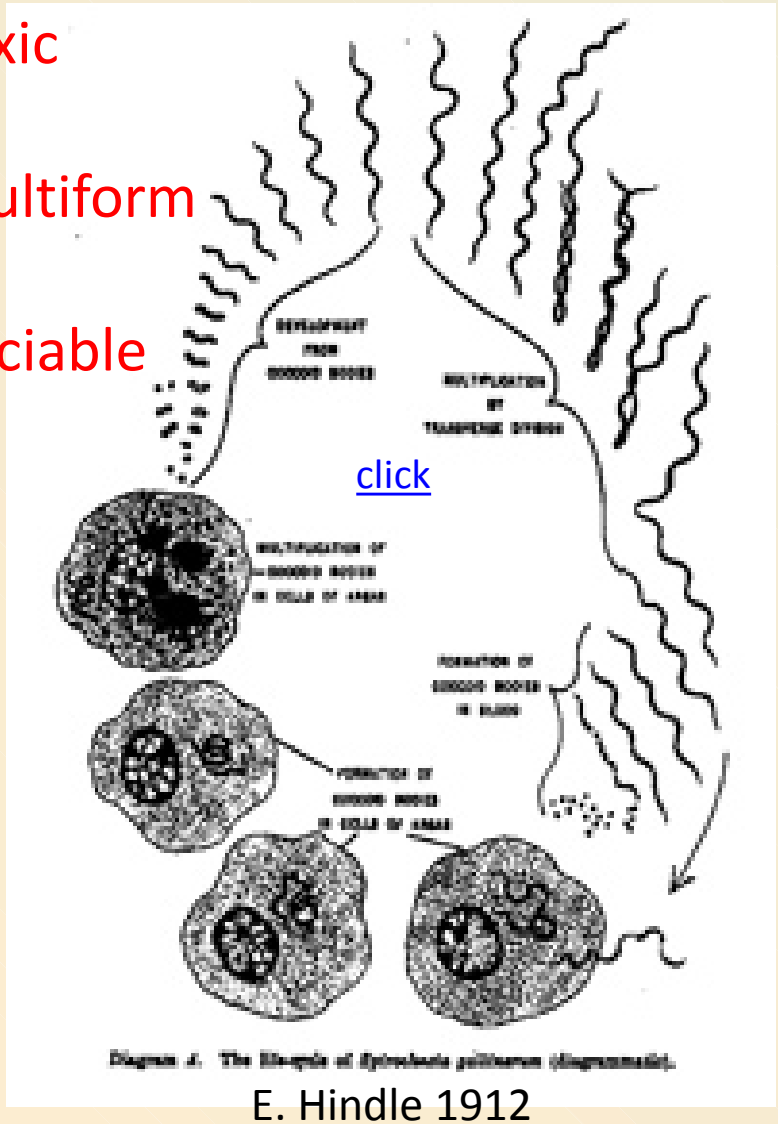
http://www.xerlebnishaft.de/lebensstrukturenvergleich.pdf

http://www.xerlebnishaft.de/expand_koch_post.pdf

toxic

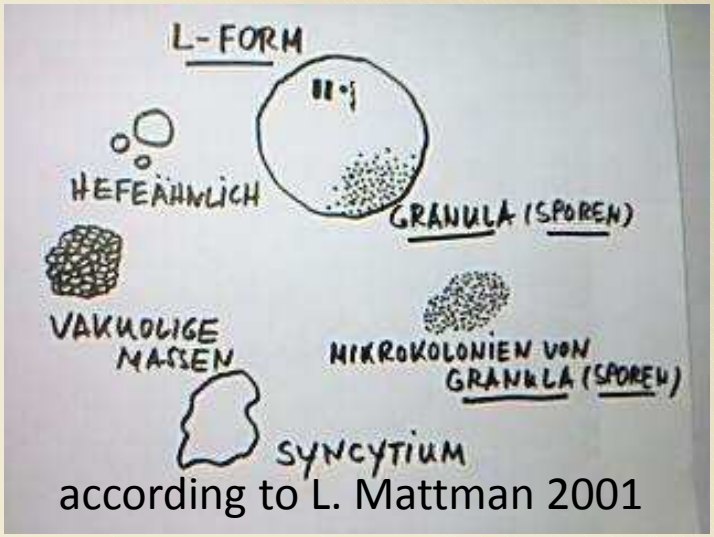
multiform

sociable



click

E. Hindle 1912

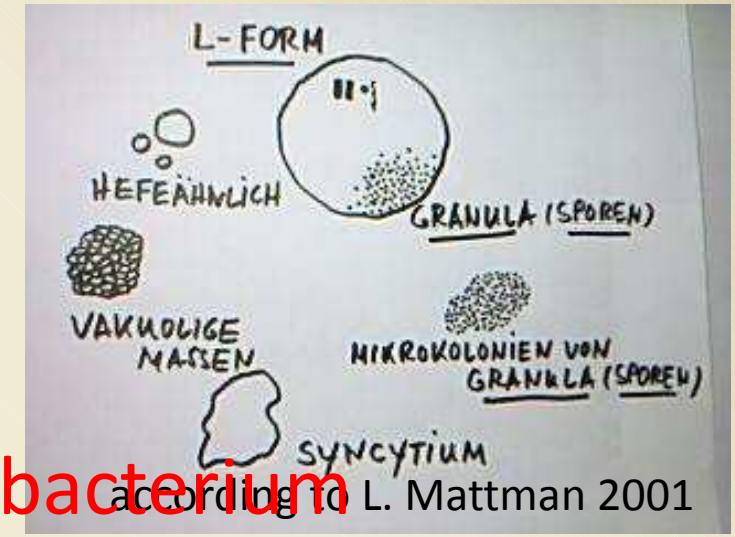


according to L. Mattman 2001

according to A. McDonald, 2008

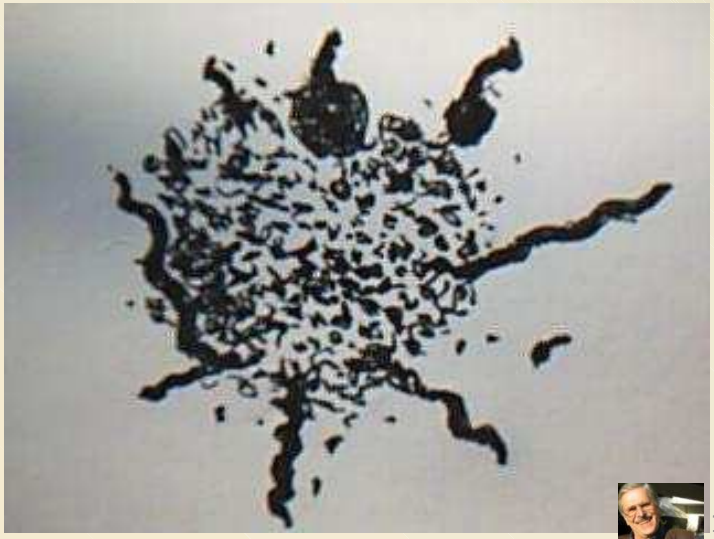
B. Defense and escape mechanisms of pleomorphic Borrelia

