Evolutionair Denken

wat is het & wat kun je er mee?

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apotheker n.p., cardioloog, gezondheidscoach, auteur/publicist

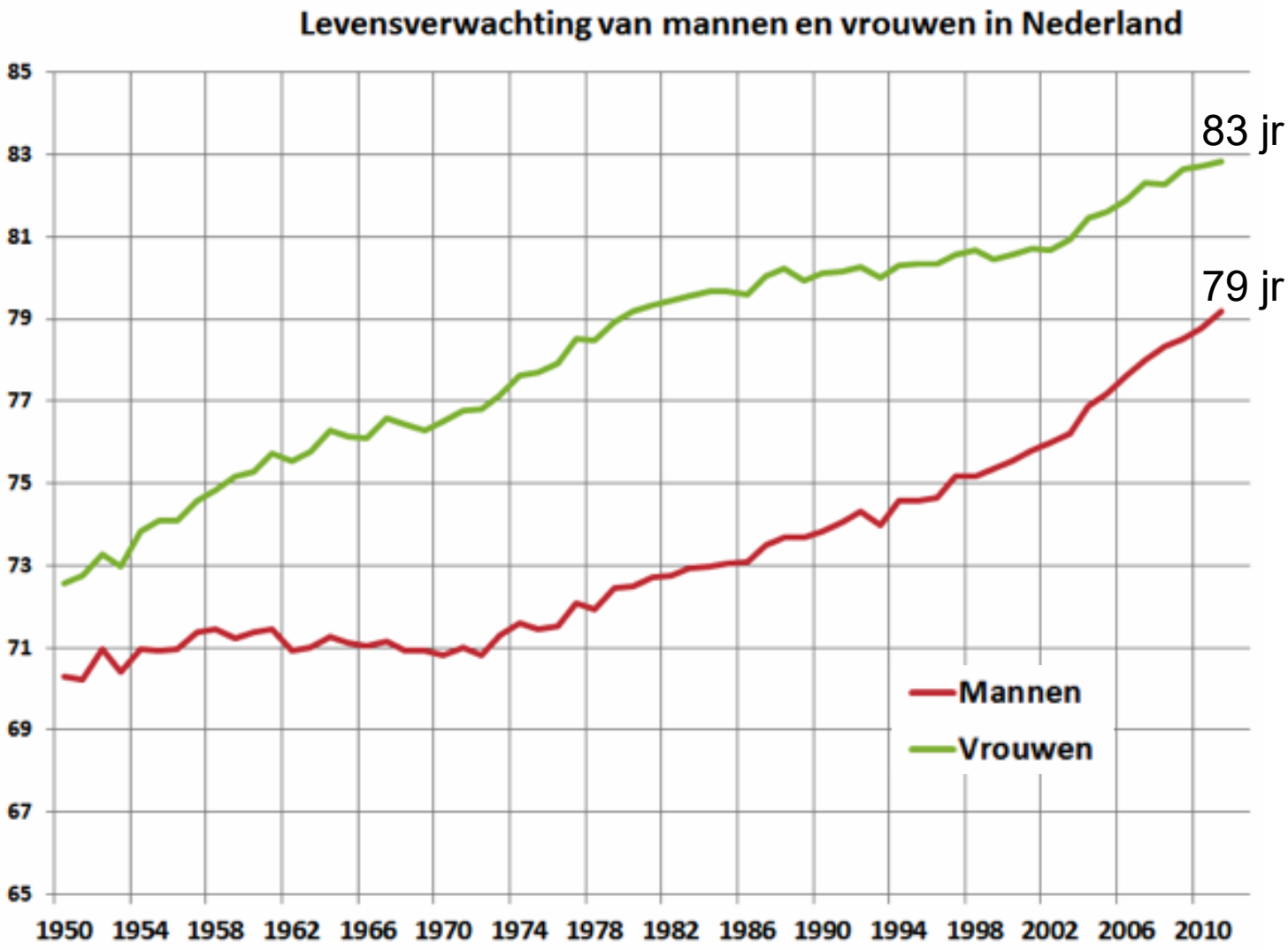
Disclosure belangen spreker

(potentiële) belangenverstrengeling	Zie hieronder
Voor bijeenkomst mogelijk relevante relaties met bedrijven Honorarium of andere (financiële) vergoeding	***Speakers honoraria from:*** ABN-Amro, Academy of Integrative Medicine, Bonusan, Care by Nature, Folia Orthica, Health Benefits 08, Hogeschool NHLStenden, Hormoonfactor, Hormooncommunity, ING, Nationale Nederlanden, Nutriphyt, Facebook, Natura Foundation, Otro Elements, Pro-Osteo, SCEM (Seinen Congres & Events Management), Stichting Education Atrium Innovations
• Sponsoring of onderzoeksgeld • Aandeelhouder • Andere relatie, namelijk …	-Friesland-Campina - Eigenaar www.remkokuipers.com - Auteur: *Oerdieet* - Auteur: *Oergezond* Supporter and practitioner of a healthy lifestyle

