

Biogene Amine, Peptide und Proteine u.a. Biogenic amines, peptides and proteins, and the like.

A. Aus der Thio(l)esterwelt, from the thio(l)ester world

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

Eiweiß hat **Schwefel** (Cystein, Methionin, Glutathion, Acetylcystein, Glutathion, Sulfonsäuren)
Protein has sulfur (cysteine, methionine, glutathione, acetylcysteine, glutathione, sulfonacids)

Thioester-Gruppen (SH-Gruppen) spielen im Komplement-System <http://xerlebnishaft.de/complement.pdf>
eine zentrale Rolle als Vermittler zwischen Eiweiß- und Purin- Stoffwechsel.

Thioester groups (SH-groups) play in the complement system <http://xerlebnishaft.de/complement.pdf>
a central role as an intermediary between protein and purine metabolism.

DeDuve Chr (1994) Ursprung des Lebens. Präbiotische Evolution und die Entstehung der Zelle. Spektrum.
<http://www.amazon.de/Der-Ursprung-Lebens-Pr%C3%A4biotische-Entstehung/dp/3860251872>

Eiweiß hat im Gegensatz zu den Nukleinsäuren kein Phosphor
Protein, in contrast to the nucleic acids has no phosphorus

Thio(l)ester Thioester zur nucleophilen Acylierung in der Natur

http://www.chem.uzh.ch/robinson/lectures/AC_BII/Kap11/kap11.html#11.13

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

Spermidin <http://www.xerlebnishaft.de/bildmethyl-arginin.pdf>

Lida Mattman (2001) Cell Wall Deficient Forms. Stealth Pathogens. CRC Press, Seite , page 93

“Spermine levels might explain why some individuals have classical bacteria in infections and others only L-Phase organisms”.

„Die Spermin Mengen könnten erklären warum manche Patienten klassische Bakterien ausbilden und andere nur intrazellulär persistierende bakterielle Dauerformen (L-Formen, Spheroplasten)“.

L-Arginin <http://www.xerlebnishaft.de/bildmethyl-arginin.pdf>

Der **Harnstoffzyklus** (auch Arginin- oder Krebs-Henseleit-Zyklus) verwandelt bei Säugetieren die meist toxischen stickstoffhaltigen Abbauprodukte der Proteine, z.B. Ammonium, zu ungiftigem Harnstoff.

The **urea cycle** (also arginine or Krebs-Henseleit cycle) in mammals transforms usually toxic nitrogenous decomposition products of proteins, for example Ammonium, into non-toxic urea.

Hirsch JG. (1958) **Bactericidal action of histone**. J Exp Med 108, 925–44

“The arginine-rich fraction of calf thymus histone (histone B) exerts bactericidal activity on various coliform bacilli and micrococci under certain conditions *in vitro*”.

„Die arginin-reiche Fraktion von Kalbsthymus Histon (Histon-B) wirkt *in vitro* an verschiedenen coliformen Bazillen und Mikrokokken unter bestimmten Bedingungen bakterizid“.

L-Prolin

N-Acetylcystein und Glutathion

ist ein Glutathion Prodrug. Die **SH-Gruppe** im N-Acetylcystein-Molekül kann leicht oxidiert werden. Dabei verbinden sich zwei Moleküle über eine Disulfid-Brücke und reaktive sauerstoffhaltige Radikale, z.B.

werden Wasserstoffperoxid (H₂O₂) und Hydroxylradikale (OH•) zu unschädlichen Molekülen reduziert. N-acetylcysteine is a Glutathione prodrug.

The **SH group** in the N-acetyl cysteine molecule may be easily oxidized. It combines two molecules via a disulfide bridge, and reactive oxygen-containing radicals, for example, Hydrogen peroxide (H₂O₂) and hydroxyl radicals (OH •) are reduced to harmless molecules.

Glutathion (GSH), auch γ-L-Glutamyl-L-cysteinylglycin, ist ein Tripeptid, das aus den drei Aminosäuren Glutaminsäure, Cystein und Glycin gebildet wird.