E. Hindle 1912



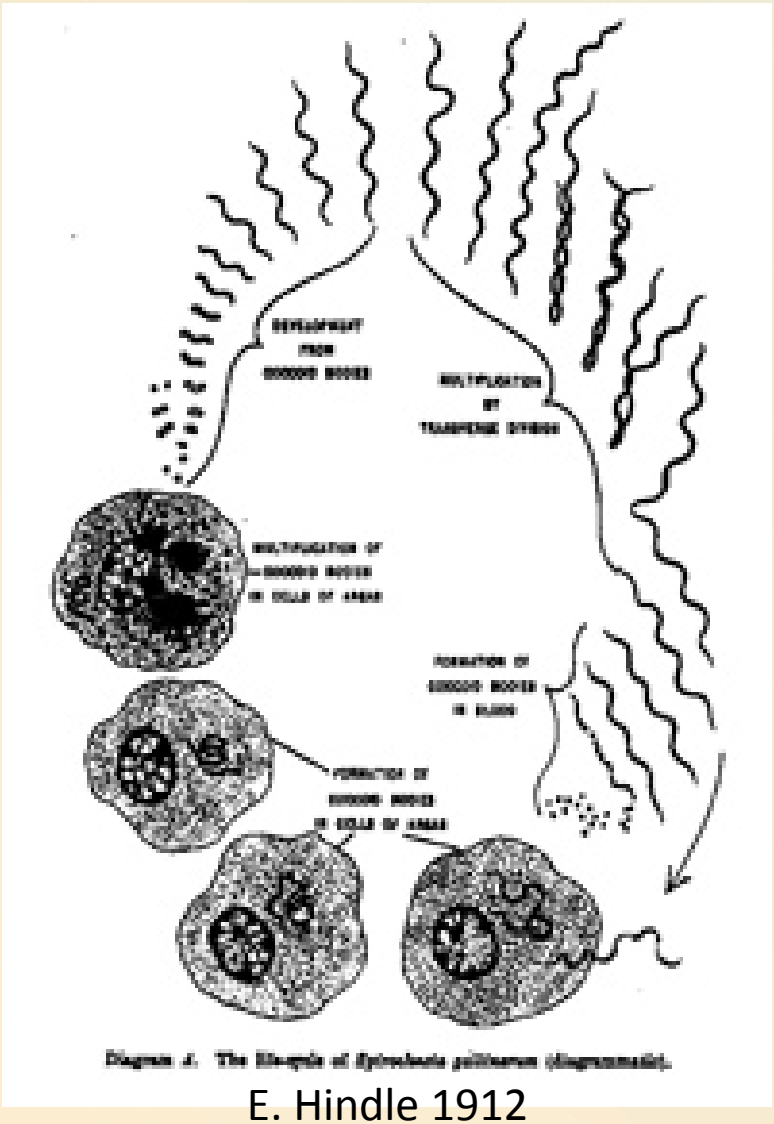
according to L. Mattman 2001

Always the same bacterium



according to A. McDonald, 2008

B. Defense and escape mechanisms of pleomorphic Borrelia



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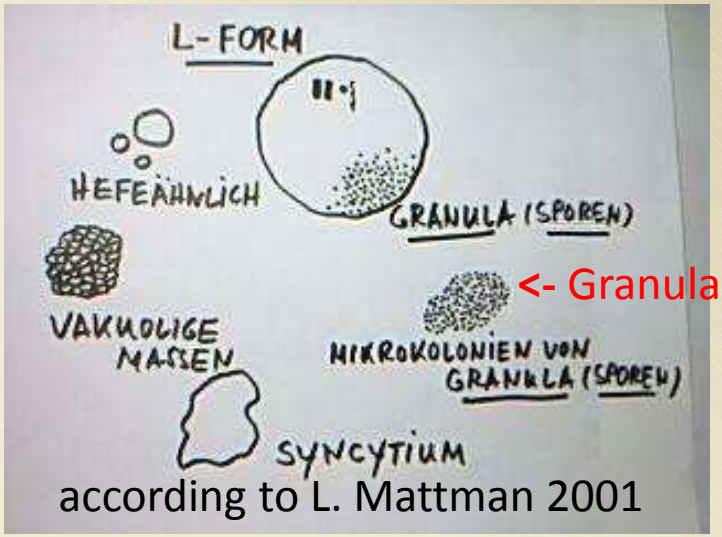
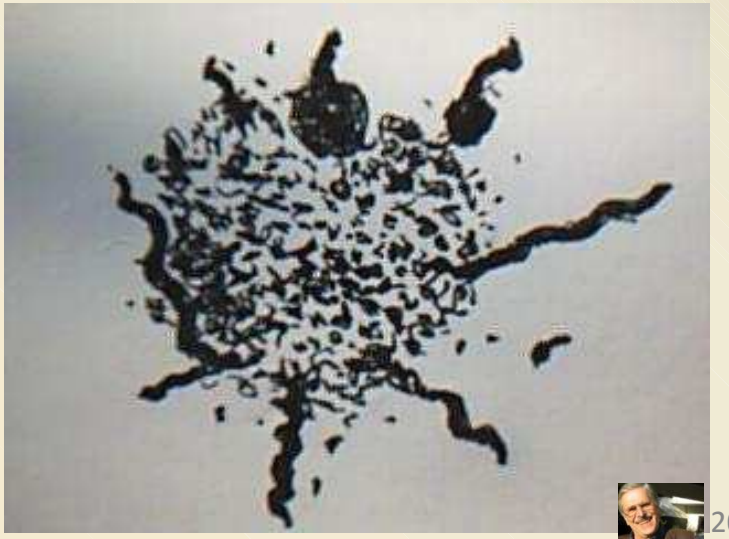


according to L. Mattman 2001



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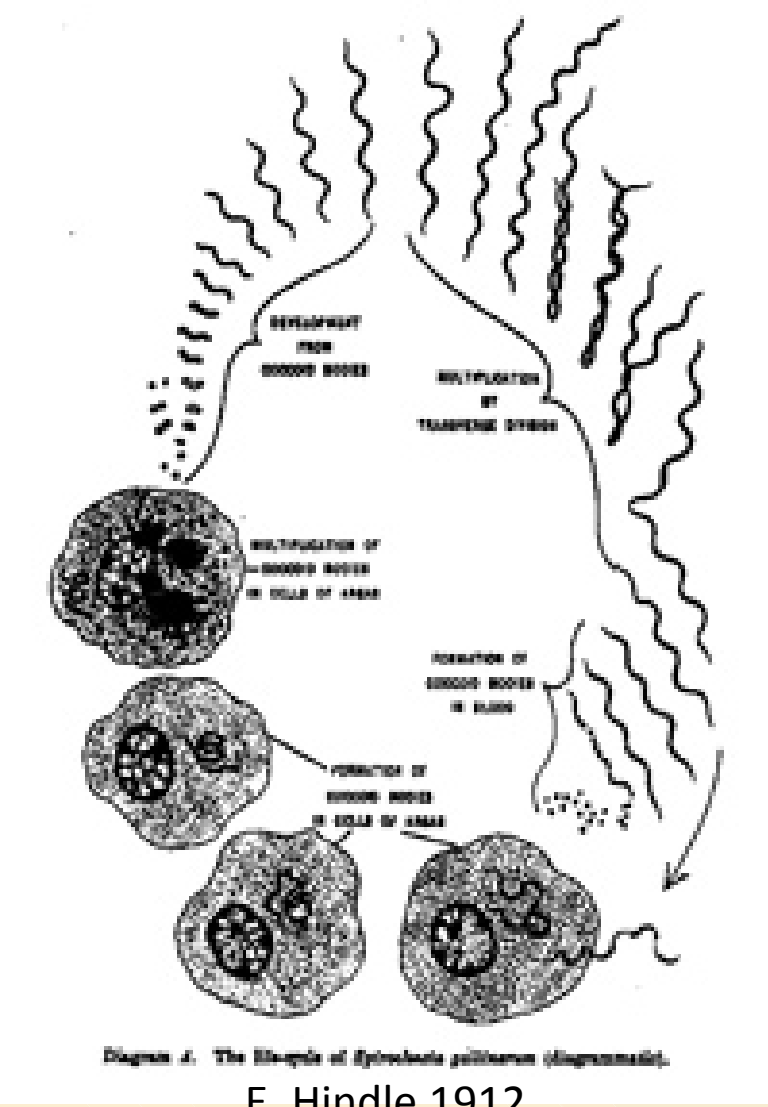

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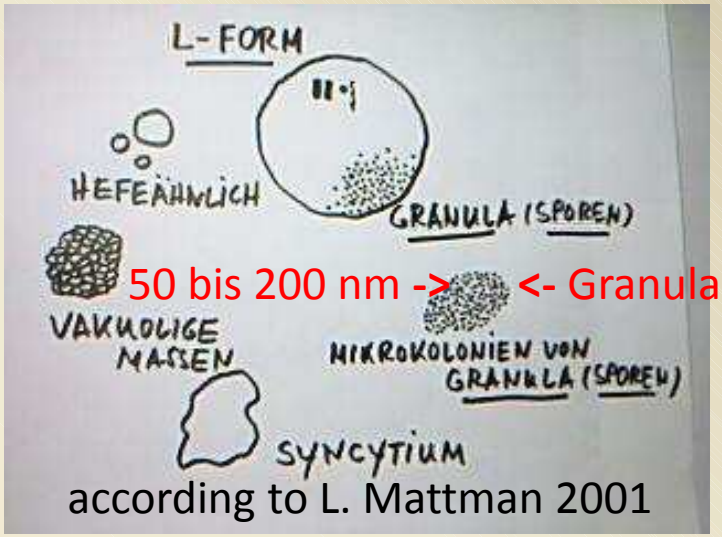

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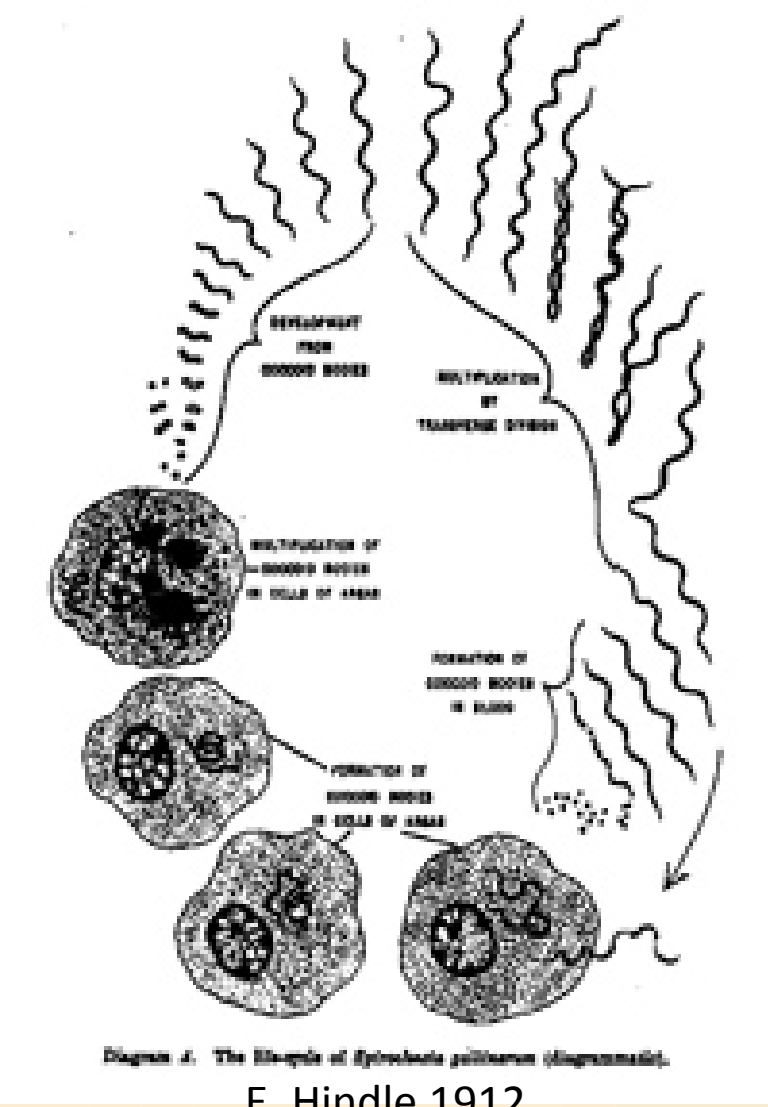

