



Fett in der Ernährung: eine Tragödie ohne Ende?

Kultur Casino, Bern. 13. September, 2016

Dr. Paolo Colombani

J Clin Epidemiol Vol. 51, No. 6, pp. 443–460, 1998
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0895-
PII S0895-

1998

VARIANCE AND DISSENT
Presentation

The Questionable Role of Saturated and
Polyunsaturated Fatty Acids in Cardiovascular Disease

*Uffe Ravnskov**
LUND, SWEDEN

LIPIDE IN FLEISCH, MILCH UND EI

Herausforderung für die Tierernährung

2004

High- or low-fat diets?

Eine unendliche Geschichte

Dr. P. Colombani

Tagung zur Würdigung des 60. Geburtstags von Caspar Wenk

Schriftenreihe Institut für Nutztierwissenschaften, ETH Zürich, Band 25 (M. Kreuzer, C. Wenk & T. Lanzini, Hrsg.) 2004

Vom Fett in der Ernährung des Menschen

Ein unendliches Gedankenspiel in fünf Akten

P.C. COLOMBANI

INW Ernährungsbiologie ETH Zürich

No association of dietary saturated fats and cardiovascular diseases in human studies

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2006

Fakten und Märli...



Wie entwickle ich Empfehlungen?



EVIDENZBASIERTE Empfehlungen



Use of evidence in WHO recommendations

Andrew D Oxman, John N Lavis, Atle Fretheim

Lancet 2007; 369: 1883-89

Systematic reviews ... are rarely used for developing recommendations.

Instead, processes usually rely heavily on experts.

Experts have been known to use non-systematic methods when they review research, which frequently result in recommendations not reflecting systematic summaries of the best available evidence.





Use of systematic reviews in WHO recommendations

Systematic reviews have an inherent ability to minimise systematic and random errors in the assessment of existing research as well as provide a means for policy makers and programme managers to access all available evidence on key questions in a judicious manner.¹

In 2007, Andrew O'Leary² found

Since 2009: OK

... searched the WHO website using the search term "guidelines" and found 31 publicly available WHO guidance documents prepared or updated between January, 2009, and March, 2011.⁴ All these recommendations made reference to systematic reviews, which were generally less than 2 years old at the time of guideline preparation. Where there were no recent systematic reviews, WHO commissioned them.⁵

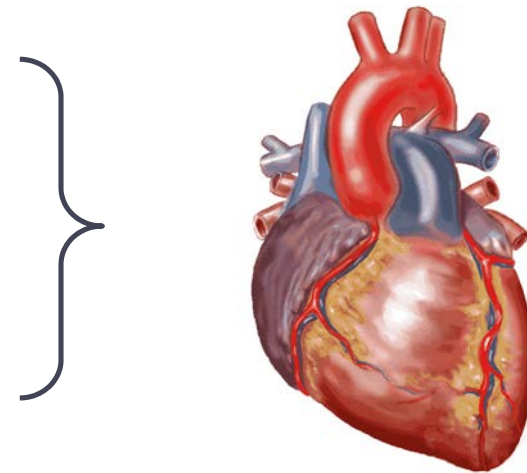
www.thelancet.com Vol 377 June 11, 2011

Referenzwerte für die Nährstoffzufuhr

2. Auflage, 1. Ausgabe 2015

Fett maximal 30 Energie% (besser 25 %), da sonst, insbesondere wegen gesättigtem Fett, enge Beziehung zu:

- «Schlechten» Blutfetten
- Gefäßverkalkung
- Übergewicht



**Risiko koronare
Herzerkrankung↑**

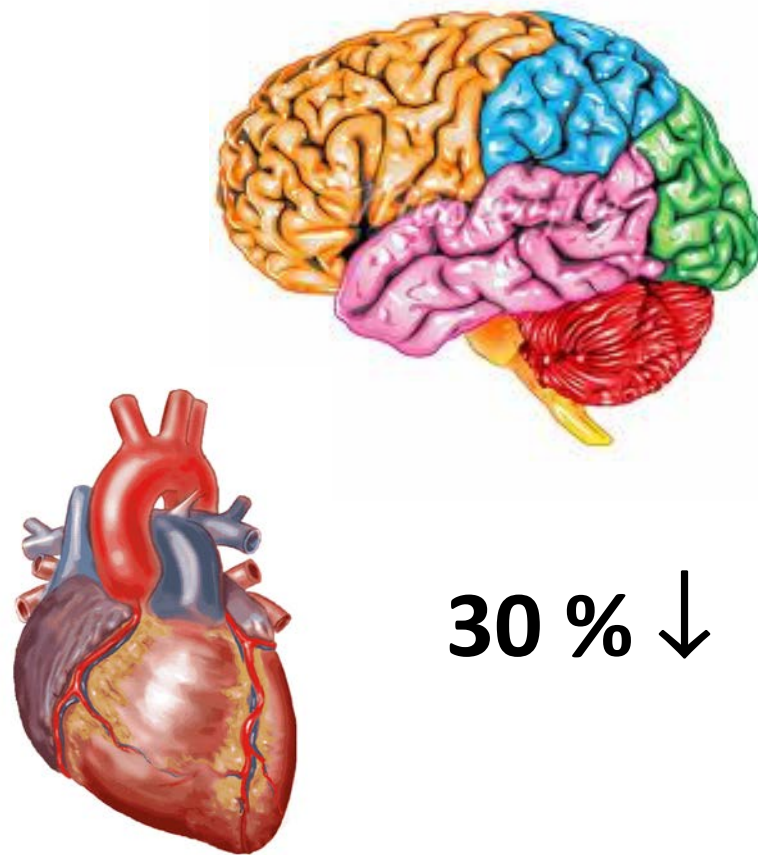


30 Energie% Fett

Erwachsene Frau	60 g
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Erwachsener Mann	75 g
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Mediterrane Diät – n=7500



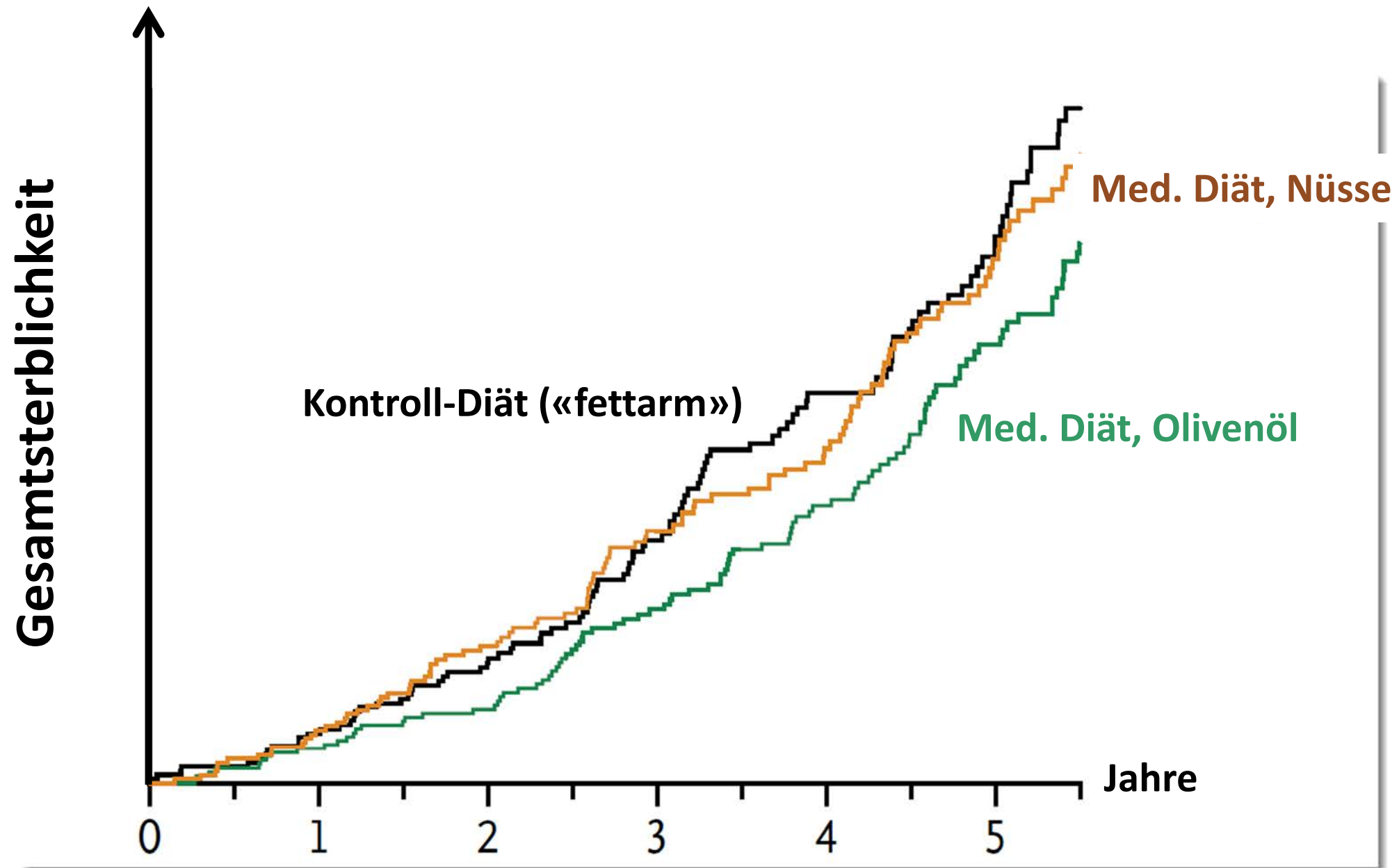
30 % ↓

50 g Olivenöl pro Tag
total 100 g Fett pro Tag
für rund 5 Jahre



Estruch et al. NEJM 368, 1279-1290, 2013

Mediterrane Diät – n=7500



Fette in der Ernährung

Aktualisierte Empfehlungen der Eidgenössischen Ernährungskommission



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Eidgenössisches Departement des Innern EDI
Bundesamt für Gesundheit BAG