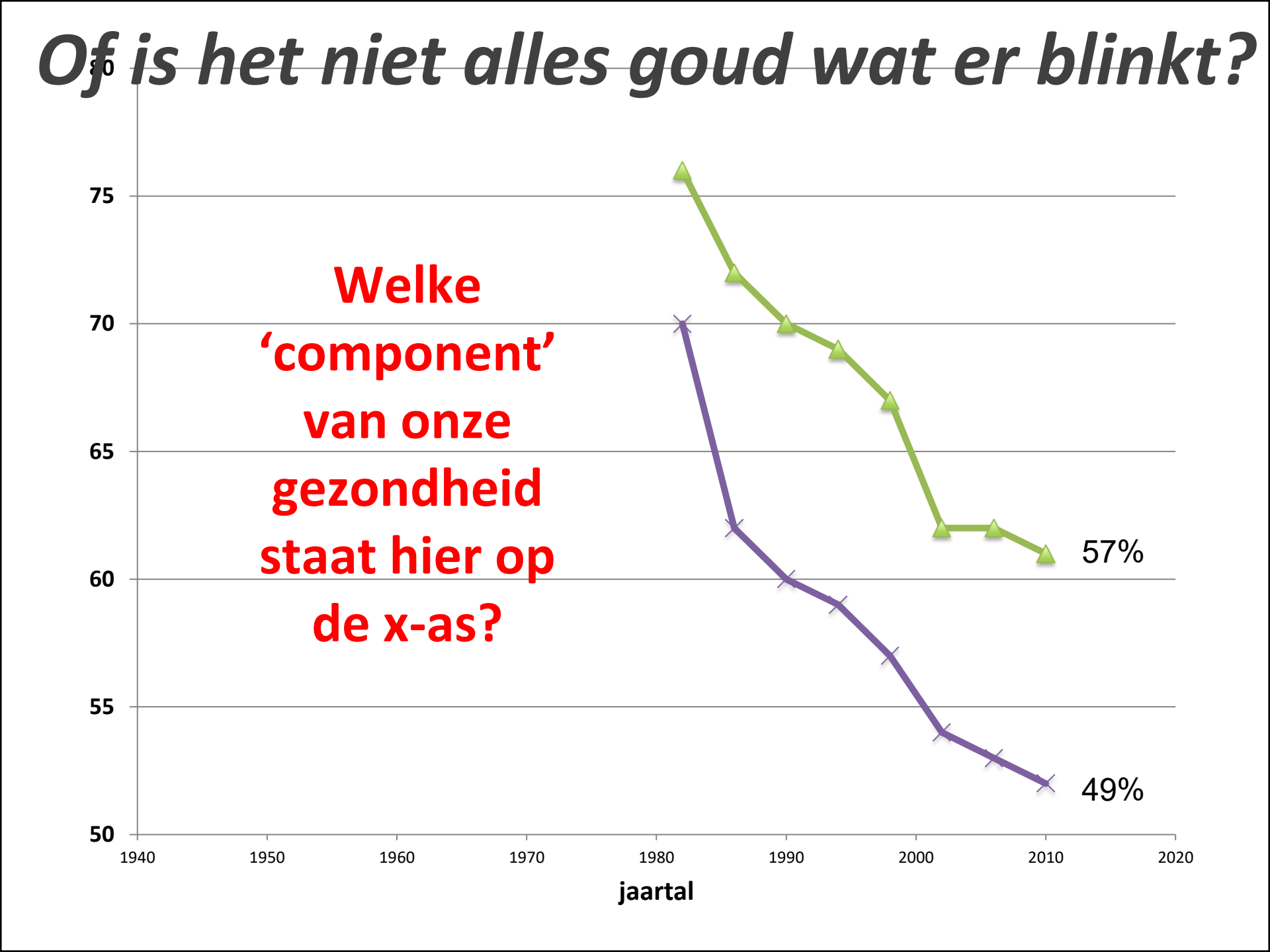
Evolutionair Denken

Introductie

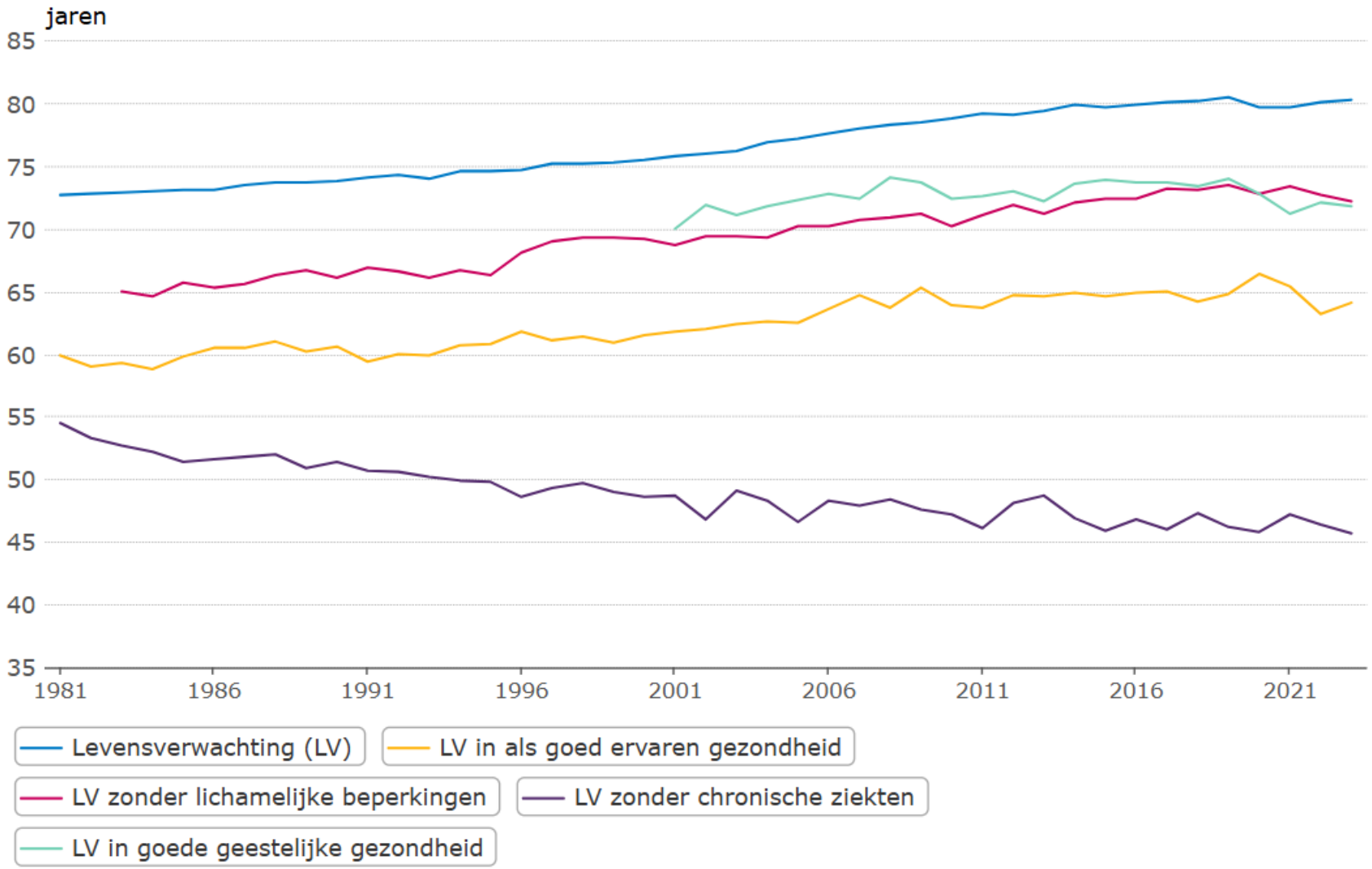
Lang leve onze gezondheid!



Of is het niet alles goud wat er blinkt?