Glutathione (GSH) = γ-L-glutamyl-L-cysteinyl-glycine, is a tripeptide formed from the three amino acids glutamic acid, cysteine and glycine." <http://de.wikipedia.org/wiki/Glutathion>

→ **Cytoskelett, cytoskeleton** <http://www.xerlebnishaft.de/zytoskelett.pdf>

Alliin, Cycloalliin, Sulfoxyde, Sulfonsäuren, Histone, Carnosin

Spezielle Peptide und Auto-Vaccine, Peptid Antibiotika, Peptid Hormone, das Proteom und Prione

B. Aus der Eiweißwelt, from the protein world

L-Tryptophan / Kynurenin <http://de.wikipedia.org/wiki/Tryptophan> <http://en.wikipedia.org/wiki/Tryptophan>
http://www.ganzimmun.de/seiten/test.php?test_id=1435 <http://lib.bioinfo.pl/paper:1531156>

Protein- und Peptidhormone

Neuropeptid der Epiphyse: Melatonin

Neuropeptide des Hypothalamus: Freisetzungshormone für LH/FSH, TSH, ACTH, GH, Somatostatin, Agouti-ähnliches Peptid, Neuropeptid Y, Leptin, Ghrelin.

Glykoproteinhormone der Adenohypophyse: Follikelstimulierendes Hormon Follitropin (FSH), Luteinisierendes Hormon Luteotropin (LH), Schilddrüsenstimulierendes Hormon Thyreotropin (TSH), Adrenocorticotropin (ACTH).

Weitere adenihypophysäre Hormone: Wachstumshormon: GH, Prolaktin, Melanozytenstimulierendes Hormon (MSH), Galanin, Kisspeptin.

Neuropeptide der Neurohypophyse: Adiuretin (Vasopressin), Oxytocin.

Hormone der Schilddrüsen: Kalzitinin.

Hormone der Nebenschilddrüsen: Parathormon.

Hormone des Herzens: Atrial-Natriuretisches Peptid (ANP).

Hormone der pankreatischen Inselzellen: Insulin, Glucagon, Somatostatin, Pankreatisches Polypeptid.

Peptidhormone des Magen- und Darmtraktes: Cholecystokinin (CCK), Sekretin, Gastrin, Ghrelin, Vasoaktives intestinales Peptid (VIP), Gastroinhibitorisches Peptid (GIP), Peptid Tyrosyl-Tyrosin (PYY).

Peptidhormone der Leber: Insulin-like growth factor (IGF),
Proteohormone der Gonaden: Inhibin, Activin.

Protein and peptide hormones

Neuropeptide of the epiphysis: Melatonin

Neuropeptides of the hypothalamus: release hormones for LH / FSH, TSH, ACTH, GH, somatostatin, agouti-like peptide, neuropeptide Y, leptin, ghrelin.

Glycoprotein hormones of the anterior pituitary: follicle-stimulating hormone, follitropin (FSH), luteinizing hormone Luteotropin (LH), thyroid stimulating hormone thyrotropin (TSH), adrenocorticotrophic hormone (ACTH).

More adenihypophysäre hormones: growth hormone: GH, prolactin, melanocyte stimulating hormone (MSH), galanin, Kisspeptin.

Neuropeptide the neurohypophysis: antidiuretic (vasopressin), oxytocin.

Of thyroid hormones: calcitonin.

Hormones of the parathyroid glands: parathyroid hormone.

Hormones of the heart: Atrial natriuretic peptide-(ANP).

Hormone of the pancreatic islet cell: insulin, glucagon, somatostatin, pancreatic polypeptide.

Peptide hormones of the gastro-intestinal tract: cholecystokinin (CCK), secretin, gastrin, ghrelin, vasoactive intestinal peptide (VIP), Gastroinhibitorisches peptide (GIP), peptide tyrosyl-tyrosine (PYY).

Peptide hormones of the liver: insulin-like growth factor (IGF),

Proteohormones of the gonads: inhibin, activin.

Quellen: <http://de.wikipedia.org/wiki/Hormon> u.a.