«Fette 20 – 35 % der gesamten Energiezufuhr, max. 40 %»

Mediterrane Diät: rund 40 – 45 % Fett

Verabschiedet von der Eidgenössischen Ernährungskommission (EEK)

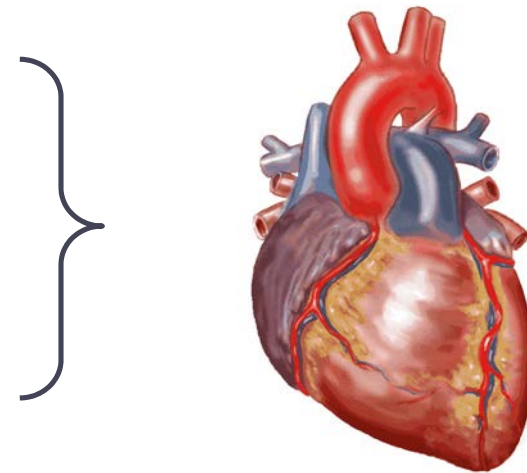
am 30. September 2012

Referenzwerte für die Nährstoffzufuhr

2. Auflage, 1. Ausgabe 2015

Fett maximal 30 Energie% (besser 25 %), da sonst, insbesondere wegen **gesättigtem Fett**, enge Beziehung zu:

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**Risiko koronare
Herzerkrankung↑**



Gesättigte Fettsäuren und Herz-Kreislaufkrankungen

Systematische Zusammenfassung

Total aller Studien: 350'000 Versuchspersonen

Bei «hoher» Zufuhr an gesättigten Fettsäuren (ca. 2-3x wie empfohlen)

Risiko Hirnschlag	19 % ↓
Risiko Herzerkrankungen	7 % ↑
<u>Risiko Herz-Kreislaufkrankungen</u>	<u>0 % ↑</u>

Siri-Tarino P.W. et al. (2010): Am.J.Clin.Nutr. 91: 535–546.



Gesättigte Fettsäuren und Gefahr verfrühten Sterbens

Systematische Zusammenfassung

Total aller Studien: 100'000 Versuchspersonen

Bei «hoher» Zufuhr an gesättigten Fettsäuren (ca. 2-3x wie empfohlen)

Risiko verfrühten Sterbens

1 % ↓



Souza R.J. de et al. (2015): BMJ 351: h3978.

Gefahr verfrühten Sterbens: Rauchen...

Systematische Zusammenfassung

Total aller Studien: 300'000 Versuchspersonen

Starke Raucher/innen (20+ Zigaretten pro Tag) vs. nicht-rauchend

Risiko verfrühten Sterbens 150 % ↑



Shavelle R.M. et al. (2008): J.Insur.Med. 40: 170–178.

Gefahr verfrühten Sterbens: Fitness...