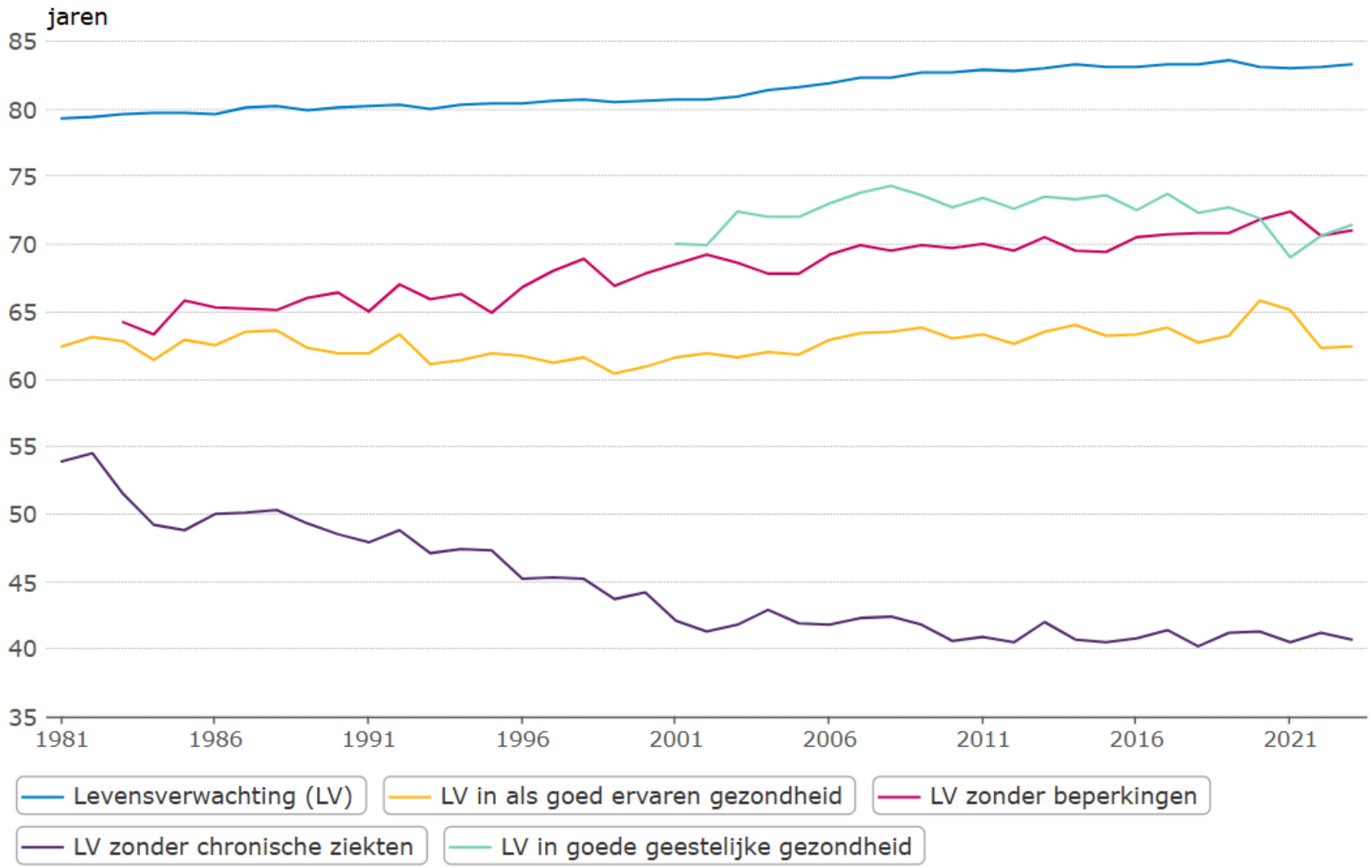


(Gezonde) levensverwachting mannen 1981-2023

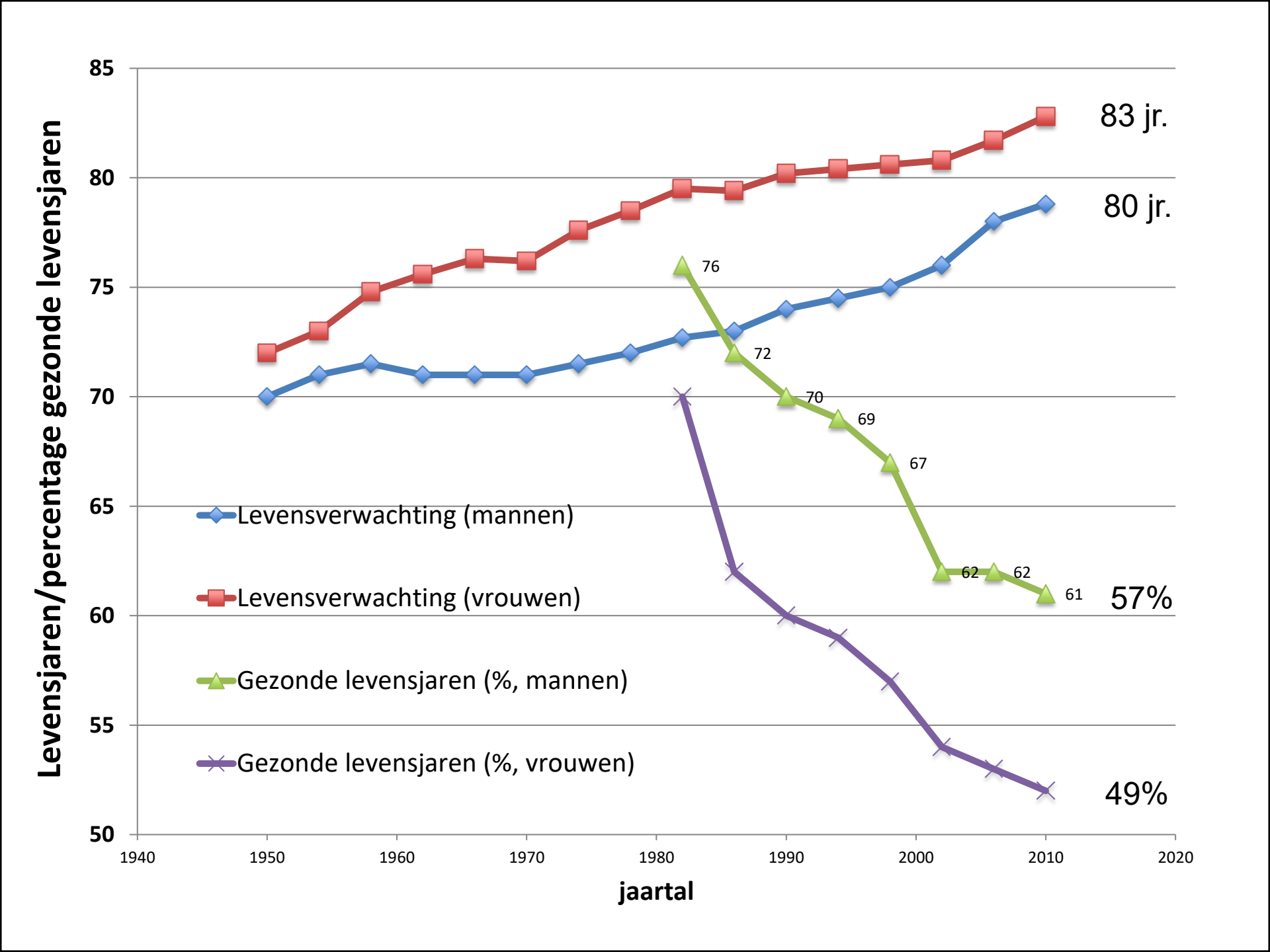


Bron: https://www.vzinfo.nl/gezonde-levensverwachting/leeftijd-en-geslacht

(Gezonde) levensverwachting vrouwen 1981-2023

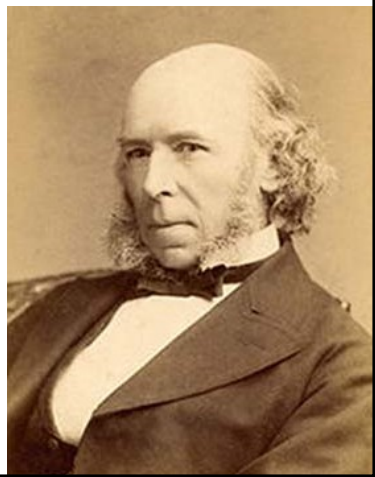


Bron: https://www.vzinfo.nl/gezonde-levensverwachting/leeftijd-en-geslacht


Levensjaren/percentage gezonde levensjaren
85
80
75
70
65
60
55
50
1940
1950
1960
1970
1980
1990
2000
2010
2020
jaartal
83 jr.
80 jr.
76
72
70
69
67
62
62
61
57%
49%
Levensverwachting (mannen)
Levensverwachting (vrouwen)
Gezonde levensjaren (%, mannen)
Gezonde levensjaren (%, vrouwen)

Take home message No. 1:

We worden *steeds ouder*
maar ook
steeds *jonger ziek*:
dubbel zo lang chronisch ziek




Hoe kan dit nou?

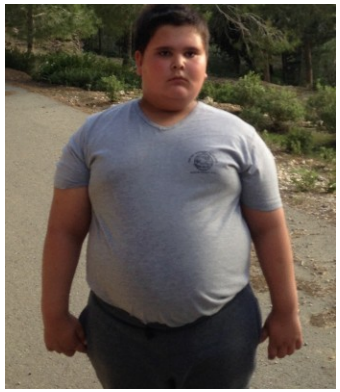
The problem starts… at (before?) birth

The epidemiological burden of obesity in childhood: a worldwide epidemic requiring urgent action

Table 3 Estimates of the proportion of obese children aged 2–4 years, by region

Region	Sex	1980 (% obese)	2015
Sub-Saharan Africa	Female	3.7 (3.1–4.4)	5.4 (4.5–6.5)
	Male	4.3 (3.4–5.5)	5.8 (4.7–7.1)
South Asia	Female	2.8 (1.5–4.9)	4.0 (2.1–7.1)
	Male	2.4 (1.3–4.2)	4.5 (2.3–8.1)
East and Southeast Asia and Oceania	Female	2.3 (1.4–3.8)	6.8 (4.2–10.8)
	Male	2.3 (1.4–3.7)	8.1 (4.8–12.5)
High-income countries	Female	6.0 (4.9–7.2)	8.9 (7.2–10.9)
	Male	6.1 (4.9–7.6)	10.0 (8.0–12.4)
Latin America and the Caribbean	Female	3.9 (2.7–5.7)	8.7 (6.0–12.4)
	Male	5.0 (3.2–8.0)	9.8 (6.4–14.1)
Middle East and North Africa	Female	4.3 (3.7–5.1)	9.2 (7.6–10.9)
	Male	3.5 (2.9–4.3)	8.8 (7.3–10.7)
Central and Eastern Europe and Central Asia	Female	9.0 (7.3–11.1)	9.3 (7.7–11.3)
	Male	11.5 (9.4–14.1)	12.6 (10.4–15.0)

Estimates were published by the Institute for Health Metrics and Evaluation (see Table 1)



Di Cesare et al, BMC Medicine, 2109

The problem continues at school(?)