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Minois N et al. (2011) **Polyamines in aging and disease.** *Aging* 3, 1–17

[Bishop BM](#), [Juba ML](#), [Russo PS](#) et al. (2017) **Discovery of Novel Antimicrobial Peptides from *Varanus komodoensis* (Komodo Dragon) by Large-Scale Analyses and De-Novo-Assisted Sequencing Using Electron-Transfer Dissociation Mass Spectrometry.** *J. Proteome Res.*, Article ASAP DOI: 10.1021/acs.jproteome.6b00857
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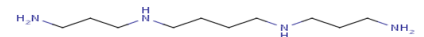
[Blum K](#), [Modestino EJ](#), [Febo M](#) et al. (2017) **Lyme and Dopaminergic Function: Hypothesizing Reduced Reward Deficiency Symptomatology by Regulating Dopamine Transmission.** *J Syst Integr Neurosci.* 3(3). doi: 10.15761/JSIN.1000163. Epub 2017 May 11.
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Thio(l)ester

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<http://www.ncbi.nlm.nih.gov/pubmed/11357130>

Spermidin, Spermin <http://xerlebnishaft.de/bildmethyl-arginin.pdf>



Spermidin (AI3-26636; 1,4-Diaminobutane, N-(3-aminopropyl)-; 1,4-Butanediamine, N-(3-aminopropyl)-; 1,5,10-Triazadecane; 4-Azaoctamethylenediamine; Spermidine; BRN 1698591; N-(3-Aminopropyl)-1,4-butane-diamine),

Spermin (AI3-26633; 1,4-Bis(aminopropyl) butanediamine, Spermine; BRN 1750791; 4,9-Diaza-1,12-dodecanediamine; Diaminopropyltetramethylenediamine)

Erhöhte Spermidin Werte sind Entzündungsmarker bei regenerierenden Geweben.

Erniedrigte Spermidin Werte finden sich bei Vergiftungen, Vitaminmangel, Pyrollurie.

Diagnostik: z.B Labor Bayer aktuell

<http://www.labor-bayer.de/newsletter/DrBayer-News-2013-09-web.pdf> ,
zusätzlich Homocystein-Nachweis

Therapie: Soja, Grape fruit, Weizenkeime, Durian-Frucht

Synthetisiert zu erwerben: Fa. Sigma - Aldrich (2016) **Spermidine**

<http://www.sigmaaldrich.com/catalog/product/sigma/s2626?lang=de®ion=DE&gclid=CJXCmsPYwM4CFU46GwodEh4OIQ>

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<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC389533/>

Raina A, Jänne J (1975) **Physiology of the natural polyamines putrescine, spermidine and spermine**. Medical biology 1975-6-1 PMID [169440](https://www.sigmaaldrich.com/catalog/papers/169440)
<https://www.sigmaaldrich.com/catalog/papers/169440>
« **The biochemistry and biological function of the naturally occurring polyamines, putrescine, spermidine, and spermine, have been reviewed with special reference to animal organisms. These compounds are universally distributed in all living material. Their biosynthesis from ornithine and methionine is accurately controlled and may fluctuate according to the metabolic needs of the cell. Polyamines strongly and specifically interact with nucleic acids in vitro. It appears that under physiological conditions a substantial portion of cellular polyamines is noncovalently bound to nucleic acids and nucleic acid-containing structures such as ribosomes. Polyamines are able to stimulate protein and ribonucleic acid synthesis in vitro. In several systems characterized by rapid growth polyamines and ribonucleic acid accumulate in parallel. Evidence that polyamines may have an essential role in protein and/or nucleic acid synthesis is substantiated by recent observations on polyamine-deficient bacterial mutants, although no specific function has been established with certainty as yet. Some clinical applications of polyamine research related to cancer are also discussed briefly.** »

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« **Comparison with controls revealed that the Sqd/Spm ratio in both whole blood and erythrocytes was significantly higher in the group of cystic fibrosis patients** »

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<https://www.ncbi.nlm.nih.gov/pubmed/7350997>
« **Red blood cells (RBC) from 69 patients with advanced cancer and 37 healthy controls were subjected to polyamine determination by using high-performance liquid chromatography. The polyamine contents in normal human RBC were spermidine 15.04 +/- 3.63 nmol and spermine 8.82 +/- 3.12 nmol per 10(10) RBC. Spermidine and spermine levels in RBC were elevated in patients with cancer (p less than 0.005). Serial studies in seven patients with cancer indicated that both polyamines in RBC were reduced after successful surgery. Our data indicate that the determination of polyamine levels in RBC is clinically useful as a marker of disease activity in patients with cancer.** »