Systematische Zusammenfassung

Total aller Studien: 73'00 Versuchspersonen

Niedrige, gemessene Herzfitness verglichen mit guter Herzfitness

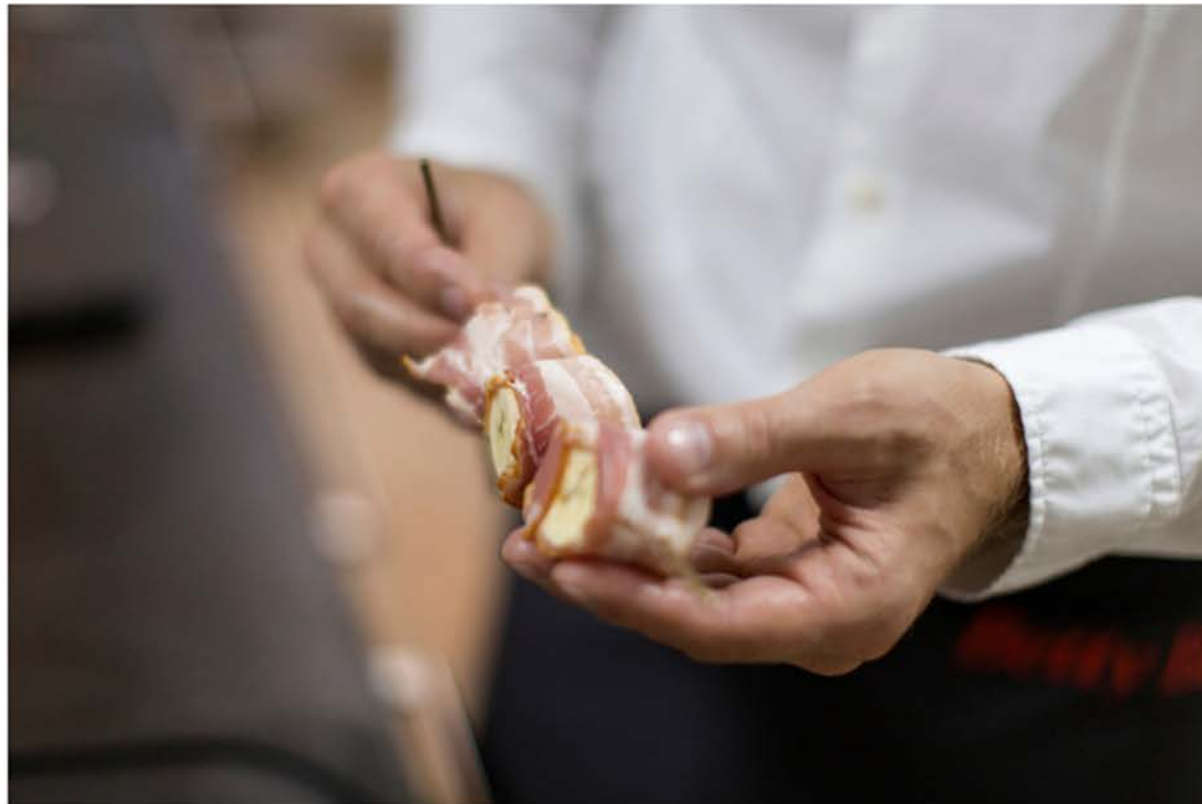
Risiko verfrühten Sterbens 140 % ↑



Barry V.W. et al. (2014): Prog.Cardiovasc.Dis. 56: 382–390.

WHO stuft Wurst und Schinken als krebserregend ein

Die Weltgesundheitsorganisation führt verarbeitete Fleischprodukte neu auf der Liste krebserregender Nahrungsmittel.



26. Oktober 2015

Auswertung von mehr als 800 Studien

Pro 50 g/d verarbeitetes Fleisch

Darmkrebsrisiko 18 % ↑

Würste & Co. und Darmkrebs?

News

Carcinogenicity of red meat and processed meat

In October, 2015, 22 scientists from ten countries met at the International Agency for Research on Cancer (IARC) in Lyon, France, to evaluate the carcinogenicity of the consumption of red meat and processed meat. These assessments will be published in volume 114 of the IARC Monographs.

Red meat refers to unprocessed mammalian muscle meat—for example, beef, veal, pork, lamb, mutton, horse, and goat meat—including minced or frozen meat; it is usually consumed cooked. Processed meat refers to meat that has been transformed through salting, curing, fermentation, smoking, or other processes to enhance flavour or improve preservation. Most processed meats contain pork or beef, but may also contain other red meats, poultry offal (eg, liver), or meat byproducts such as blood.

Red meat contains high biological value proteins and important micronutrients such as B vitamins, iron (both free iron and haem iron), and zinc. The fat content of red meat varies depending on animal species, sex, breed, and feed, and the cut of meat. Meat processing, such as curing and smoking, can result in formation of carcinogenic chemicals, including N-nitroso-compounds (NOC) and polycyclic aromatic hydrocarbons (PAHs). Cooking improves the digestibility and palatability of meat, but also produces known or suspected carcinogens, including heterocyclic aromatic amines (HAA) and PAHs. High-temperature cooking by pan-frying, grilling, or barbecuing generally produces the highest amounts of these chemicals.¹³

Depending on the country, the proportion of the population that consumes red meat varies worldwide from less than 5% to up to 100%, and from less than 2% to 65% for processed meat. The mean intake of red meat by those who consume it is about 50–100 g per person per day, with high consumption equalling

in Europe, Japan, and the USA.^{14,15} Supporting evidence came from six of nine informative case-control studies. A meta-analysis of colorectal cancer in ten cohort studies reported a statistically significant dose-response relationship, with a 17% increased risk (95% CI 1.05–1.31) per 100 g per

occurrence of colonic preneoplastic lesions was reported in three and four studies, respectively.^{16,17} The mechanistic evidence for carcinogenicity was assessed as strong for red meat and moderate for processed meat. Mechanistic evidence is mainly available for the

National Cancer Center Research Institute, Japan
Declaration of interests:
All representatives declare no competing interests.
Observers:
D.A. Alexander, for the IARC Working Group, USA; B.L. Roemer, for the North American Meat

be experimentally suppressed by calcium, supporting its contribution to carcinogenic mechanisms. Meat heated at a high temperature contains HAA. HAA are genotoxic, and the extent of conversion of HAA to genotoxic metabolites is greater in man than in rodents. Meat smoked or

grilled and smoked foods. Food Central 2011; 22:2028–35.
4 Food and Agriculture Organization of the United Nations Statistics Division. Food balance, 2015. <http://faostat3.fao.org/browse/FB/vt/> (accessed July 3, 2015).
5 Norat T, Bingham S, Ferrari P, et al. Meat, fish, and colorectal cancer risk: the European Prospective Investigation into Cancer and Nutrition. J Natl Cancer Inst 2005; 97: 906–16.