Percentage of 5-19 year old Obese

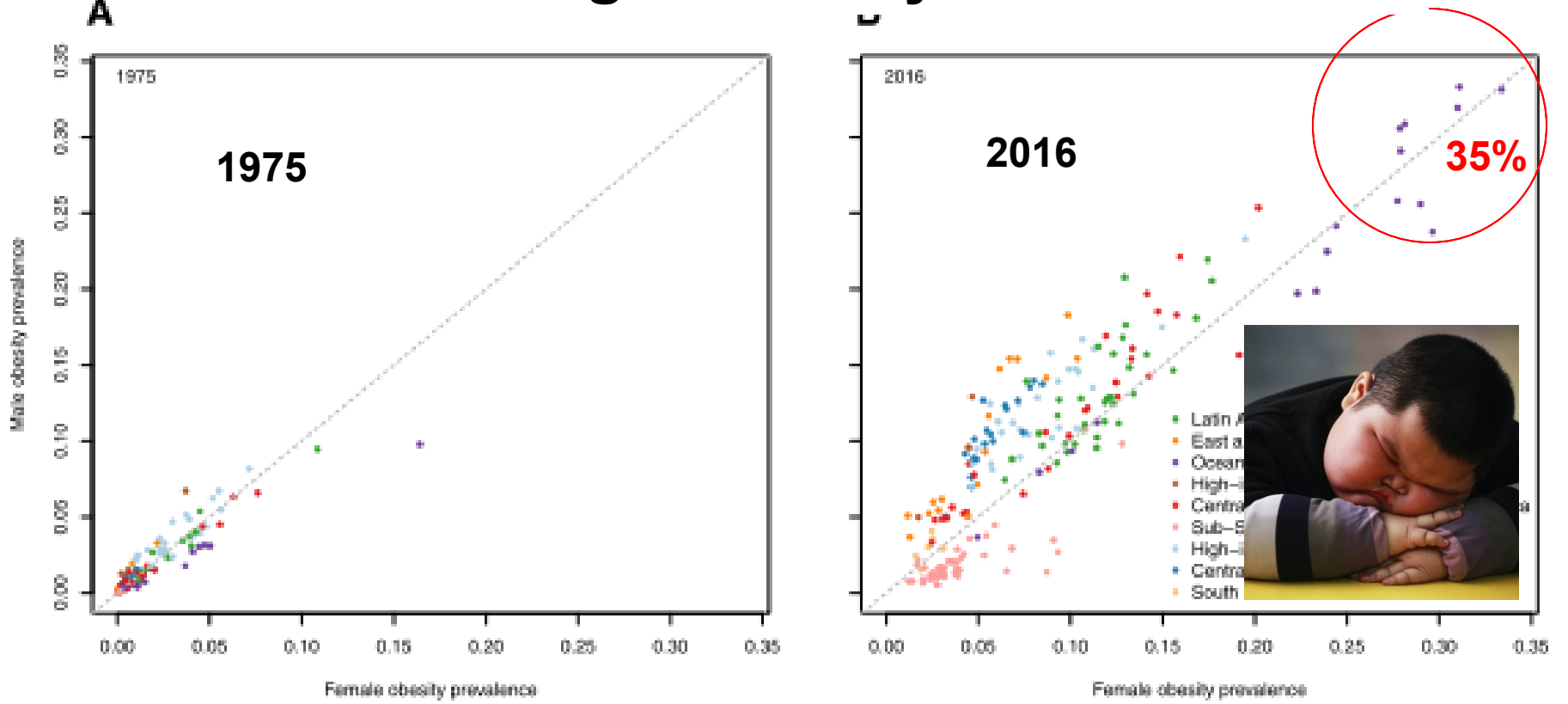
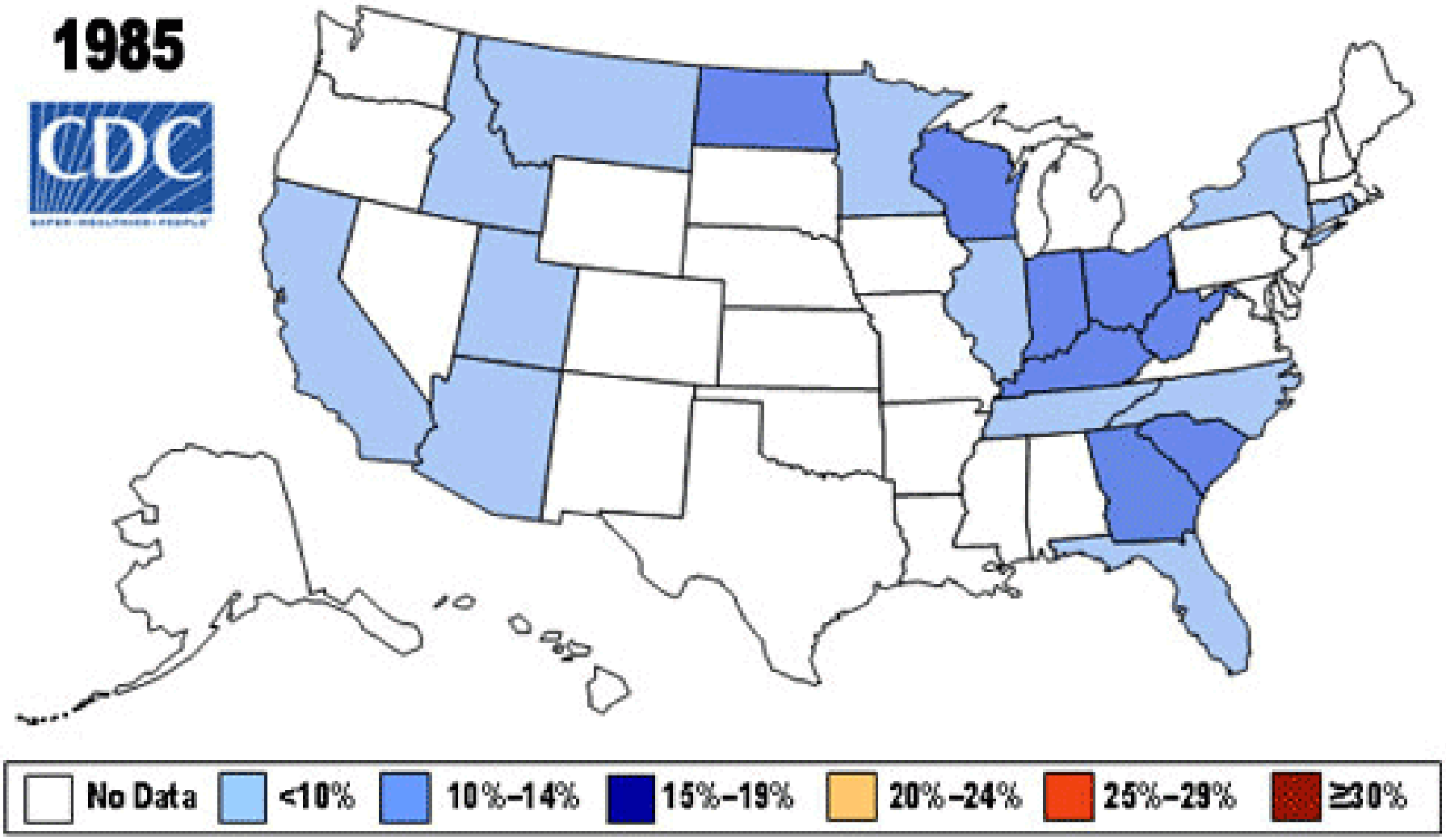


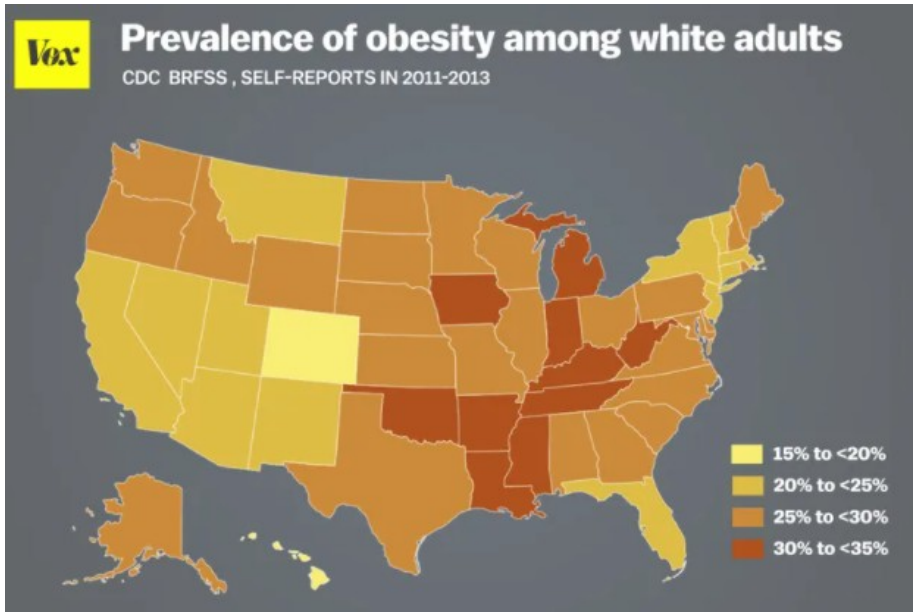
Fig. 10 Comparison of obesity prevalence in girls and boys aged 5–19 years in 1975 and 2016. Estimates of obesity in (**a**) 1975 and (**b**) 2016 were published by the Non-Communicable Diseases Risk Factor Collaboration (NCD-RisC) using the World Health Organization growth reference [47] (see Table 1)