US Patent Issued on [November 24, 1998](http://www.patentstorm.us/patents/5840559/claims.html) <http://www.patentstorm.us/patents/5840559/claims.html>
Spermine, Spermidine and Putrescine: General Biosynthesis Physiology Literature
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“Although autophagy has widely been conceived as a self-destructive mechanism that causes cell death, accumulating evidence suggests that autophagy usually mediates cytoprotection, thereby avoiding the apoptotic or necrotic demise of stressed cells. Recent evidence produced by our groups demonstrates that autophagy is also involved in pharmacological manipulations that increase longevity. Exogenous supply of the polyamine spermidine can prolong the lifespan of (while inducing autophagy in) yeast, nematodes and flies. Similarly, resveratrol can trigger autophagy in cells from different organisms, extend lifespan in nematodes, and ameliorate the fitness of human cells undergoing metabolic stress. These beneficial effects are lost when essential autophagy modulators are genetically or pharmacologically inactivated, indicating that autophagy is required for the cytoprotective and/or anti-aging effects of spermidine and resveratrol. Genetic and functional studies indicate that spermidine inhibits histone acetylases, while resveratrol activates the histone deacetylase Sirtuin 1 to confer cytoprotection/longevity. Although it remains elusive whether the same histones (or perhaps other nuclear or cytoplasmic proteins) act as the downstream targets of spermidine and resveratrol, these results point to an essential role of protein hypoacetylation in autophagy control and in the regulation of longevity. »

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“Our findings indicate that autophagy is critical for suppression of memory impairments by spermidine and that polyamines, which are endogenously present, are candidates for pharmacological intervention”.

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Sigrist SJ, Carmona-Gutierrez D, Gupta VK et al. (2014) **Spermidine-triggered autophagy ameliorates memory during aging**, Autophagy, 10,1, 178-179, DOI: 10.4161/autophagy.26918

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Eisenberg T, Abdellatif M, Schröder S et al. (2016) Cardioprotection and lifespan extension by the natural polyamine spermidine. Nature Medicine. 22(12) <http://rdcu.be/mC0h> DOI: 10.1038/nm.4222

<https://www.ncbi.nlm.nih.gov/pubmed/27841876>

“Here we show that oral supplementation of the natural polyamine spermidine extends the lifespan of mice and exerts cardioprotective effects, reducing cardiac hypertrophy and preserving diastolic function in old mice. Spermidine feeding enhanced cardiac autophagy, mitophagy and mitochondrial respiration, and it also improved the mechano-elastic properties of cardiomyocytes in vivo, coinciding with increased titin phosphorylation and suppressed subclinical inflammation. ... Our results suggest a new and feasible strategy for protection against cardiovascular disease.”

[Eisenberg T](#), [Abdellatif M](#), [Zimmermann A](#) et al. (2017) **Dietary spermidine for lowering high blood pressure**. *Autophagy*. 0. doi: 10.1080/15548627.2017.1280225. [Epub ahead of print]

<https://www.ncbi.nlm.nih.gov/pubmed/28118075>

<http://www.tandfonline.com/action/journalInformation?journalCode=kaup20>

„Altogether, spermidine represents a cardio- and vascular-protective autophagy inducer that can be readily integrated in common diets.“

Presse: <http://www.google.de/search?q=spermidin+graz&hl=de&btnG=Google+Search>

<http://www.google.de/search?q=spermidin+graz&hl=de&btnG=Google+Search>

L-Arginin

➔ Bild Methyl-Arginin <http://www.xerlebnishaft.de/bildmethyl-arginin.pdf>

➔ L-Arginin <http://www.erlebnishaft.de/l-arginin.pdf>

L-Prolin

L-Prolin ist eine **nichtessentielle**, sekundäre **α -Aminosäure**, d.h. L-Prolin hat eine endständige Carboxygruppe und in deren direkter Nachbarschaft die Aminogruppe. L-Prolin wird im Stoffwechsel synthetisiert.

Der Ausgangsstoff von L-Prolin ist **L-Glutamat**. Die Synthese erfolgt unter Energieaufwand mit einem ATP (Adenosintriphosphat) und zwei NADPH (Nicotinamidadeninukleotidphosphat) aus Pyrrolin-2-carbonsäure [(S)- 3,4-Dihydro- 2H-pyrrol- 2-carbonsäure].