News

In preparation

Volume 114

Red Meat and Processed Meat

In preparation

Volume 115

Larsen SC, Rafter J, Holmberg L, Bergkvist L, Wolk A. Red meat consumption and risk of cancers of the proximal colon, distal colon and rectum: the Swedish Mammography Cohort. Int J Cancer 2005; 113: 829–34.
English DR, Madhres RJ, Hodge AM, Hopper JL, Haydon AM, Giles GG. Red meat, chicken, and fish consumption and risk of colorectal cancer. Cancer Epidemiol Biomarkers Prev 2004; 13: 1509–14.
Oda S, Shimizu N, Nagata C, et al. The relationship between the consumption of meat, fat, and coffee and the risk of colon cancer: a prospective study in Japan. Cancer Lett 2006; 244: 260–67.
Bernstein AM, Song M, Zhang X, et al. Processed and unprocessed red meat and risk of colorectal cancer: analysis by tumor location and modification by time. PLoS One 2015; 10: e0135959.
Cross AJ, Ferrucci LM, Bish A, et al. A large prospective study of meat consumption and colorectal cancer risk: an investigation of potential mechanisms underlying this association. Cancer Res 2010; 70: 2496–14.
Chao A, Thun MJ, Connell CJ, et al. Meat consumption and risk of colorectal cancer. JAMA 2005; 293: 173–82.
Chan DS, Lau R, Aune D, et al. Red and processed meat and colorectal cancer incidence: meta-analysis of prospective studies. PLoS One 2011; 6: e25456.
Pierre E, Freeman A, Tache S, van der Meer R, Corpet DE. Beef meat and blood sausage promote the formation of apoxymethane-induced mucin-depleted foci and aberrant crypt foci in rat colons. J Nutr 2004; 134: 2721–26.
Pierre E, Santarelli R, Tache S, Guenard F, Corpet DE. Beef meat promotion of dimethylhydrazine-induced colorectal carcinogenesis biomarkers is suppressed by dietary calcium. Br J Nutr 2008; 99: 1000–06.
Santarelli RL, Vendregh J, Naud N, et al. Meat processing and colon carcinogenesis: cooked, nitrite-treated, and oxidized high-borne cured meat promotes mucin-depleted foci in rats. Cancer Prev Res (Phila) 3: 652–64.
Aune D, Chan DS, Vieira AR, et al. Red and processed meat intake and risk of colorectal adenomas: a systematic review and meta-analysis of epidemiological studies. Cancer Causes Control 2013; 24: 613–27.
Gay LJ, Mitrovic PN, Kien J, et al. Diet, lifestyle and clinical pathological factors associated with APC mutations and promoter methylation in colorectal cancers from the EPIC-Norfolk study. J Pathol 2012; 228: 495–55.
Pierre FH, Martin OC, Santarelli RL, et al. Calcium and alpha-tocopherol suppress cured meat promotion of chemically induced colon carcinogenesis in rats and reduce associated biomarkers in human volunteers. Am J Clin Nutr 2013; 98: 1255–62.
Le Luu RK, Winter JM, Christopherson CT, et al. Butyrylated starch intake can prevent red meat-induced O6-methyl-3-deoxyguanosine adducts in human rectal tissue: a randomised clinical trial. Br J Nutr 2015; 114: 220–30.
Lewin MH, Bailey N, Bandalova T, et al. Red meat enhances the colonic formation of the DNA adduct O6-carboxymethyl guanine: implications for colorectal cancer risk. Cancer Res 2006; 66: 1859–65.

www.thelancet.com/oncology Published online October 26, 2015 [http://dx.doi.org/10.1016/S1470-2045\(15\)00444-1](http://dx.doi.org/10.1016/S1470-2045(15)00444-1)

- 18 gute grosse Studien, nicht 800 Studien
- 12 Studien mit, 6 Studien ohne Zusammenhang
- Ergebnis identisch wie in 2011er Analyse, das identisch war mit 2007er Analyse
- Immer ca. +15 % Risiko bei «hohem» Konsum

Bouvard V. et al. (2015): Lancet Oncol. 16: 15599-1560.

Gefahr verfrühten Sterbens: Fitness...

Systematische Zusammenfassung

Total aller Studien: 73'00 Versuchspersonen

Niedrige, gemessene Herzfitness verglichen mit guter Herzfitness

Risiko verfrühten Sterbens 140 % ↑

+50 g Fleischwaren: 0.3 % ↑



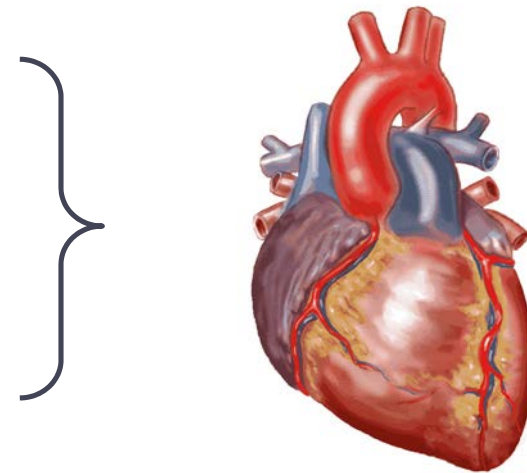
Barry V.W. et al. (2014): Prog.Cardiovasc.Dis. 56: 382–390.