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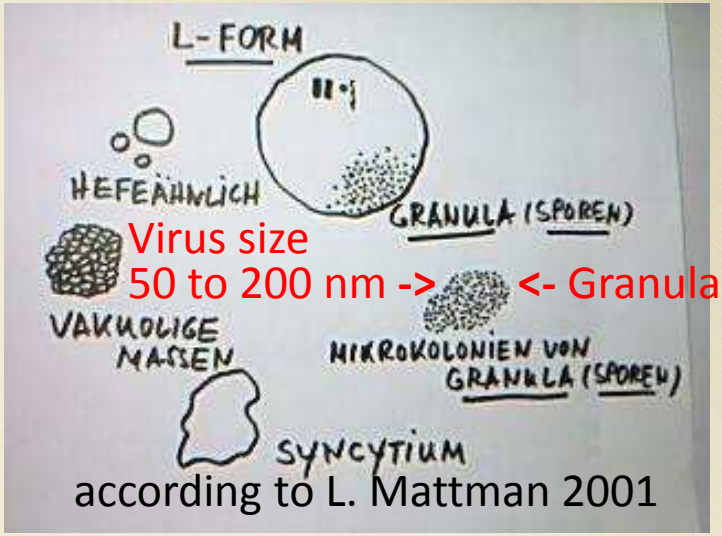

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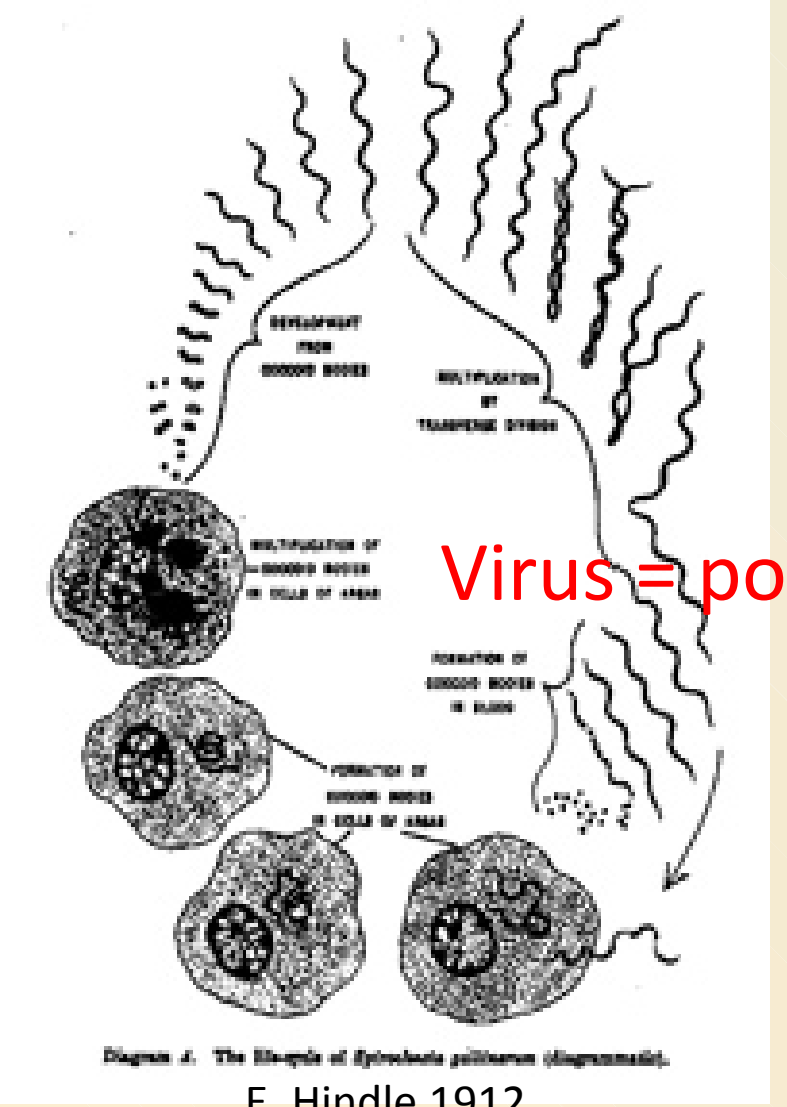

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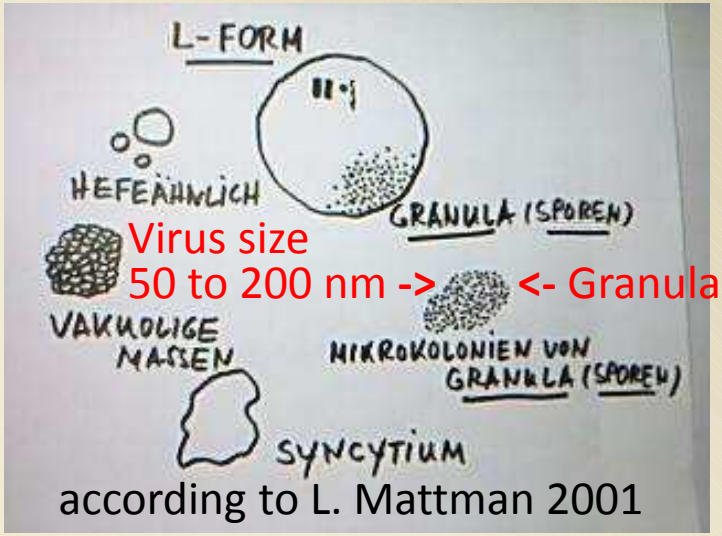
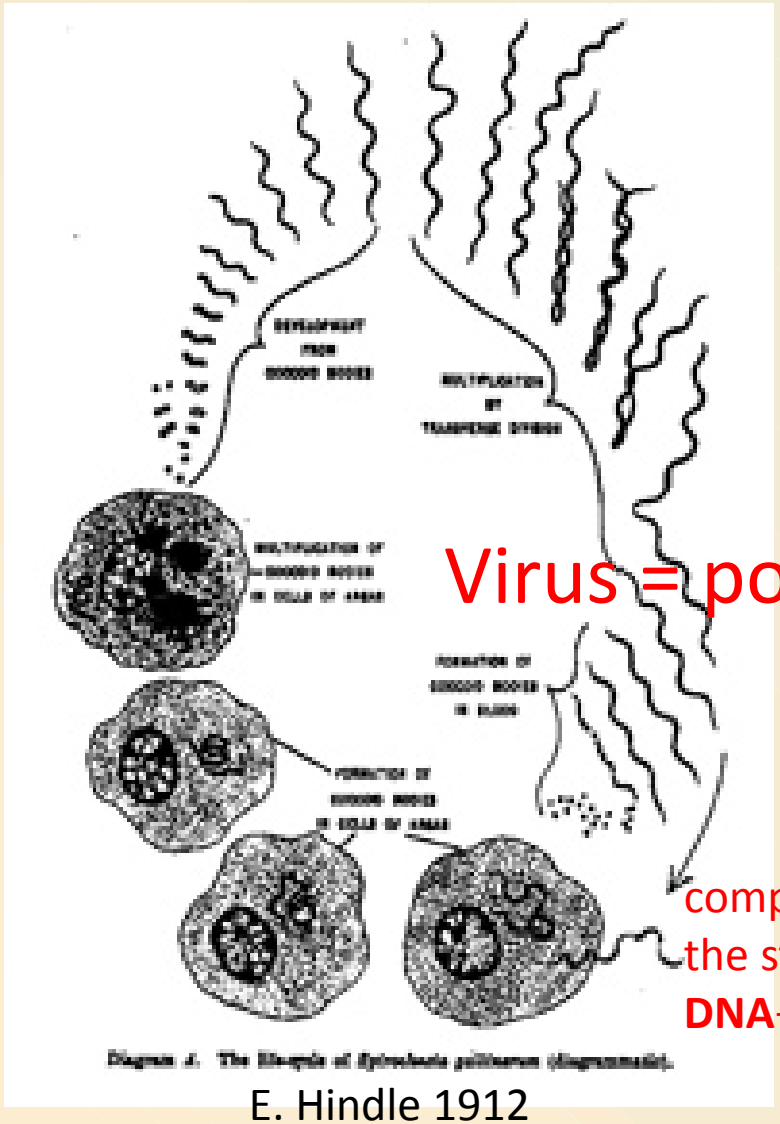