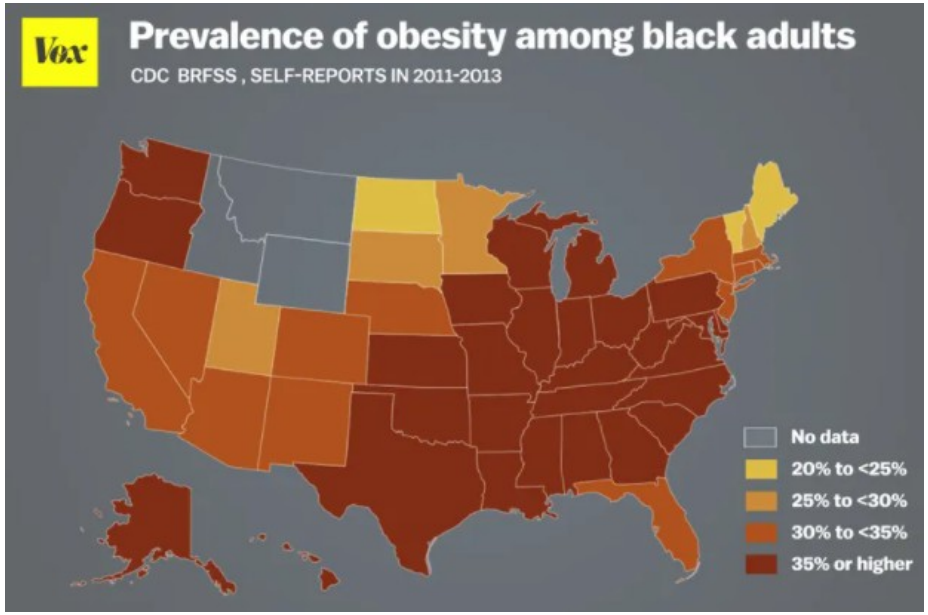
Di Cesare et al, BMC Medicine, 2109

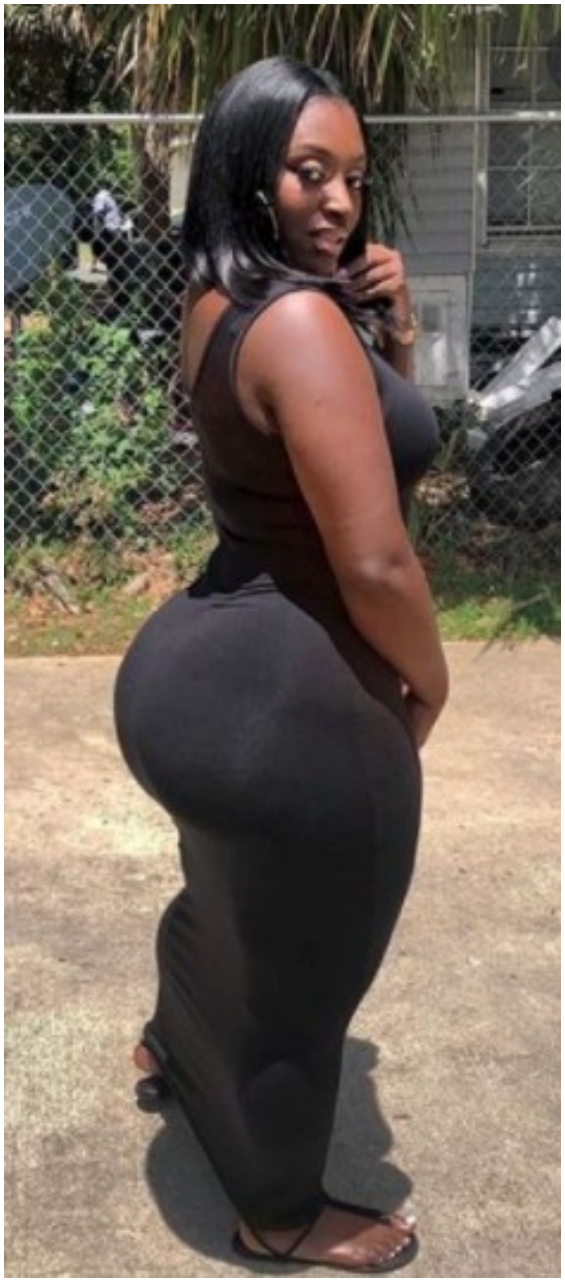
Obesity rates in the US



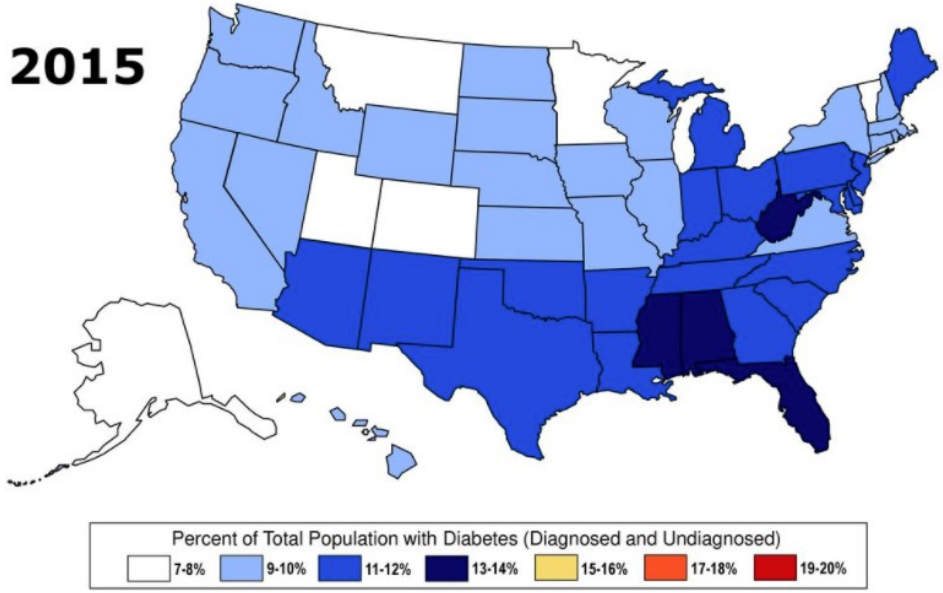
Culturalisme ≠ Racisme (Yuval Harari)