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- Gefäßverkalkung
- • **Übergewicht**



**Risiko koronare
Herzerkrankung↑**



Nahrungsfett und anschliessende Gewichtsveränderung

EPIC Studie – grösste weltweit laufende Studie: Hier 90'000 Teilnehmende

Pro zusätzliche 100 g Fett pro Tag...

Bauchumfang bei Männern: + 1 mm pro Jahr

Bauchumfang bei Frauen: - 1 mm pro Jahr



Forouhi N.G. et al. (2009): Am.J.Clin.Nutr. 90: 1632–1641.

Übergewicht überhaupt ein Problem?

Risiko verfrühten Sterbens im Vergleich zu fit und normalgewichtig

Normalgewichtig	nicht fit	120 % ↑	
Übergewichtig	nicht fit	150 % ↑	
Stark übergewichtig	nicht fit	210 % ↑	
Übergewichtig	fit	10 % ↑	ns
Stark übergewichtig	fit	10 % ↑	ns



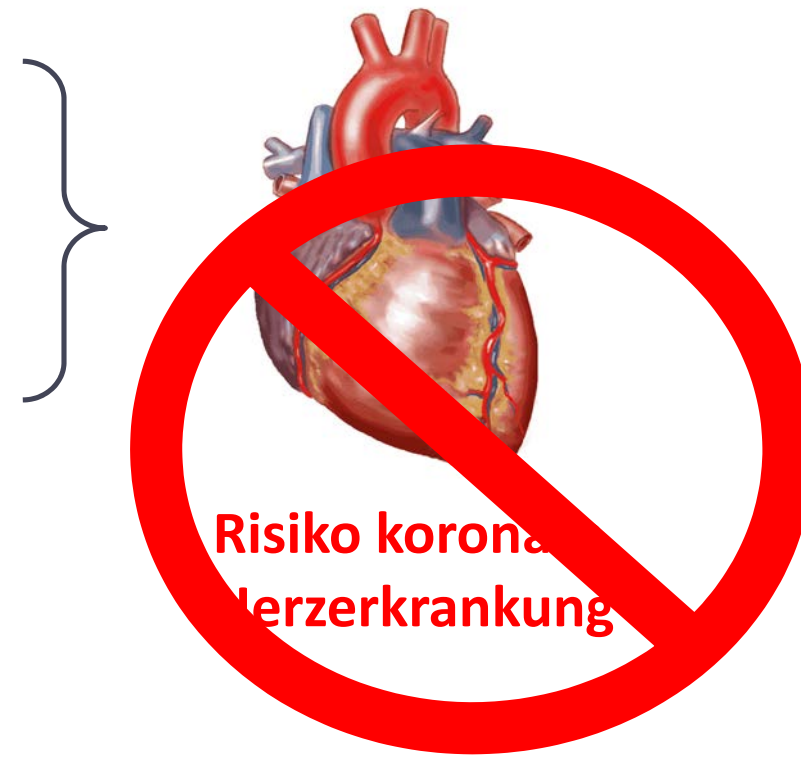
Wei M. et al. (1999): JAMA 282: 1547–1553.

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Referenzwerte für die Nährstoffzufuhr

2. Auflage, 1. Ausgabe 2015

Kohlenhydrate mehr als 50 % Energie (epidemiologisch begründet), da sonst zu viel insbesondere gesättigtes Fett, das enge Beziehung hat zu:

- «schlechten» Blutfetten
- Gefäßverkalkung
- Übergewicht



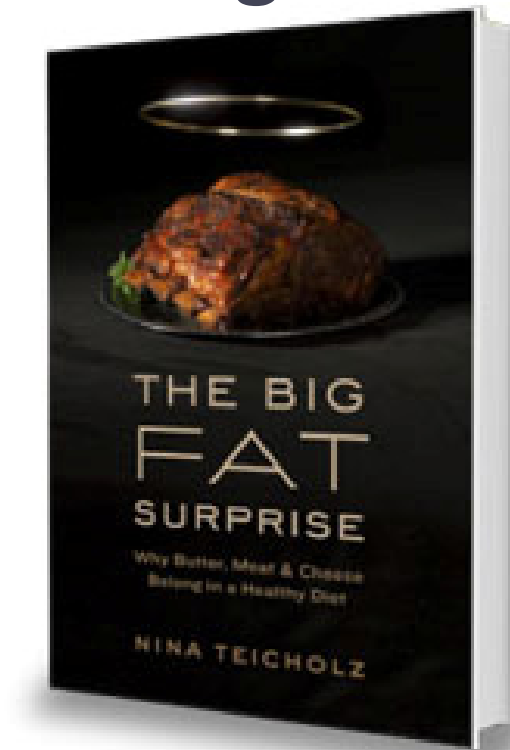
Kohlenhydratbelastung und Gefahr chronischer Erkrankungen

Systematische Zusammenfassung

Total aller Studien: 1'900'000 Versuchspersonen

Bei hoher Kohlenhydratbelastung....