according to L. Mattman 2001

Virus = poison = toxin

according to A. McDonald, 2008

B. Defense and escape mechanisms of pleomorphic Borrelia



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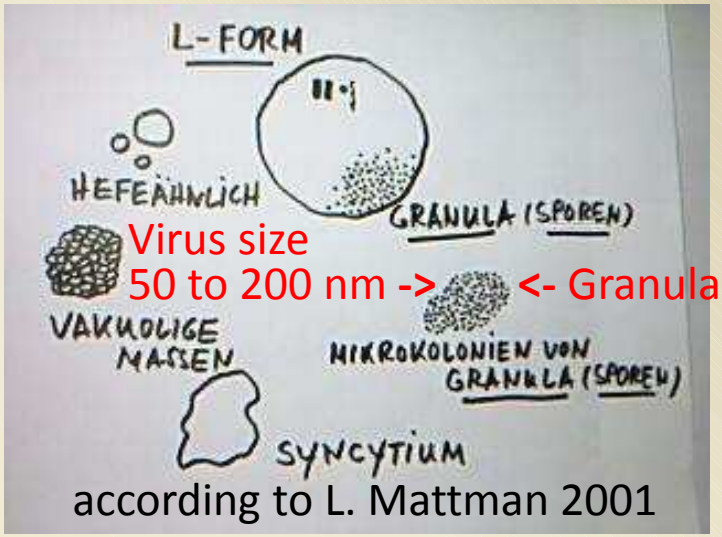


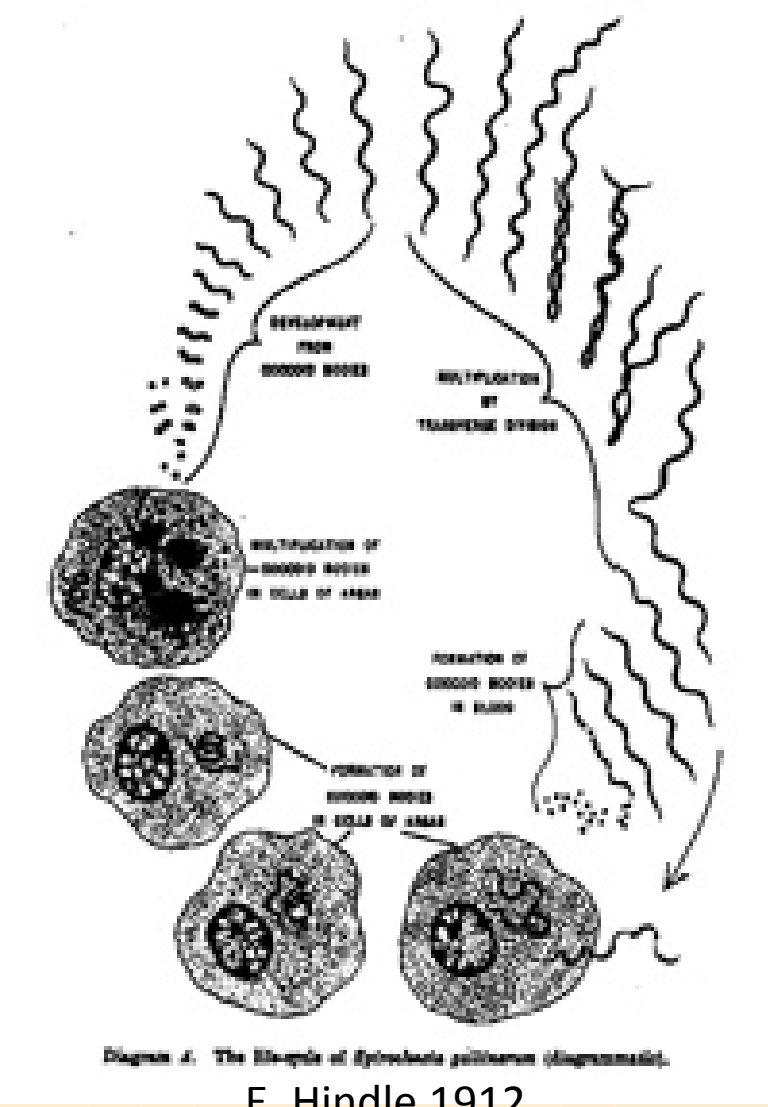
according to L. Mattman 2001

Virus = poison = toxin *

composition
the stealth forms:
DNA+RNA+**Lipids**+Protein

according to A. McDonald, 2008

B. Defense and escape mechanisms of pleomorphic Borrelia



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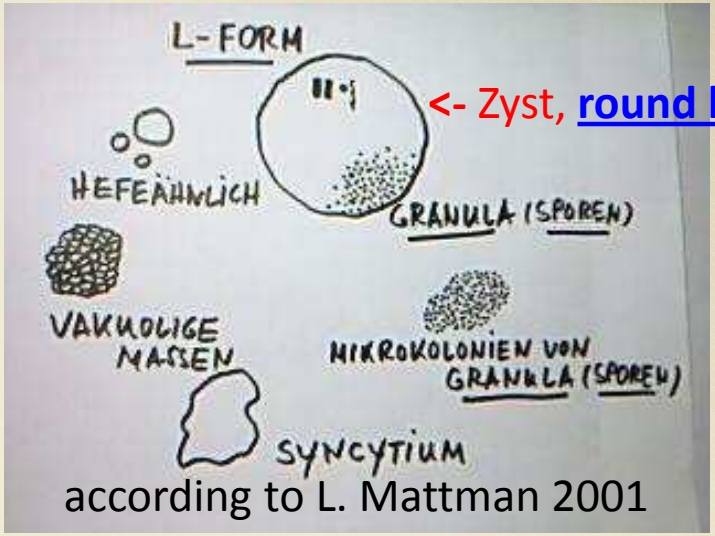
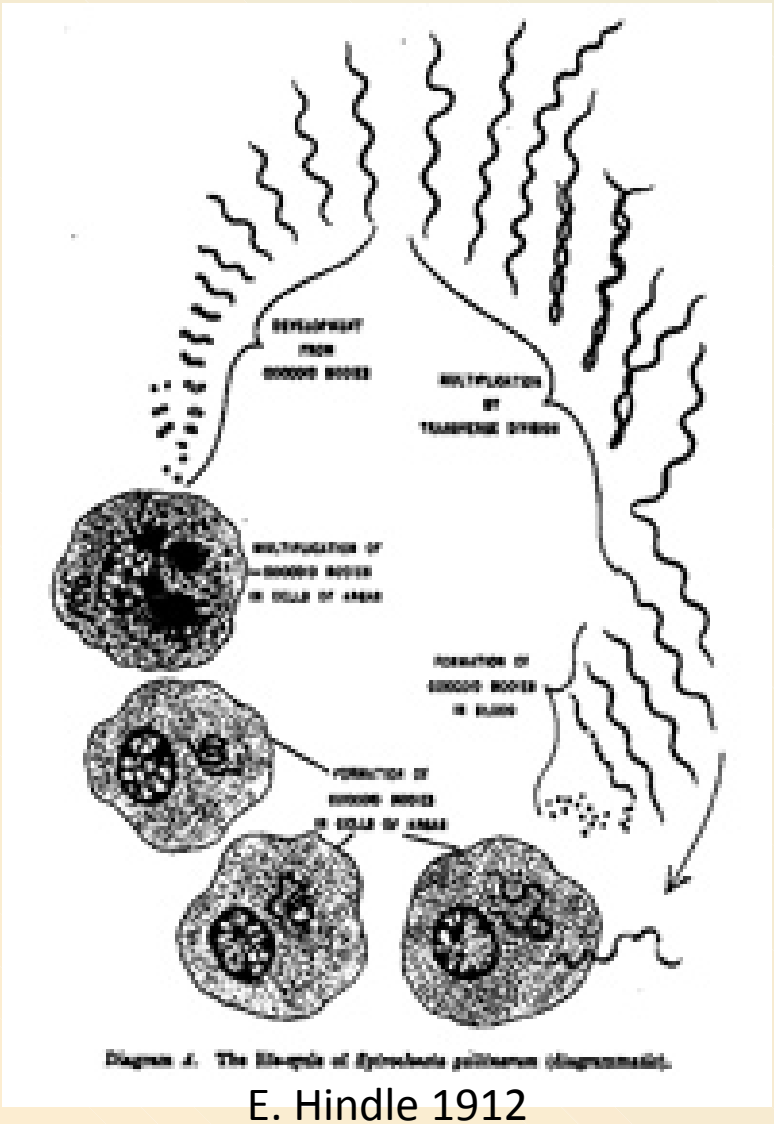


