

NADH (COENZYME 1):
 Newest findings on its anti-diabetic,
 anti-obesity, anti-skin ageing and anti-
 fatigue effect

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Lecture at the
 Anti-Ageing Conference London
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NADH

(1) What is NADH ?
 (2) Biological Functions
 (3) Therapeutic Effects

NADH

- Nicotinamide- (= Vitamin B3)
- Adenine -
- Dinucleotide -
- Hydride

(reduced **Coenzyme – 1**)

The 5 most important biological functions of

NADH

- (1) Fuel for cellular energy production
- (2) Cell - und DNA Repair
- (3) Highly potent Anti-oxidant
- (4) Stimulates Adrenaline und Dopamine
- (5) Stimulates **N-O** Production

(1) **NADH**
 the fuel for cellular
 energy production

Can we increase the energy
 production of a cell ?

Yes.
 we can
 by
NADH

ATP concentration
 in heart cells **before** (blue) and
after (red) incubation with **N.A.D.H.**

Condition	ATP Concentration (approx.)
before N.A.D.H.	35
after N.A.D.H.	48

NADH - supplementation decreases pinacidil-primed
 $I_{K(ATP)}$ in ventricular cardiomyocytes by increasing
 intracellular ATP

Pelzmann B, Hallström S, Schaffer P, Lang P, Nadlinger K,
 Birkmayer GD, Vrecko C, Reibnegger G and Koidl B.
 Brit. J. Pharm. 2003 139, 749-754

Vitality of heart cells
 with (red) and without (blue) **N.A.D.H.**

Time	Vitality without N.A.D.H. (%)	Vitality with N.A.D.H. (%)
Start	100	100
2h	85	95
4h	45	80
6h	10	55

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(2) NADH
essential for cell and DNA repair

DNA repair enzymes need **NADH** as a Co-factor.

Hence:
The more **NADH** a cell has available, the better the DNA-repair system works.

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The Reduced Coenzyme Nicotinamide Adenine Dinucleotide (NADH) repairs DNA damage of PC12 cells induced by doxorubicin

JR Zhang, K.Vreko, K.Nadlinger, D.Storga, GD.Birkmayer and G.Reibnegger
J.Tumor Marker Onco.13, 5-17 (1998)

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X-ray induced L02 cells damage rescued by new anti-oxidant NADH
Fu-Qian Liu, Ji-Ren Zhang

Abstract
To explore molecular mechanism of mitochondria adenine dinucleotide (NADH) anti-oxidation against x-ray induced L02 cells damage, NADH(L02) liver cells were cultured in RPMI 1640, exposed to X-ray irradiation and continued to culture in the presence or absence of NADH. Cellular viability was evaluated by methyl-3TT method. The percent age of apoptotic cells and positive expression of p53, bax and bcl-2, bcl-xL, bcl-2 proteins were determined by FCM. Level of intracellular ROS was determined by confocal microscope scanning. Morphological change was detected by scanning electron microscopy.

RESULTS: The viability of L02 cells was decreased with increasing dose of X-ray irradiation. NADH could not only attenuate the apoptosis induced by X-ray irradiation, but also up-regulated expression of bcl-2 protein and down-regulated expression of p53, bax, bcl-xL and bcl-2 proteins (P<0.05). At the same time, NADH could reduce level of intracellular ROS in irradiated L02 cells.