Risiko Gallenblasenerkrankungen	25 bis 40 % ↑
Risiko Diabetes	30 bis 40 % ↑
Risiko Herzerkrankungen	25 bis 55 % ↑
<u>Risiko verfrühten Sterbens</u>	<u>10 bis 15 % ↑</u>



Barclay A.W. et al. (2008): Am.J.Clin.Nutr. 87: 627–637.

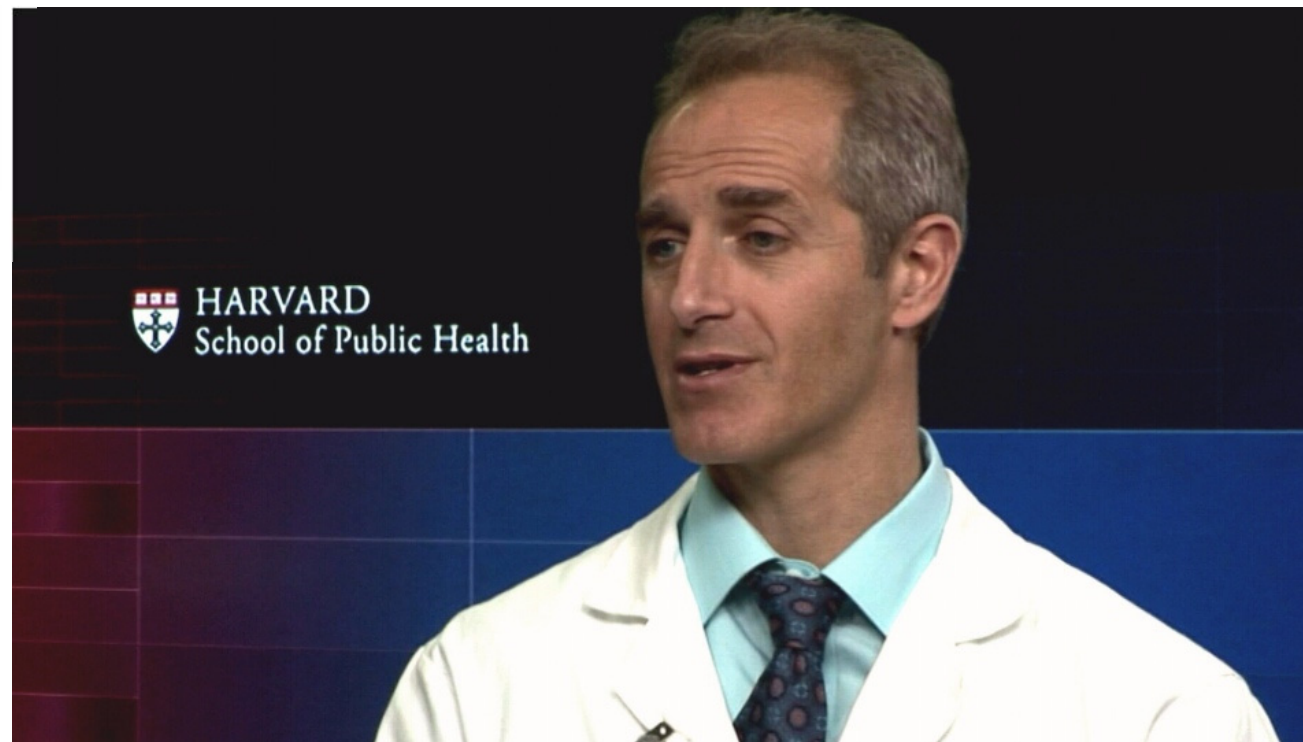
Authoritative Review

OPEN

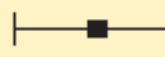
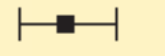
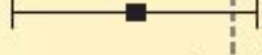
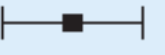
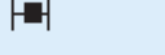
Dietary and Policy Priorities for Cardiovascular Disease, Diabetes, and Obesity A Comprehensive Review

Dariush Mozaffarian, MD, DrPH

January 12, 2016



405 Referenzen

Trans fat	CHD	high vs low		1.32 (1.10, 1.54)	Mente A 2009
	CHD	Each 2% E vs. carbohydrate		1.23 (1.11, 1.37)	Mozaffarian D 2006
Total fat	CHD	high vs low		0.99 (0.88, 1.09)	Mente A 2009
	Stroke	intervention vs control		1.01 (0.90, 1.13)	Hooper L 2012
	Diabetes	high vs low		0.93 (0.86, 1.01)	Alhazmi A 2012
Saturated fat	CHD	top vs. bottom tertile		1.03 (0.98, 1.07)	Chowdhury R 2014
	Stroke	high vs low		0.81 (0.62, 1.05)	Siri-Tarino M 2010
	Diabetes	high vs low		0.99 (0.91, 1.07)	Alhazmi A 2012
Glycemic load	CHD	high vs low		1.23 (1.06, 1.42)	Mirrahimi A 2014
	Stroke	high vs low		1.19 (1.05, 1.36)	Cai X 2015
	Diabetes	high vs low		1.13 (1.08, 1.17)	Bhupathiraju S 2014



Nutrition and policy science have advanced rapidly, creating confusion...