according to L. Mattman 2001

according to A. McDonald, 2008

B. Defense and escape mechanisms of pleomorphic Borrelia



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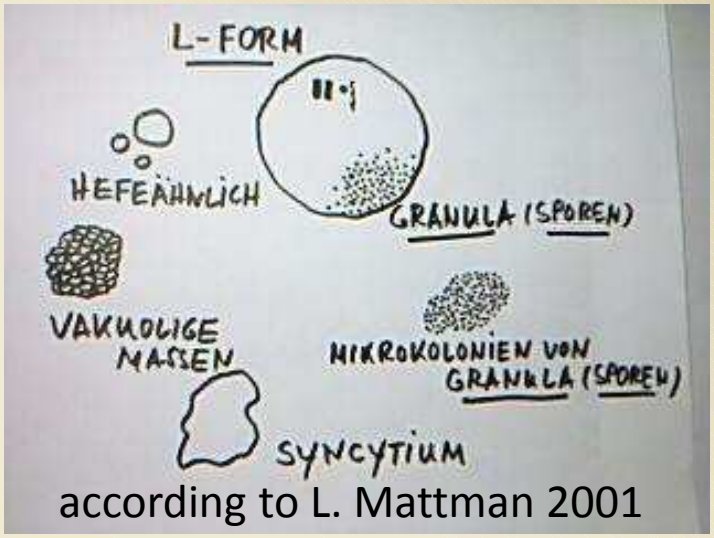
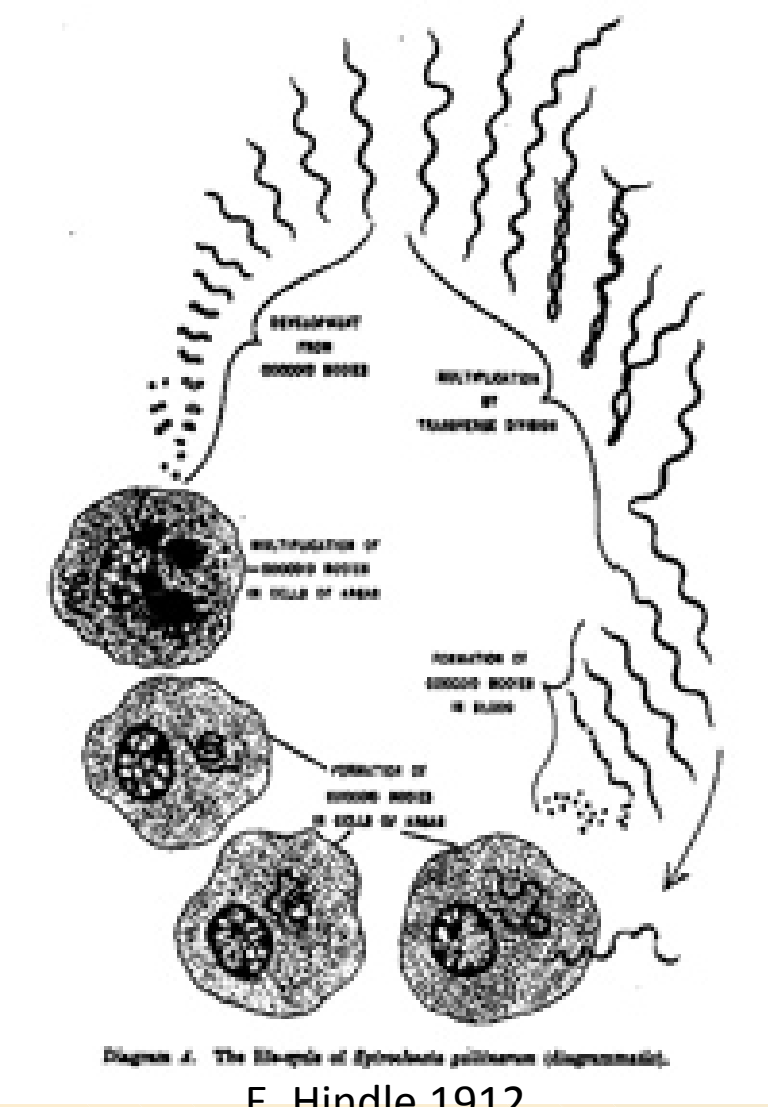


according to L. Mattman 2001

<- spiral bacterium

according to A. McDonald, 2008

B. Defense and escape mechanisms of pleomorphic Borrelia



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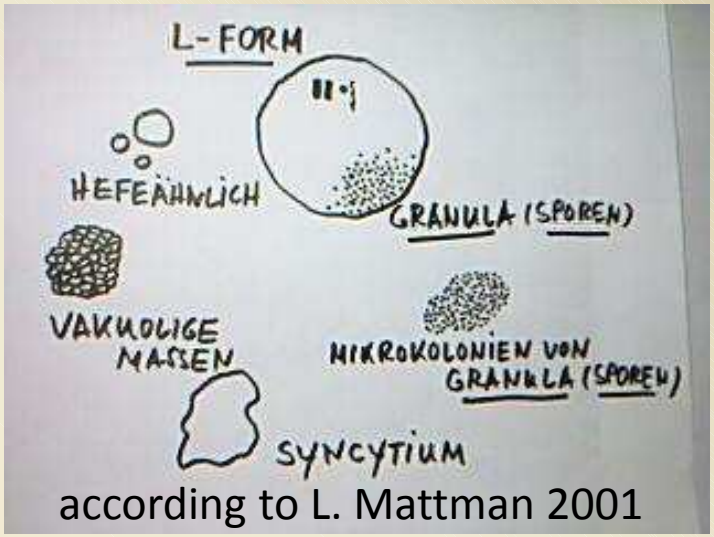


according to L. Mattman 2001

according to A. McDonald, 2008

B. Defense and escape mechanisms of pleomorphic Borrelia

L-shapes and granules * are

Bakteria-forms of life

from 50 to 250 nm size (virus size)

with very sluggish metabolism.

They are hardly capable of reproduction and they can in spurts germinate again to classical forms of bacteria.

Colony formation

C. Biofilms

Host attack

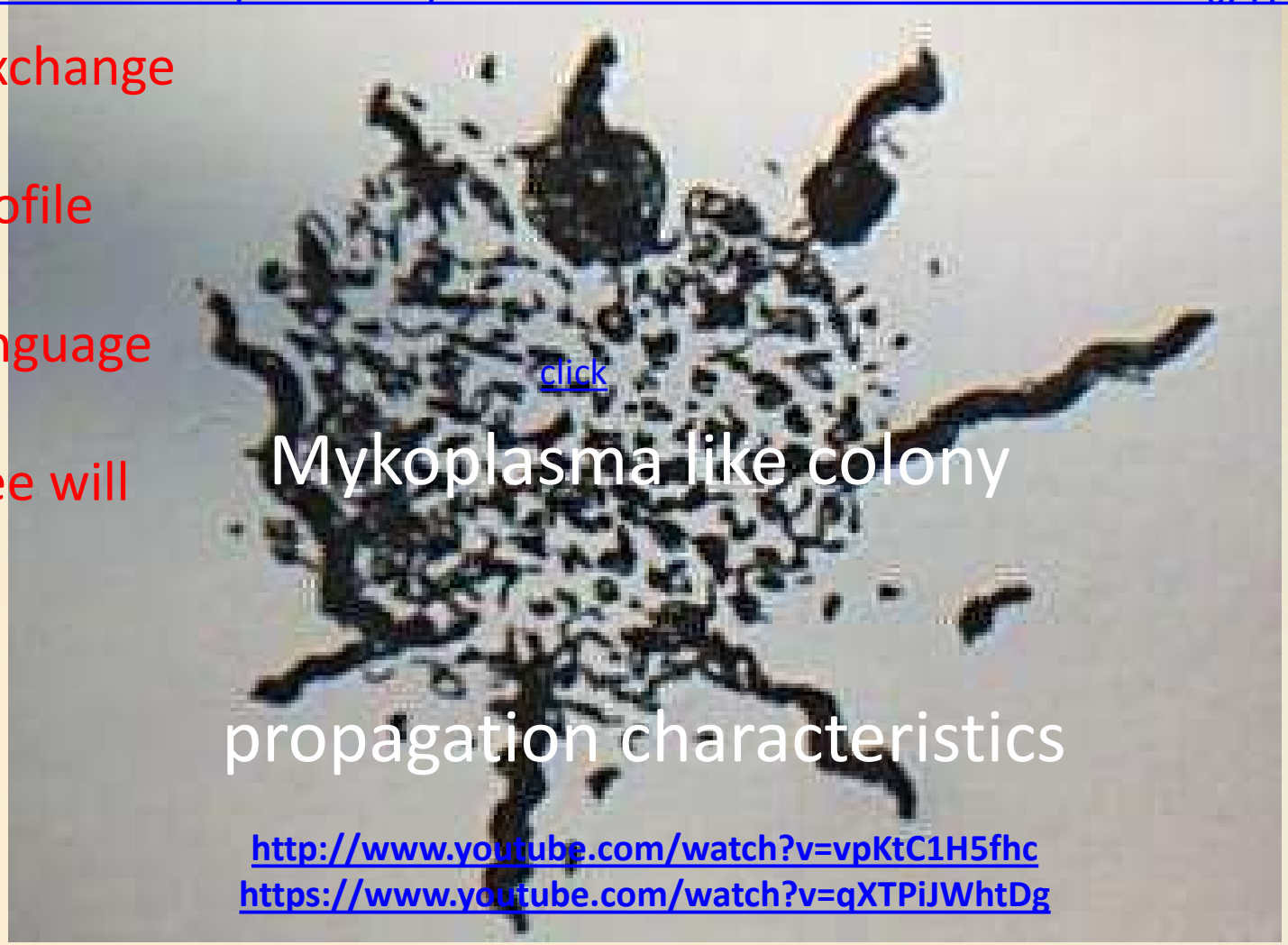
http://www.authorstream.com/Presentation/doctorrao-248605-biofilms-infections-science-technology-ppt-powerpoint/

Gene exchange

Own profile

Own language

Own free will



according to A. McDonald, 2008

C. Defense and escape mechanisms of Biofilms

Biofilms are the
„Cities of microbes“.
Biofilms are
a special type of aggregate living organisms.
They consist of original bacterial shapes,
pleomorphic and L-shapes,
foreign organisms, fungi, protozoa,
the adhesive peptidoglycan,
nucleic acids, lipids, and lektins.

http://www.youtube.com/watch?v=lpI4WCM_9pM

C. Defense and escape mechanisms of Biofilms

Biofilms are found extracellularly, at boundary surfaces of objects, the „Substratum“.