CONCLUSION: NADH has marked anti-oxidation effect. Its mechanism may be associated with up-regulation of bcl-2 expression and down-regulation of p53, bax and bcl-2 expression, as well as decline of intracellular ROS. However, further investigation of its mechanism is worthwhile.

doi:10.1007/s12013-010-9100-0
Published online: 2010-08-04

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The Cytoprotection of Nicotinamide Adenine Dinucleotide (NADH) in the Mitochondria Regulation Mechanism*

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(3) NADH
a highly potent antioxidant

- **NADH** reduces lipid peroxidation
- **NADH** normalizes Cholesterol
- **NADH** lowers blood pressure

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Oral NADH effects blood pressure, lipid peroxidation and lipid profile in spontaneously hypertensive rats

Busheri N, Taylor J, Lieberman S, Mirdamadi-Zonosi N, Birkmayer G, Preuss HG.
Geriat.Nephrol.Urol. 18(2) 95-100 (1998)

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The antioxidative capacity of NADH in humans

Reibnegger G, Greilberger J, Juergens G. and Oettl K.
J.Tumor Marker Oncol. 18, 37-41 (2003)

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(4) NADH
stimulates Adrenaline und Dopamine production

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NADH
stimulates dopamine and adrenaline production.
Hence it improves

NADH stimulates endogenous dopamine biosynthesis by enhancing the recycling of tetrahydrobiopterin in rat pheochromocytoma cells

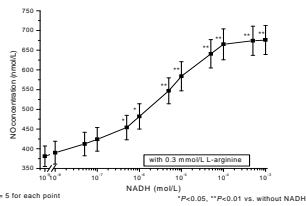
Vrecko K, Storga D, Birkmayer GD, Möller R, Tarfeit E, Horejsi R, Reibnegger G
Biochimica et Biophysica Acta 1361, 59-65 (1997)

(5) NADH stimulates N-O production

NADH stimulates N-O production
N-O relaxes blood vessels

Hence:
N.A.D.H. helps with:
 Angina pectoris, Asthma, Migraine and also the genital organs get more blood.

Effect of pretreatment (for 180 min) with different concentrations of NADH on 1.0 lg(m)/mol/L acetylcholine (ACh)-stimulated maximal NO release from HUVECs



Therapeutic Applications of NADH

- Improvement of Parkinson Symptoms
 Birkmayer JGD, et al., Acta Neurol. Scand. (1993) 87, 32-35.)
- Improvement of Chronic Fatigue Syndrome
 Forsyth, L.M. et al., Ann. Allergy Asthma and Immunology (1999), 82, 185-191.
- Improvement of cognitive impairment with Alzheimer Patients
 Demarin V. et al., Drugs Exptl. Clin. Res. (2004) 30, 185-192.
- Improvement of Symptoms of Depression
 Birkmayer JGD, Birkmayer W. New Trends in Clin. Neuropharm. (1991) 5, 75-86.

Nicotinamide adenine dinucleotide (NADH) - A new therapeutic approach to Parkinson's disease- Comparison of oral and parenteral application

Birkmayer JGD, Vrecko C, Volc D, Birkmayer W.
 Acta Neurol. Scand. 87, 32-35 (1993)

N A D H - The biological antidepressive substance
 Experience with 205 patients

G.D. Birkmayer and W. Birkmayer
 New Trends in Clinical Neuropharmacology, 5: 7-86 (1991)

NADH and Chronic Fatigue-Syndrome (CFS)

Parenteral application of NADH in Parkinson's disease: clinical improvement partially due to stimulation of endogenous levodopa biosynthesis

W. Kuhn, Th. Müller, R. Winkler, S. Danzénböck, A. Gerner, R. Hackner, C. Mattner, and H. Pernsteiner

¹Department of Neurology, St. Elizabeth Hospital, State University of Innsbruck and ²Department of Neurology & Neurophysiology, Medizinische Fakultät, University of Innsbruck, Innsbruck, Austria

Accepted July 18, 1996

Summary: Exogenous application of levodopa is conventionally used to overcome the nigral dopamine deficit in idiopathic Parkinson's disease (PD). The stimulation of endogenous biosynthesis of levodopa via activation of tyrosine hydroxylase (TH) has been proposed as one therapeutic concept in

Therapeutic effects of oral NADH on the symptoms of patients with chronic fatigue syndrome

L.M.Forsyth, H.G.Preuss, A.L.McDowell
L.Chiazze, G.D.Birkmayer and J.Bellanti

ANNALS OF ALLERGY, ASTHMA AND IMMUNOLOGY,
82: 185-191 (1999)