Focus on foods & overall diet patterns, rather than single isolated nutrients...

Recognize the complex influences of different foods on ... weight regulation

Evidence-based personalized nutrition appears to depend more on non-genetic characteristics (e.g., physical activity, abdominal adiposity, gender, socioeconomic status, culture) than genetic factors.

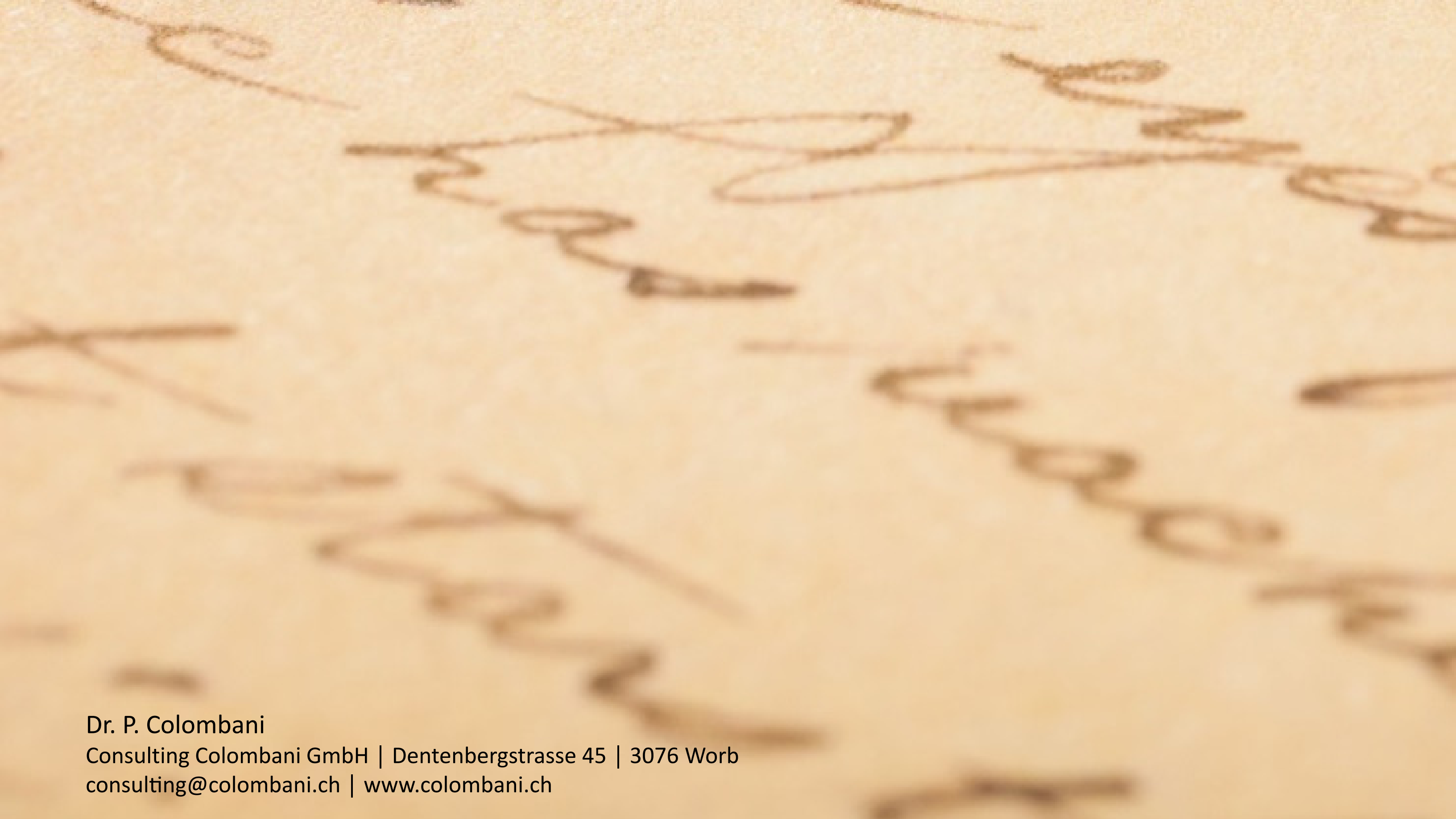
Take home...

Ich lass mir den Appetit nicht verderben

Ich geniesse mein Essen

Je regelmässiger und mehr ich mich körperlich bewege,
umso mehr Freiheiten habe ich beim Essen und Trinken





Dr. P. Colombani

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