Biofilms are known as "slime layer" or perceived as "covering", as „bacterial vegetations“

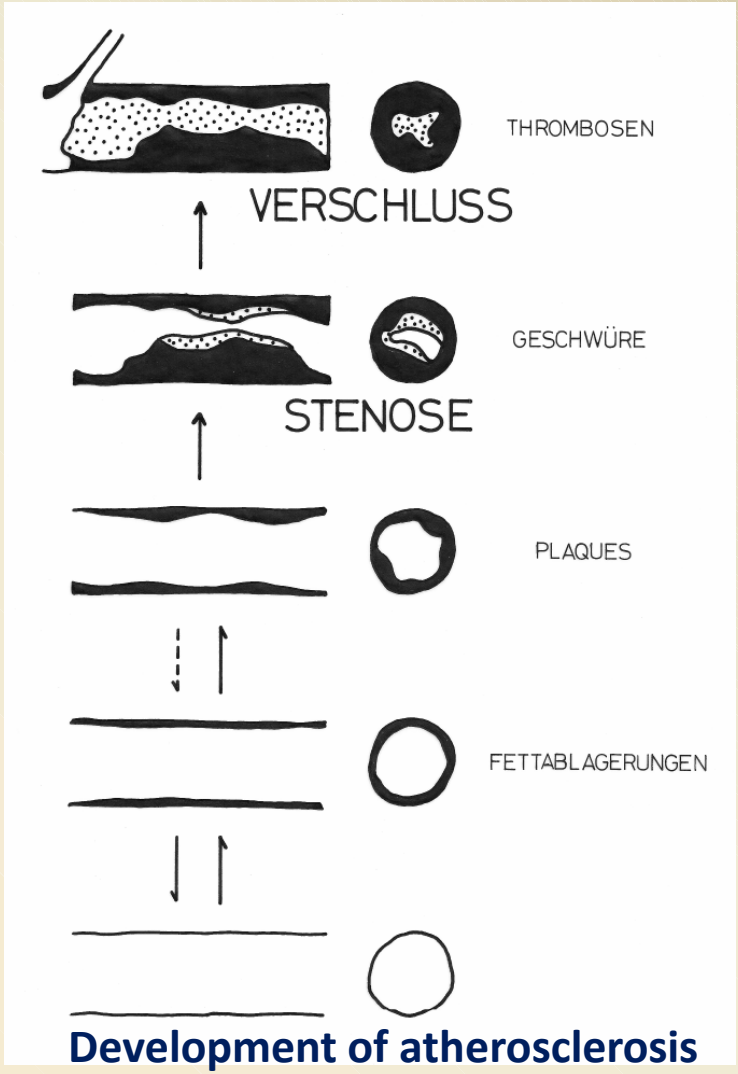
or as pellicle or as sielhaut

C. Defense and escape mechanisms of Biofilms

Biofilms in cell tissues

- **3. Existence phase**
- Balance between growth and degradation of the biofilm
- **2. Accumulation phase** (Quorum sensing)
- Colonization (Organisation phase)
- **1. Induction phase** (Biopolymer)
- Adhesion (loss of surface negativity in the host, glycoproteins)

/\



Development of atherosclerosis

C. Defense and escape mechanisms of Biofilms

Biofilms in cell tissues

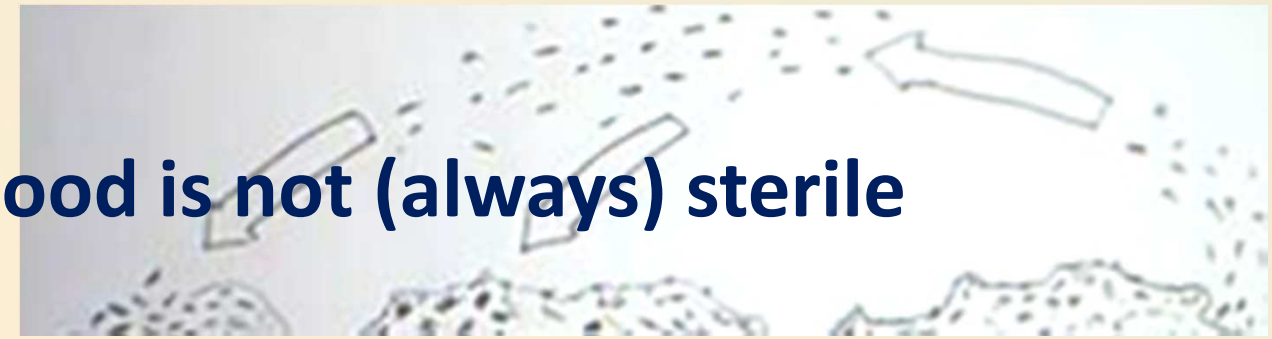
- V
  swarm out
  4. Sepsis
- Detachment in a larger context
  5. Molting, embolization, e.g. heart attack, stroke
- autonomous locomotion on surfaces
  6. Walking motion, for example in bronchioles
- Symbiogenesis
  7. Integration

http://www.youtube.com/watch?v=8QuB2-jBaE8

C. Defense and escape mechanisms of Biofilms

Chronic Borreliosis is a

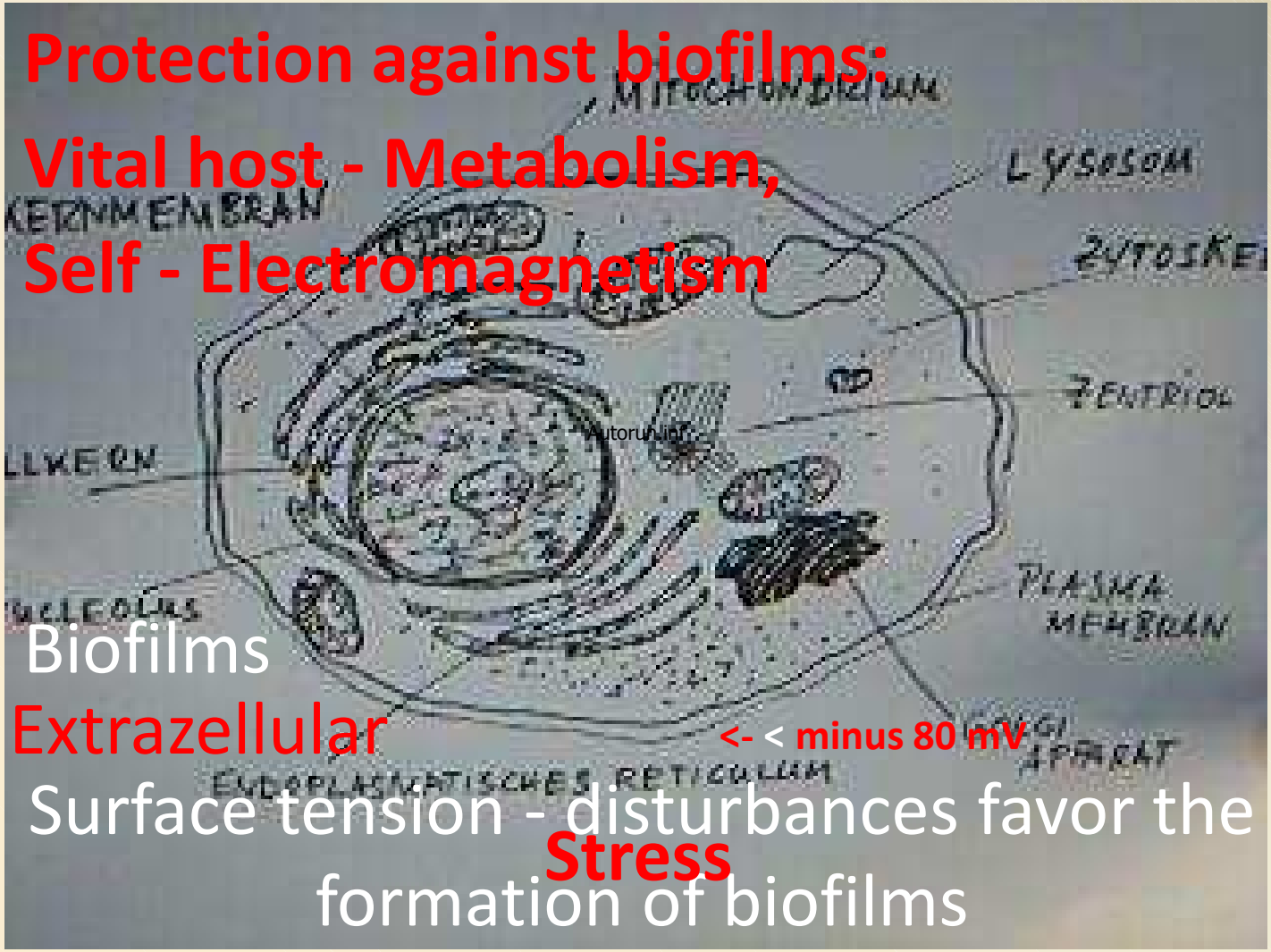
Biofilm-disease



The blood is not (always) sterile

http://www.youtube.com/watch?v=M_DWNFFgHbE

C. Defense and escape mechanisms of Biofilms



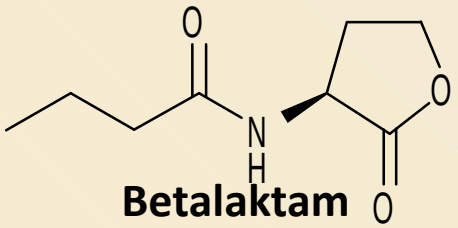
C. Defense and escape mechanisms of Biofilms

All Borrelia variants speak bacterial Esperanto.