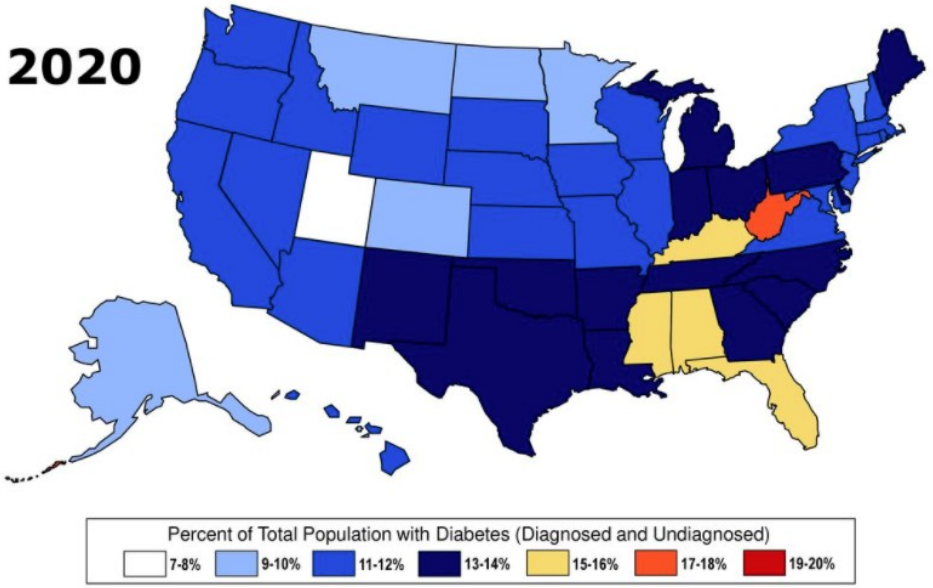


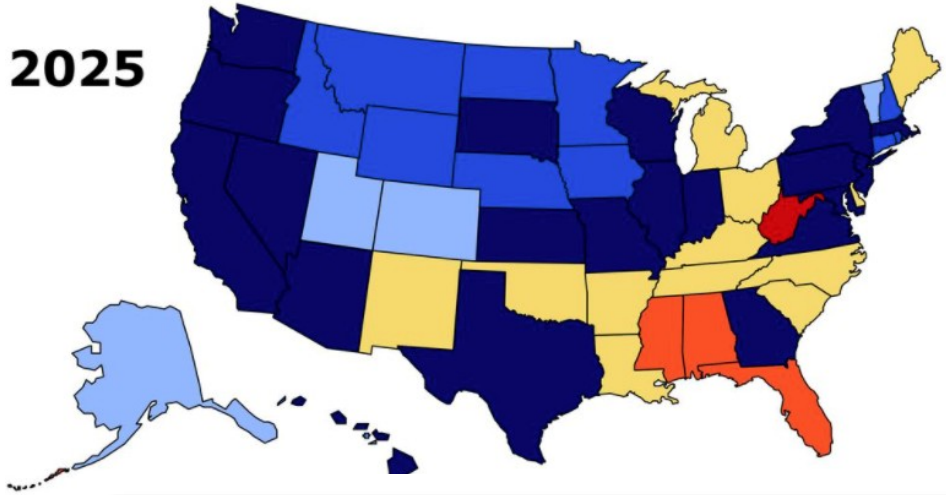


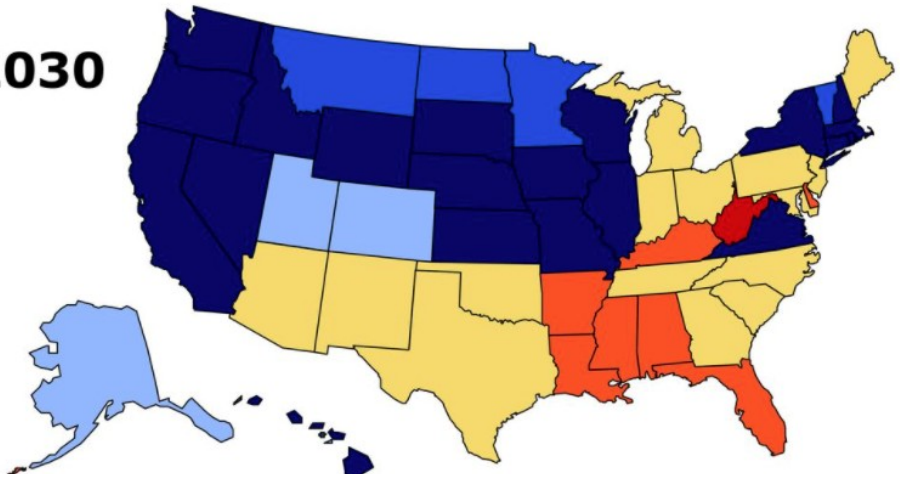


Obesity -> Diabetes: rates in the US





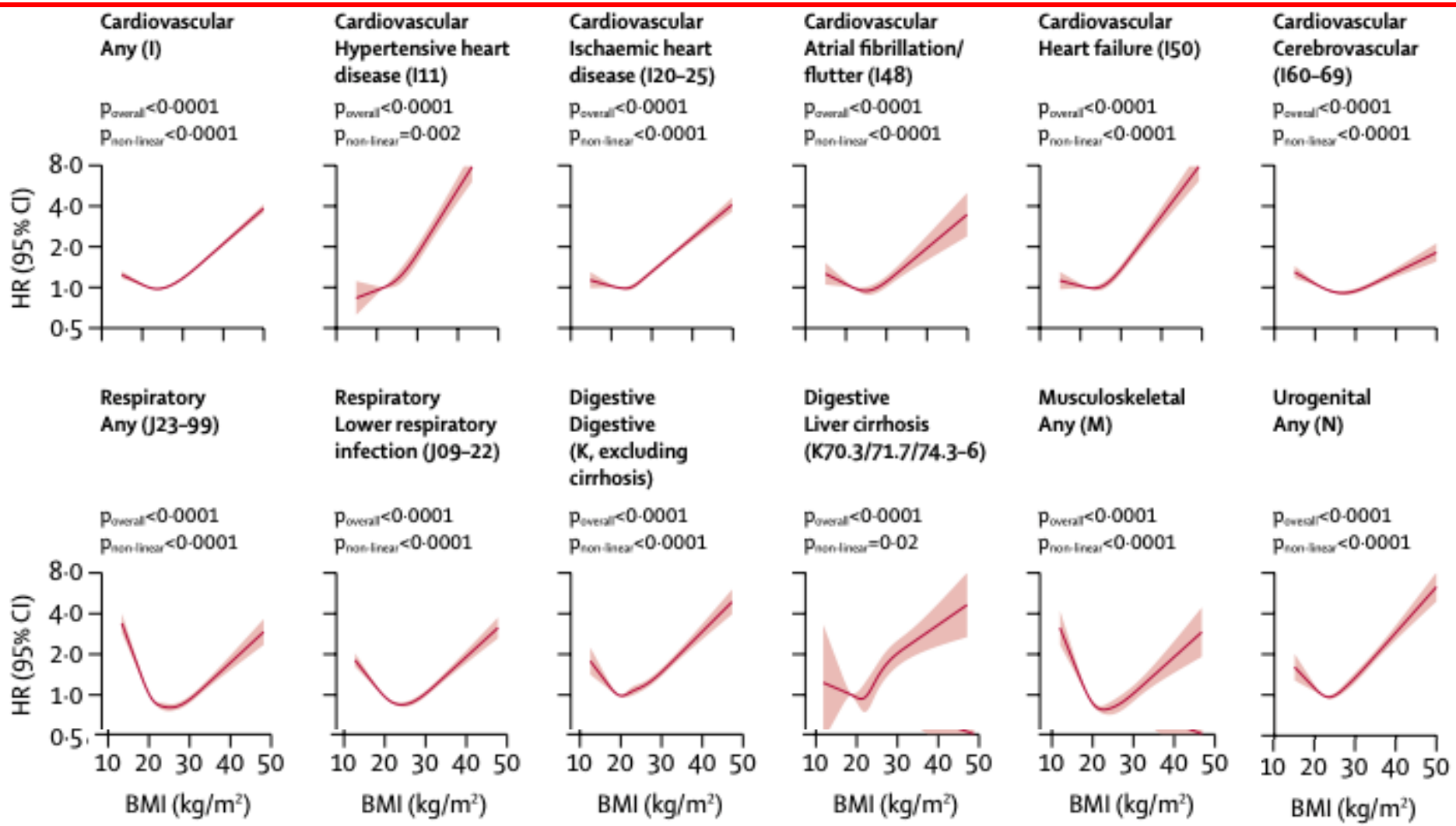




Percent of Total Population with Diabetes (Diagnosed and Undiagnosed)