Bei **Pflanzen** ist der Gehalt an L-Prolin ein Biomarker für Trocken- und Salz – Stress.

Bei **Tieren** ist L-Prolin beteiligt an der **Bildung von Kollagen** im Bindegewebe und im Knochen. L-Prolin ist die Vorgängersubstanz der im Kollagen des Knochens chemisch gebundenen α -Aminosäure L-Hydroxyprolin. L-Hydroxyprolin braucht zu seiner Entstehung **Vitamin C**. (Mangelkrankheit = Skorbut).

L-Prolin moderiert die Protein-Faltung und es puffert die enzymblockierende Funktion von Ionen.

Im Kollagenen häufig vorkommende Aminosäure-Sequenz: **Glycin-Prolin-Hydroxyprolin**. (Das Medikament Captopril z.B. wird aus L-Prolin hergestellt).

L- Proline is a **non-essential secondary α - amino acid** , that is, L- proline has a terminal carboxyl group and in the direct vicinity of the amino group .

L- proline is synthesized in metabolism.

The starting material of L- proline is **L - glutamate**. The synthesis is carried out under energy expenditure with an ATP (adenosine triphosphate) and two NADPH (nicotinamide adenine dinucleotide) from pyrroline -2 -carboxylic acid [(S) - 3,4- dihydro -2H -**pyrrole**-2 -carboxylic acid] .

For **plants**, the content of L-proline is a biomarker for the dry and salt - stress.

In **animals**, L-proline participates in the **formation of collagen** in the connective tissue and bone. L- Proline is a precursor of the substance is chemically bound in the collagen of the bone, α - amino acid, L -hydroxyproline . L -hydroxyproline needs of its construction **Vitamin C**. (deficiency disease is scurvy).

L- proline moderates the protein folding and buffers the enzyme blocking function of ions.

Frequently occurring amino acid sequence in collagens are **glycine-proline-hydroxyproline**. (The drug Captopril is produced from L- proline)

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« Thus, antioxidants accelerate tumor growth by disrupting the ROS-p53 axis. Because somatic mutations in p53 occur late in tumor progression, antioxidants may accelerate the growth of early tumors or precancerous lesions in high-risk populations such as smokers and patients with chronic obstructive pulmonary disease who receive NAC to relieve mucus production. »

➔ **Tumorsuppressorprotein P53** <http://www.erlebnishaft.de/p53.pdf>

Alpha-Liponsäure

α-Liponsäure, (R)-Liponsäure, lipoic acid regelt den Wasserstoff- und Acyl-Gruppen-Transfer z.B. im Pyruvat-Dehydrogenase-Komplex der **Mitochondrien**, dem Verbindungsglied zwischen Glykolyse und Zitronensäurezyklus und dem α-Ketoglutarat-Dehydrogenase-Komplex im Zitronensäurezyklus.

α-Liponsäure ist ein Radikalfänger und ein starkes Antioxidans, das im Stoffwechsel verbrauchte Antioxidantien wie Vitamin C, Vitamin E, Coenzym Q10 oder Glutathion regenerieren kann.

α-lipoic acid, (R)-lipoic acid, lipoic acid regulates the hydrogen and acyl groups, for example, transfer the pyruvate dehydrogenase complex of the mitochondria, the link between glycolysis and citric acid cycle, and the α-ketoglutarate dehydrogenase complex in the citric acid cycle.

α-lipoic acid is a free radical scavenger and powerful antioxidant that can regenerate in the metabolism of consumed antioxidants such as vitamin C, vitamin E, coenzyme Q10 or glutathione.

Quelle: <http://de.wikipedia.org/wiki/Lipons%C3%A4ure>

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Alliin, Cycloalliin, Sulfoxyde, Sulfonsäuren, sulfatierte Polysaccharide

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http://de.wikipedia.org/wiki/Liste_der_K%C3%BCchenkr%C3%A4uter_und_Gew%C3%BCrzpflanzen
<http://de.wikipedia.org/wiki/Kohl>

Protonenpumpenhemmer

➔ Pantoprazol, Omeprazol, Esomeprazol, Lansoprazol, Rabeprazol

Dimerkaptopropansulfonsäure (DMPS) Dimaval®

Chelatbildner dienen seit ca. 70 Jahren der Behandlung von Metallvergiftungen. Elektrolyte, Spurenelemente und Schwermetallgifte sind an Eiweiß gebunden.