This procedure is called

Quorum sensing

http://www.youtube.com/watch?v=TVfmUfr8VPA



Betalaktam

C. Defense and escape mechanisms of Biofilms

By

Quorum sensing

all Borrelia variants,

L-shapes and granular ultrafiltrates

can in bursts germinate

into original bacteria again,

they revert all of a sudden.

C. Defense and escape mechanisms of Biofilms

Reversion activators

High Stealth - forms density (Quorum sensing Mechanismus)

Destruction of a reversion - inhibitor - factor (RIF) by Trypsin or 40 degrees Celsius

Cooling at 20 – 30 degrees Celsius, z.B. 25 degrees Celsius

Administration of oxygen, Ventilation,

examples according to L. Mattman 2001

Lactobacillus–Variants (Probiotics), Aminosugar, (N-acetylglucosamin)

Vit.E, Diaminopimelinsäure, Mucine, Gelatin, Agar (not autocavied)

C10, Mikrobial extracts (z.B. Bakteria – Zell wall extrakts)

Frequent changes of antibiotics

UV - Light at 380 - 400 nm wavelength, Mutagens

Surfaces (Chlorella, Granulats, Animal charcoal, Cholestyramin)

Biofilms and Quorum sensing therapeutics

Makrolids: Azithromycin, Clarithromycin

Lactoferrin, Ajoene from garlic

Polyphenols, Grape fruit, Lumbrokinase,

Nattokinase, Antikoagulation, Ph,

Samento, Banderol, N-Acetylcysteine,

Phenothiazine, Acyldepsipeptid (ADEP*)

Elektromagnetism and Ultrasound

"extracellular death factor" (EDF) * * = not commercially available

http://www.nature.com/nature/journal/v503/n7476/fig_tab/nature12834_F1.html

D. Gentransfer
E. Symbiogenesis

Borrelia exchange nuclear material from one another and with their host, they operate a vivid

horizontal gene transfer

http://www.erlebnishaft.de/virusbaktimmun.pdf
http://www.erlebnishaft.de/gentransfer.pdf
http://www.the-scientist.com//?articles.view/articleNo/39598/title/Superbugs-Ascending/

D. Defense and escape mechanisms by horizontal gene transfer and symbiogenesis

The new formations from the horizontal gene transfer are mostly not fit for survival or capable of reproduction.

They are discarded by the Lysosomes or muted by Methylation and a number of further mechanisms.

D. Defense and escape mechanisms by horizontal gene transfer and symbiogenesis

and possibly incorrect disposing mechanisms of the host

Levy bodies – M. Parkinson

„Amyloid plaques“ – M. Alzheimer

Elementary - bodies (EK) – Chlamydia pneumoniae and Arteriosclerosis

Spheroid neuronal Einschlusskörper * – Amyotrophic lateral sklerosis

Bacterial granular congestion – Chronic Borreliosis (Huismans 2008)

Viable persisters by horizontal gene-transfer ?

„Micelles and granules“ – Carcinomas, Sarcomas (Enby E. 1984,´89)

http://www.erlebnishaft.de/stressvar1.pdf

http://www.erlebnishaft.de/virusbaktimmun.pdf

Cell organelle therapeutics

Lysosomotropics

Hydroxychloroquin, Artemisia annua, Carbomycin, Azithromycin, Amantadin

Efflux blocking drugs

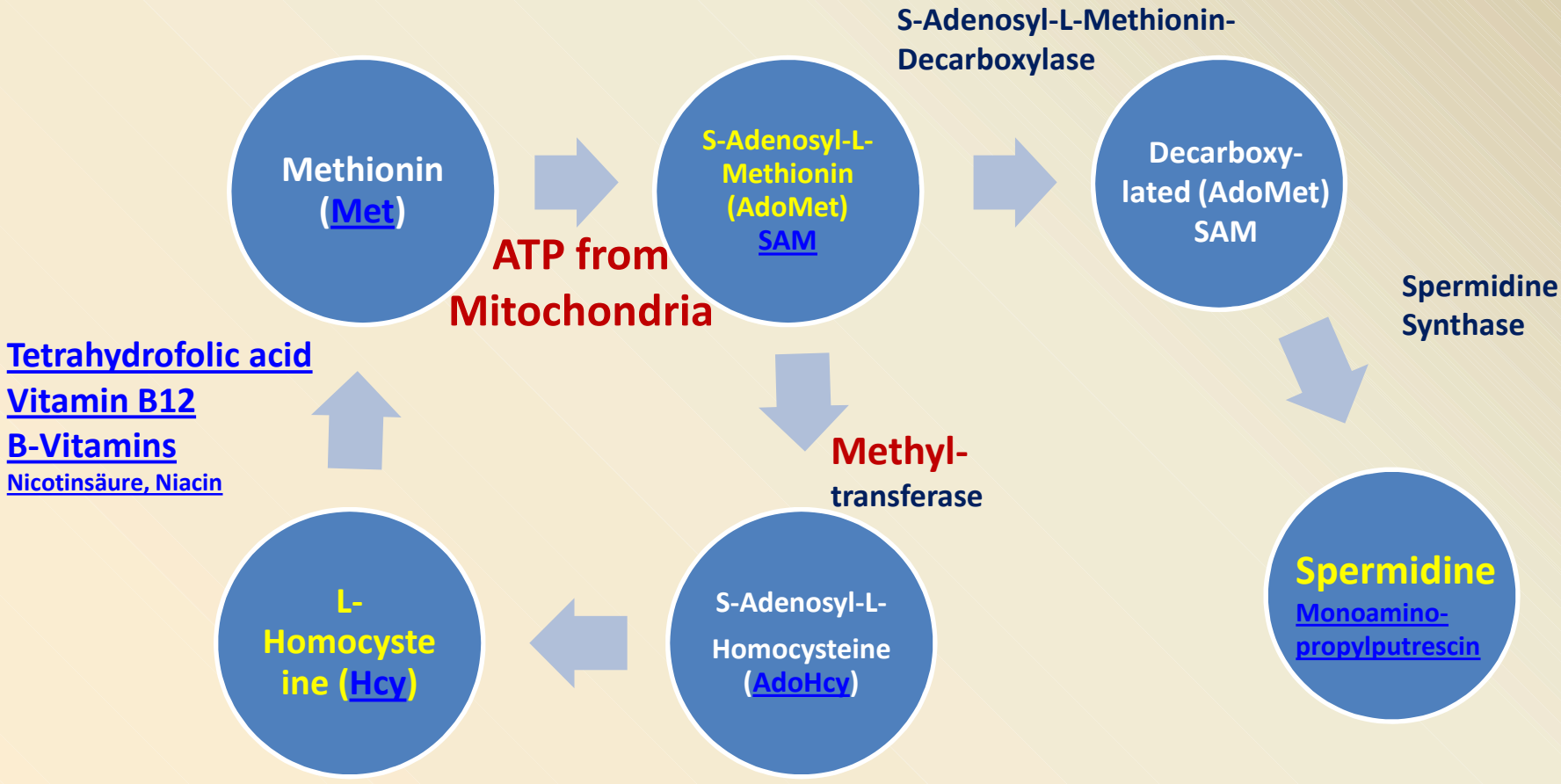
Pyrazinamide

Mitochondriotropics

Q10, L-Carnitin

Catalase: http://www.ebi.ac.uk/interpro/potm/2004_9/Page1.htm
Bakterial manganese-catalases: http://www.ncbi.nlm.nih.gov/pubmed/23376276
Caspases: http://www.ebi.ac.uk/interpro/potm/2004_8/Page1.htm

Methyl cycle



Schröder, G. et al.

http://www.erlebnishaft.de/methylierung.pdf
http://www.xerlebnishaft.de/vitamine.pdf

Nucleus, nucleotide, L-forms therapeutics

Metronidazole, Tinidazole

Inosiplex (Delimmune) * *

Acyldepsipeptid (ADEP) * *

Methylenblue (Rember) * *

Phenothiazine (Chlorpromazin *)

Methylxanthine (Pentoxyphyllin) see also * *

not yet commercially available

* = as adjuvants only

http://www.nature.com/nature/journal/v503/n7476/fig_tab/nature12834_F1.html

https://www.google.de/search?q=methyl+xantine&hl=de&btnG=Google+Search#hl=de&q=methylxanthine+derivatives+and+infectious+diseases

E. Defense and escape mechanisms by symbiogenesis

Symbiogenesis * *

is the name for

the evolutionary change through inheritance of acquired gene equipment

Margulis L. Die andere Evolution. Spektrum Akademischer Verlag Heidelberg Berlin 1999, S. 18

http://www.erlebnishaft.de/symbiogenese.pdf
http://www.kabilahsystems.de/borreliensexuellschwanger.pdf

E. Defense and escape mechanisms by symbiogenesis

Hypotheses

Originally spirochetes were attachments to archaebacteria, who were willing to include them in themselves.