NADH and Alzheimer Dementia

Treatment of Alzheimer`s Disease with stabilized oral Nicotinamide Adenine Dinucleotide: A randomized, double blind study

V.Demarin, S.Podobnik-Sarkanji, D.Storga-Tomic,
G.G.Kay,
Drugs Exptl. Clin. Res. XXX,27-33 (2004)

N.A.D.H. and Diabetes

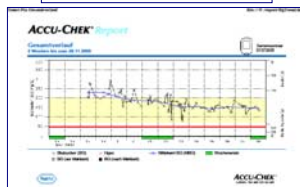
Patient: AD, m, geb. 18.05.1959

- Diabetes Typ II
- Diagnosed Nov.6th.2009
- Glucose 360 , HbA1c 15,3,
- HbA1c value 15.3. reflects a Glucose value of 300-400 in the last 3 months
- Weight 3 months ago 120

Patient: AD, m, 18.05.1959

- Therapic protocol of Prof. Birkmayer:
 - Cellergie®-NADH DIRECT 4 Tabs./day
 - L-Arginin: 3600 mg / day
 - Chrom: 400 mcg / day
 - Zink: 40 mg / day
 - Selen: 200 mcg / day
- 1 -2 h physical exercise/day

Patient: AD, m, 18.05.1959



Patient: AD, m, 18.05.1959



Visus – Werte des Patienten: AD, m, 18.05.1959

	11.12.2009	05.01.2010 Cellergie® NADH DIRECT 4 Tabletten / Tag (80 mg)
Ferne	+ 2.75	+ 0.5
Nähe	+ 4.75	+ 1.5

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N.A.D.H.

and

Obesity

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Effect of NADH on Obesity

Patient: WL, 56J. 1,86 m	BMI	Weight in Kg	Change in Kg
17.06.08	35.8	123,7	0.0
15.07.08	35.3	122.0	-1.7
12.08.08	34,5	119,5	-4.2
18.09.08	34,2	118,2	-5.5

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Weight loss in pounds (lb) after 4 weeks of NADH

Total change in weight	Visit 4-1	Visit 4 -3
MW	- 3.65	5.71
SW	6,89	7,14
SE	1,44	1,56
n	23,00	21,00
p (t-test)	2,54	-3,67
P	0,0190	0,0015
	significant	significant

CELLERGIE® NADH Cell Serum is Healthy Beauty

- Transdermal
- Energizing
- Regenerative

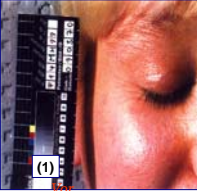
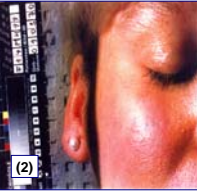
Advantages of Cellergie® NADH Cell Serum

- Real intradermal effects, no side-effects
- Can be taken in conjunction with other cosmetic lotions and creams
- can be applied to the skin either before or after creams
- No competition with classical cosmetic products
- Simply to use, exact dosing
- mobile packaging

Cellergie® NADH Cell Serum („outer beauty“) can be combined with Cellergie® NADH supplement tablets as („inner beauty“)

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The Anti-Wrinkle Effect of CELLERGIE® NADH CELL SERUM

(1) before CELLERGIE® NADH CELL SERUM (2) 2 weeks after CELLERGIE® NADH CELL SERUM

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The Natural Energy Booster

NADH:

The Biological Hydrogen

The Secret of Our Life Energy

- Hydrogen—The New Energy Supplement
- A Proven Antioxidant & Immune Enhancer
- Therapeutic for Parkinson's Disease, Chronic Fatigue, Alzheimer's Disease, and Other Conditions
- Boosts Athletic Performance & Longevity
- Safe, Effective, & Natural

George D. Birkmayer, M.D., Ph.D.

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