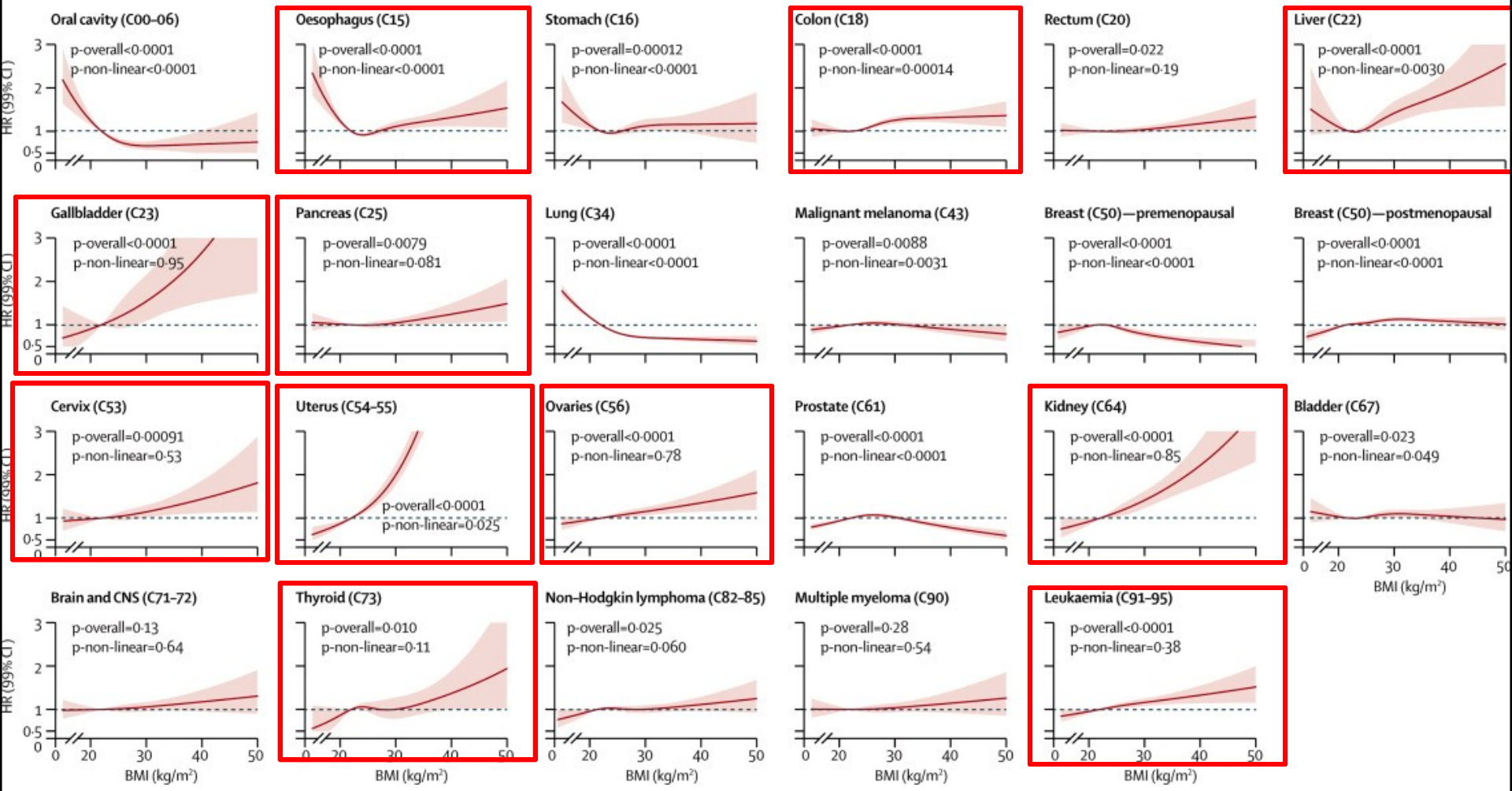
7-8% 9-10% 11-12% 13-14% 15-16% 17-18% 19-20%

Obesity and CVD / other



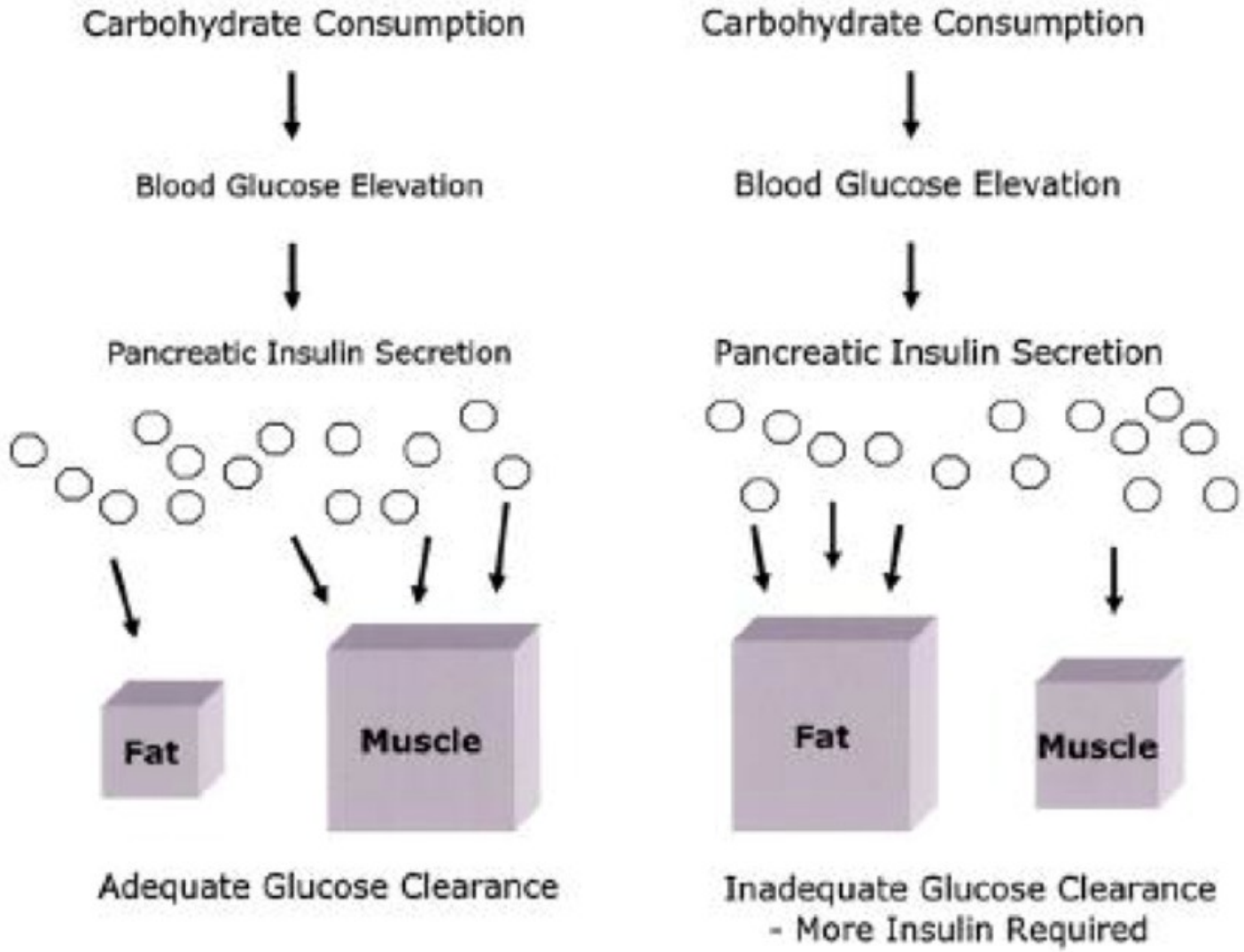
Bhaskaran et al, BMI and overall and cause specific mortality in 2.6 million UK adults, 2018

Obesity and Cancer



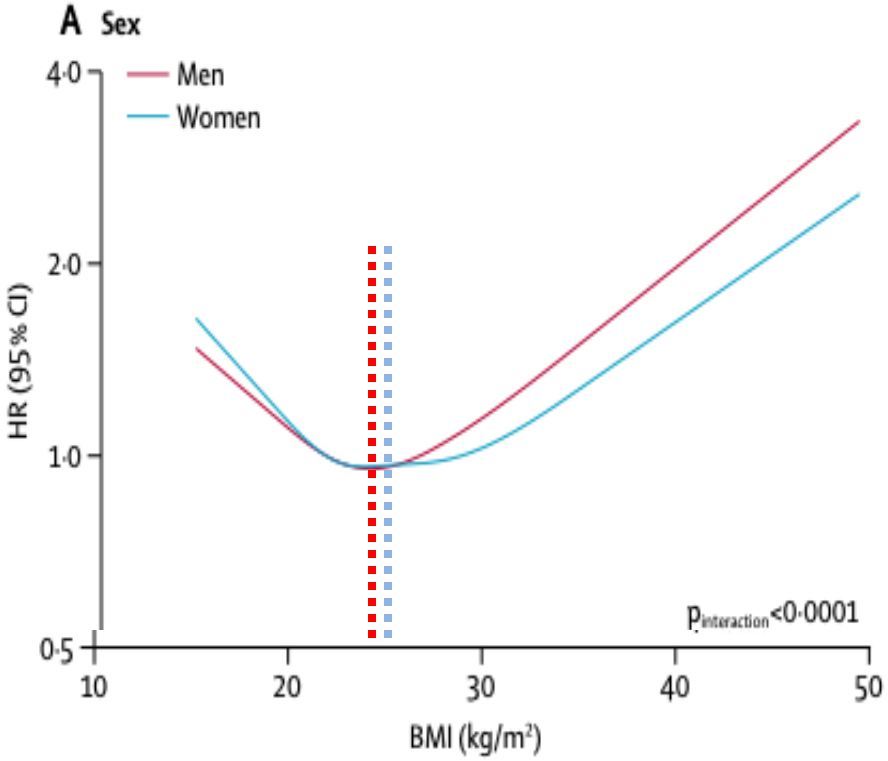
Bhaskaran et al. BMI and risk of 22 cancers: population based cohort of 5.24 million UK adults. 2014