Ruprecht J (1997) Dimaval® (DMPS) DMPD-HEYL®. Wissenschaftliche Produktmonographie. Heyl Chem.-pharm. Fabrik GmbH

Bayer W (2008) [Durchführung, Referenzbereiche und Interpretation des DMPS-Testes Eine kritische Datenanalyse](http://www.labor-bayer.de/publikationen/11_DrBayer-DMPS-2008.pdf) (pdf; 1,8 MB) http://www.labor-bayer.de/publikationen/11_DrBayer-DMPS-2008.pdf

s.a. Radiogardase-CS, Prussian blue capsules HEYL (2014) <http://www.gifte.de/Antidote/radiogardase.htm>
http://www.accessdata.fda.gov/drugsatfda_docs/label/2008/021626s007lbl.pdf

➔ **Elektrolyte, PH Wert und Spurenelemente**

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

➔ **Intoxikationen** <http://www.kabilahsystems.de/ph.pdf>

➔ **Entgiftung** <http://www.kabilahsystems.de/ph.pdf>

Dimethylsulfoxyd (DMSO)

Dimethylsulfoxid (DMSO) wirkt **antiphlogistisch und analgetisch**. Es ist eine **Schlepper-Substanz**, ein Penetrationsverstärker. Es **moduliert den Eiweiß-Stoffwechsel** in akuten Situationen. Bei Daueranwendung und in Konzentrationen über **10 % ist DMSO Zellgift**.

Stanley J (2001-2014) DMSO <http://www.dms0.org/subLevels/stanley.htm>

Carls J (2013) DMSO in der Handtherapie.
<http://www.akademie-fuer-handrehabilitation.de/downloads/dms0.pdf>

Fischer H (2014) - DMSO - Verborgenes Heilwissen aus der Natur // SPIRIT OF HEALTH
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MSM (Methylsulfonmethan) = organischer Schwefel

z.B. MSM **evtl.** plus Glucosamin, Omega-3-Fettsäuren und Mangan **bei Arthritis**.

Barrager E, Veltmann JR Jr, Schauss AG et al (2002) A multicentered, open-label trial on the safety and efficacy of methylsulfonylmethane in the **treatment of seasonal allergic rhinitis**. J Altern Complement Med 8(2), 167-73

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H₂S und NO

Shatalin K, Shatalina E, Mironov A et al. (2011) **H₂S: A Universal Defense Against Antibiotics in Bacteria**. Science 334(6058), 986-990. <http://www.sciencemag.org/content/334/6058/986>
“**The mechanism of gas-mediated antibiotic resistance relies on mitigation of oxidative stress imposed by antibiotics**”.

Sulfatierte Polysaccharide

Carrageen ist die Sammelbezeichnung einer Gruppe von antiviral wirkenden, **langkettigen sulfatierten Polysacchariden (Kohlenhydraten)**, die in Rotalgenzellen vorkommen.

González ME, Alarcón B, Carrasco L (1987) **Polysaccharides as Antiviral Agents**: Antiviral Activity of Carrageenan. Antimicrobial Agents and Chemotherapy. 31(9), 1388-1393

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<http://www.google.com/patents/EP0464759A2?cl=de>

➔ Walter T Makroalgen: Wirkstoffe und Potenziale
<http://fileserv.futureocean.org/wissenstransfer/thorsten-walter.pdf>

Histone

Histone sind basische Eiweißstoffe, die im Zellkern von Eukaryoten für die Verpackung der Nukleinsäureketten und für die Expression mancher auf ihr codierter Gene zuständig sind.

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Peptid-Antibiotika, Peptid-Transmitter und biogene Proteine

„Fast alle Aminosäuren existieren in zwei zueinander spiegelbildlichen Versionen, **D- und L-Form** genannt.

Höhere Lebewesen nutzen gewöhnlich nur die **L-Variante**.