After they had given up some of their genetic material into the cells of their host as Nukleolinus, they became the Centriole-kinetosome

and the Cell-filaments, the Cytoskeleton

Margulis L. Die andere Evolution. Spektrum Akademischer Verlag Heidelberg Berlin 1999, S. 63, 64

E. Defense and escape mechanisms by symbiogenesis

The cytoskeletal structures of nucleated organisms, the eukaryotes and the Bacteria, the prokaryotes follow the same structural principles.

However, the respective cytoskeletal structures are mutually not fully compatible.

http://www.xerlebnishaft.de/zytoskelett.pdf

E. Defense and escape mechanisms by symbiogenesis

Chronic Borreliosis is a

Cytoskeleton-disease.

The cytoskeleton is in this case not (always) well-sorted

https://www.google.de/search?q=Zytoskelett&sa=G&hl=de&tbm=isch&tbs=simg:CAESWQkVr0PRHo85EBpFCxCwjKcIGjwKOggBEhSvBIwFhwSsBIgEigStBIsFjASJBBog85wmB2qQiZekZa-zmp540WdIy59y2uSJqKJ_1W6vOp5UMIVxmq_1souYrG&dur=9394

http://en.wikipedia.org/wiki/Elongation_factor_thermo_unstable

http://www.youtube.com/watch?v=abuAh3VqZ40

Fucidine http://en.wikipedia.org/wiki/Fusidic_acid

Zytoskelettantibiotika http://www.xerlebnishaft.de/krebsstammzelltherapie.pdf

Defense and escape mechanisms of Borrelia Summary

Variety and pleomorphism http://www.erlebnishaft.de/stressvar1.pdf
Biofilms, Quorum sensing http://www.erlebnishaft.de/biofilmmed.pdf
Intrazellular stay http://www.erlebnishaft.de/stressvar2.pdf

Stay in lipid-rich and less perfused tissues
Bacterial efflux mechanisms http://www.erlebnishaft.de/stressvar2.pdf
Formation of beta-lactamase http://www.ncbi.nlm.nih.gov/pubmed/9158807

Tick salivary factors http://www.erlebnishaft.de/tick_spit.pdf
Depression of complement factors http://www.xerlebnishaft.de/complement.pdf
Change of Borrelia immunogenicity http://www.erlebnishaft.de/stressvar2.pdf

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Sequestration of host antibodies http://www.erlebnishaft.de/stressvar2.pdf
Depression of the CD57-fraction of killer cells http://www.erlebnishaft.de/cd57.pdf
Horizontal gene transfer http://www.erlebnishaft.de/gentransfer.pdf

Berntson K. (2013) Review of evidence for immune evasion and persistent infection in Lyme disease. Int. J Gen Med 6, 291-306 http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3636972/

Studienarbeit

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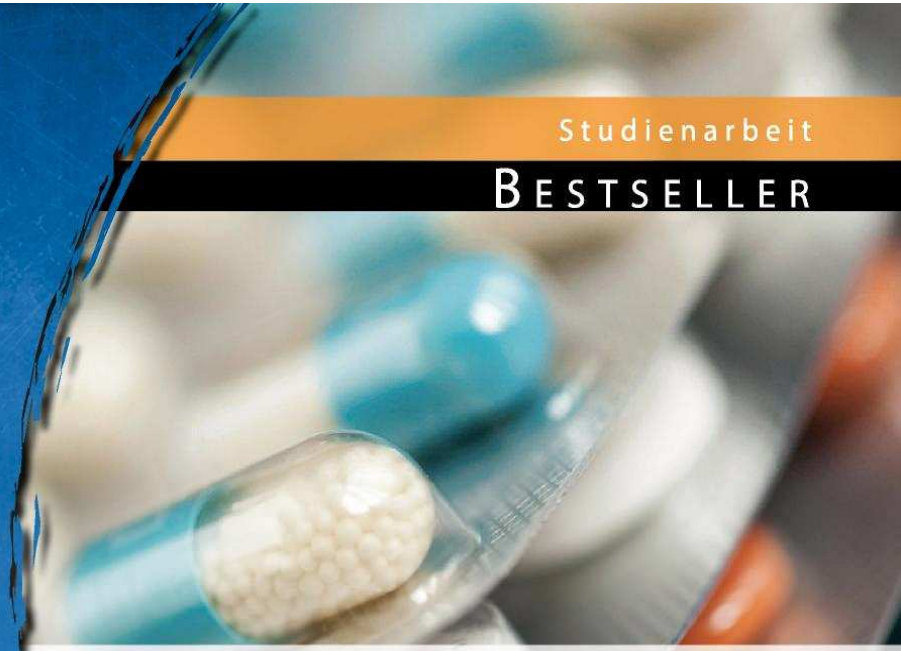

Bernt-Dieter Huismans und Wolfgang Klemann

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Intensivbehandlung, Kombinationsbehandlung, Langzeitbehandlung

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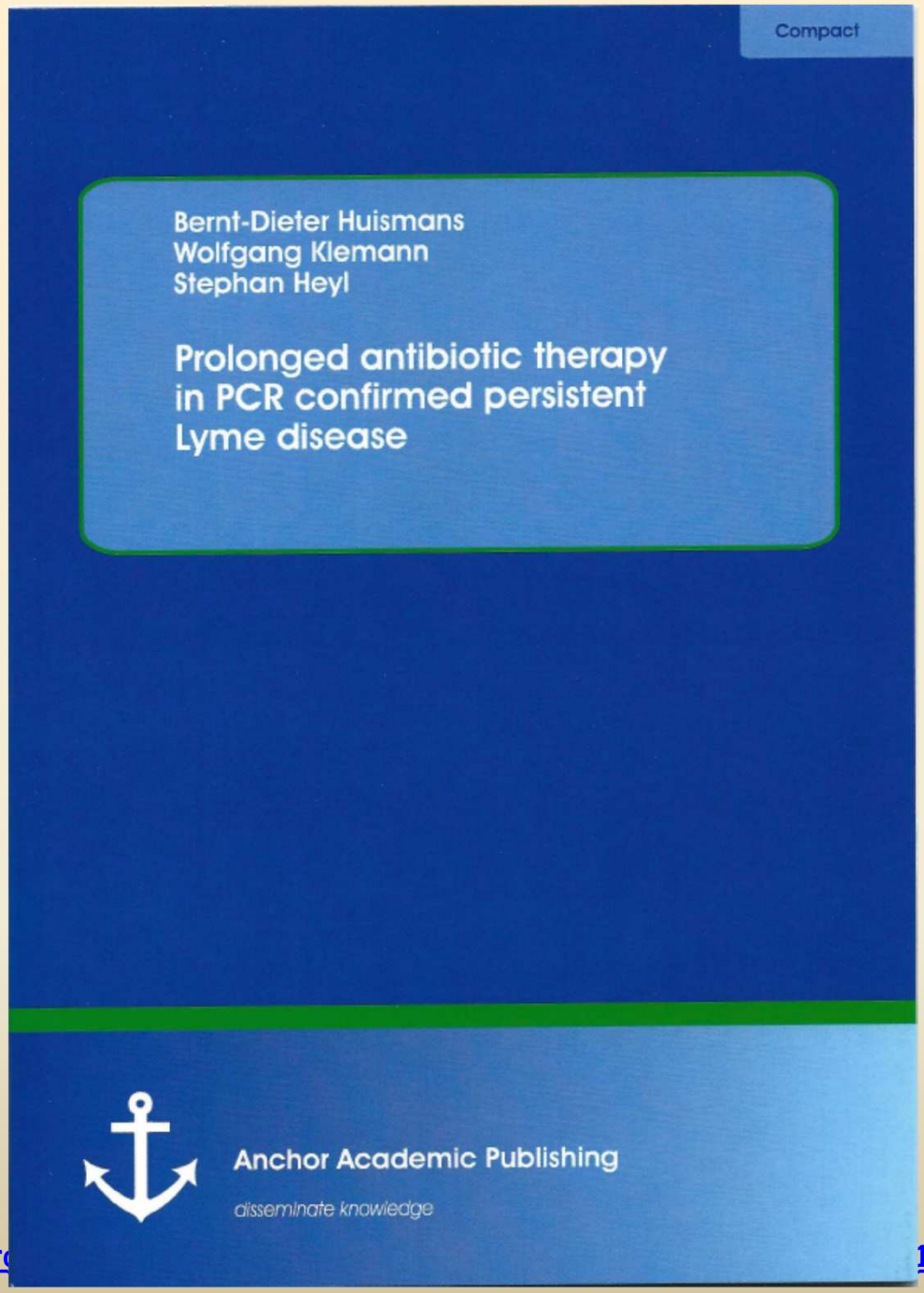

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