Mikrobielle Zellwände und Peptid-Antibiotika enthalten auch **D-Aminosäuren, rechtshändige Aminosäuren**.

Bakterien benutzen **D- Aminosäuren** für ihre Kommunikation und beim Aufbau ihrer Biofilm-Organisationen.

Der Biofilm Klebstoff Peptidoglykan enthält **D-Alanin, D-Glutamat** sowie vereinzelt **D-Serin**. Bakterien verkitten Peptidoglykan über Artgrenzen hinweg mit Hilfe von **D-Methionin** und **D-Leucin**.

Rechtshändige Aminosäuren, **D-Aminosäuren** bewahren Peptide oder Proteine davor, durch die Enzyme des Wirtes oder eines Feindes, die nur die Bindung zwischen den **L-Formen** spalten können, sofort abgebaut zu werden.

D-Aspartat ist ein Botenstoff, ein Neurotransmitter im menschlichen Gehirn und es ist an der Entwicklung des menschlichen Gehirns beteiligt.

Hirnzellen erzeugen ein Enzym, das **L-Serin** in **D-Serin** verwandelt.

D-Serin scheint für die geistige Gesundheit von Bedeutung zu sein und es aktiviert gemeinsam mit **L-Glutamat** neuronale Moleküle, die für die neuronale Plastizität entscheidend sind“.

"Almost all amino acids exist in two mutually mirror-image versions , called **D- and L-form**. Living beings usually only use the **L variant**.

Microbial cell walls and peptide antibiotics contain **D-amino acids, right-handed amino**

acids.

Bacteria use D-amino acids for their communication and to build their biofilm organizations. The biofilm adhesive peptidoglycan contains D -alanine, D- glutamate and occasionally D -serine.

Bacterial spatula peptidoglycan across species barriers with the help of D -methionine and D -leucine.

Right-handed amino acids, D -amino acids preserve peptides or proteins from being degraded by the enzymes of the host or an enemy that can only cleave the bond between the L forms immediately.

D-aspartate is a neurotransmitter, a neurotransmitter in the human brain and it is involved in the development of the human brain.

Brain cells produce an enzyme that converts L-serine in D -serine.

D -serine appears to be essentially for mental health and it activates together with L- glutamate neuronal molecules that are critical for neuronal plasticity.

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“Die Erfindung betrifft die Verwendung von Substanzen, die an den bakteriellen Translationsfaktor EF-Tu binden, zur Hemmung des Aufbaus eines Cytoskeletts in Bakterienzellen und zur Herstellung antibakterieller Mittel. Weiterhin betrifft die Erfindung antibakterielle Mittel, die Teilabschnitte der Aminosäuresequenzen der Domänen 2 und/oder 3 eines bakteriellen EF-Tu Proteins mit einer Länge von vorzugsweise 4-20 Aminosäuren enthalten”.

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Komplement, Proteo-Hormone, Hormone

- ➔ **Komplement** <http://www.xerlebnishaft.de/complement.pdf>
- ➔ **Proteo-Hormone** <http://de.wikipedia.org/wiki/Proteohormone>
- ➔ **Polyphenole** <http://www.kabilahsystems.de/polyphenole.pdf>

Probiotika, Zytoskelett, Proteom

- ➔ **Probiotika** <http://www.kabilahsystems.de/probiotika.pdf>
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- ➔ **A Tissue-Based Map of the Human Proteome** <http://www.proteinatlas.org/humanproteome>

Prione, Virulenzinhibitoren

- ➔ **Prione** <http://www.erlebnishaft.de/prione.pdf>
- ➔ **Virulenz-Inhibitoren, Chaperone u.a.** http://www.kabilahsystems.de/virulenz_inhibitoren.pdf

L-Tryptophan, L-Kynurenin und Indoleamine 2,3-dioxygenase (IDO)

Indoleamine 2,3-dioxygenase (IDO) oxidiert L-Tryptophan und D-Tryptophan zu N-Formyl-L-Kynurenin. Auch Superoxid kann dabei Sauerstoffdonator sein.

L-Tryptophansubstitution erst nach der Behandlung einer aktiven Entzündung, weil bei Entzündungen vermehrt das toxische Kynurenin gebildet wird. Zuerst antientzündlich behandeln!

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