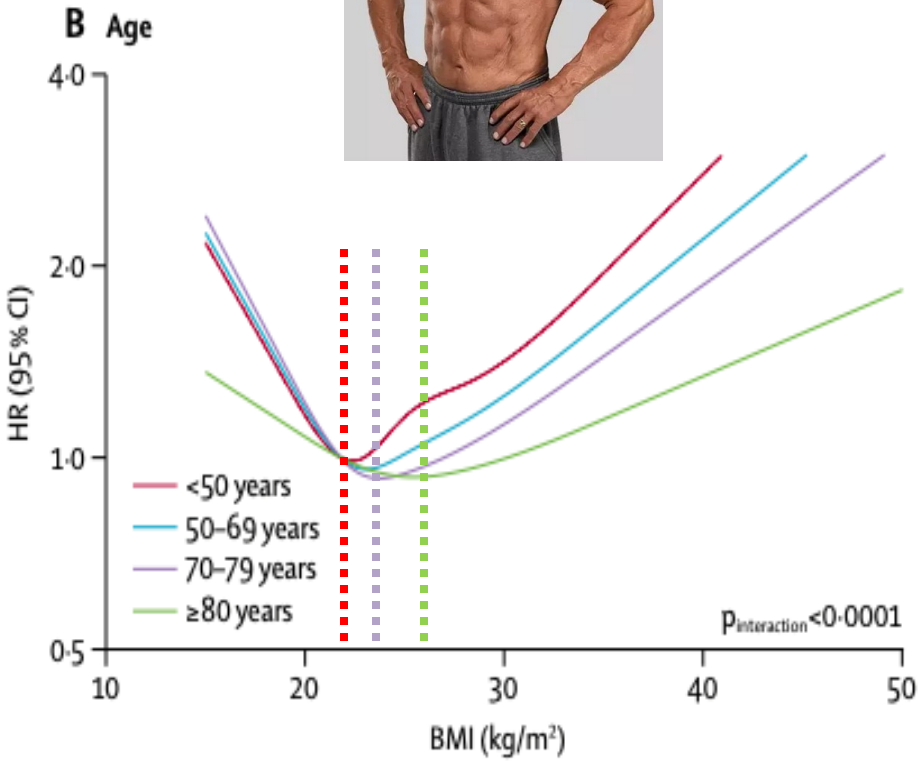
Sarcopenie & diabetes



Eaton, Cordain, Preventive Medicine, 2009

Obesity and all-cause mortality

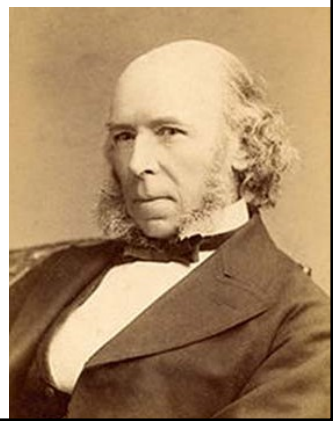




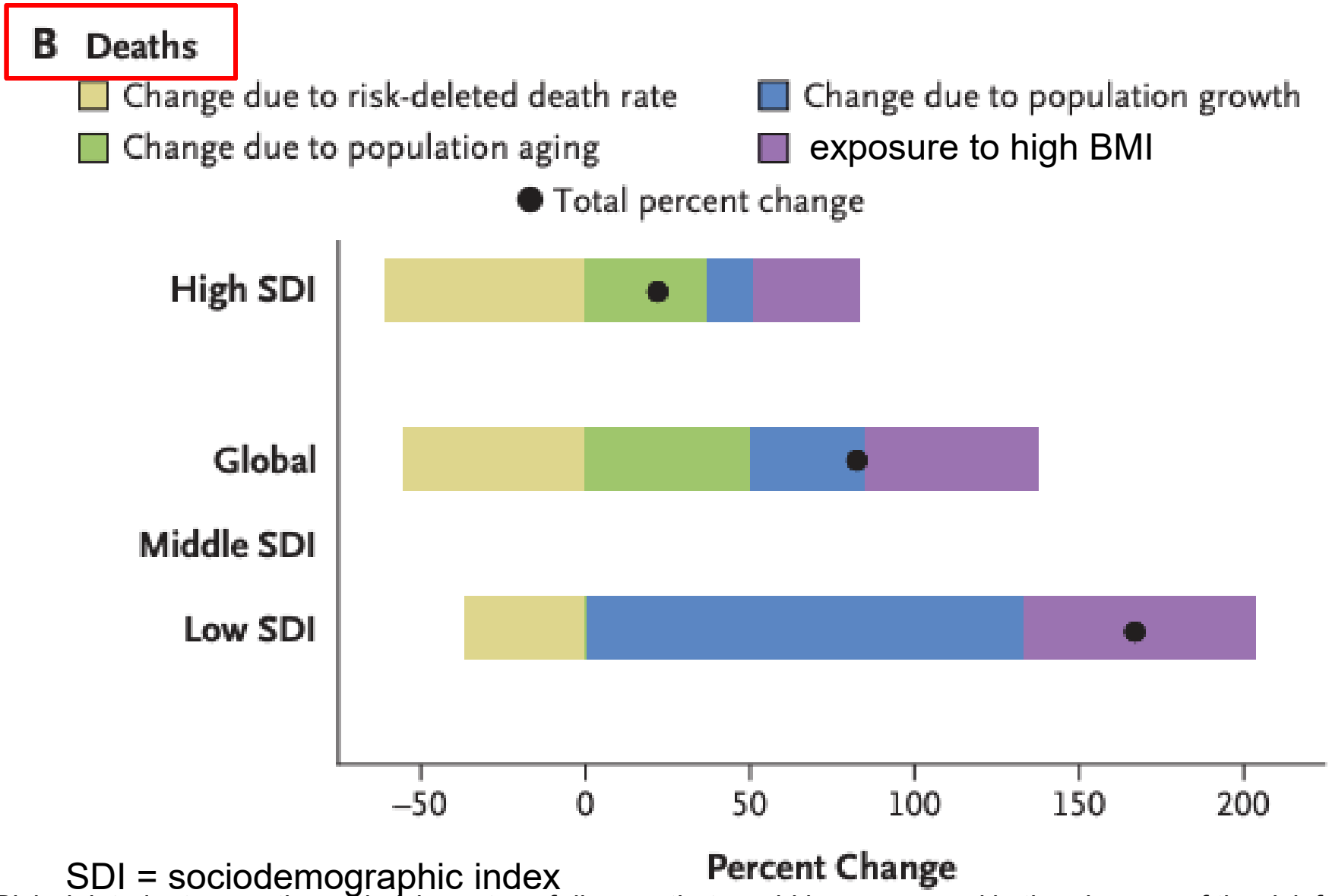
Bhaskaran et al, BMI and overall and cause specific mortality in 2.6 million UK adults, 2018

Take home message No. 3:

Obesitas is een wereldwijd probleem,
dat gerelateerd is aan vrijwel ALLE welvaartsziekten
en aan vroegtijdige sterfte



Health Effects of Overweight and Obesity in 195 Countries over 25 Years



SDI = sociodemographic index

(Risk-deleted rates are the underlying rates of disease that would have occurred in the absence of the risk factor.)

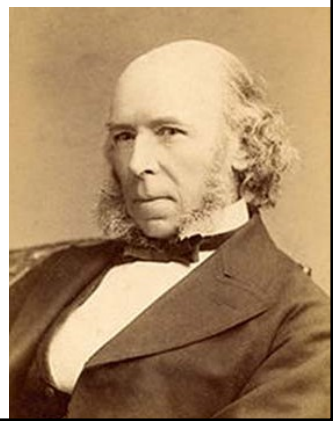
Take home message No. 4:

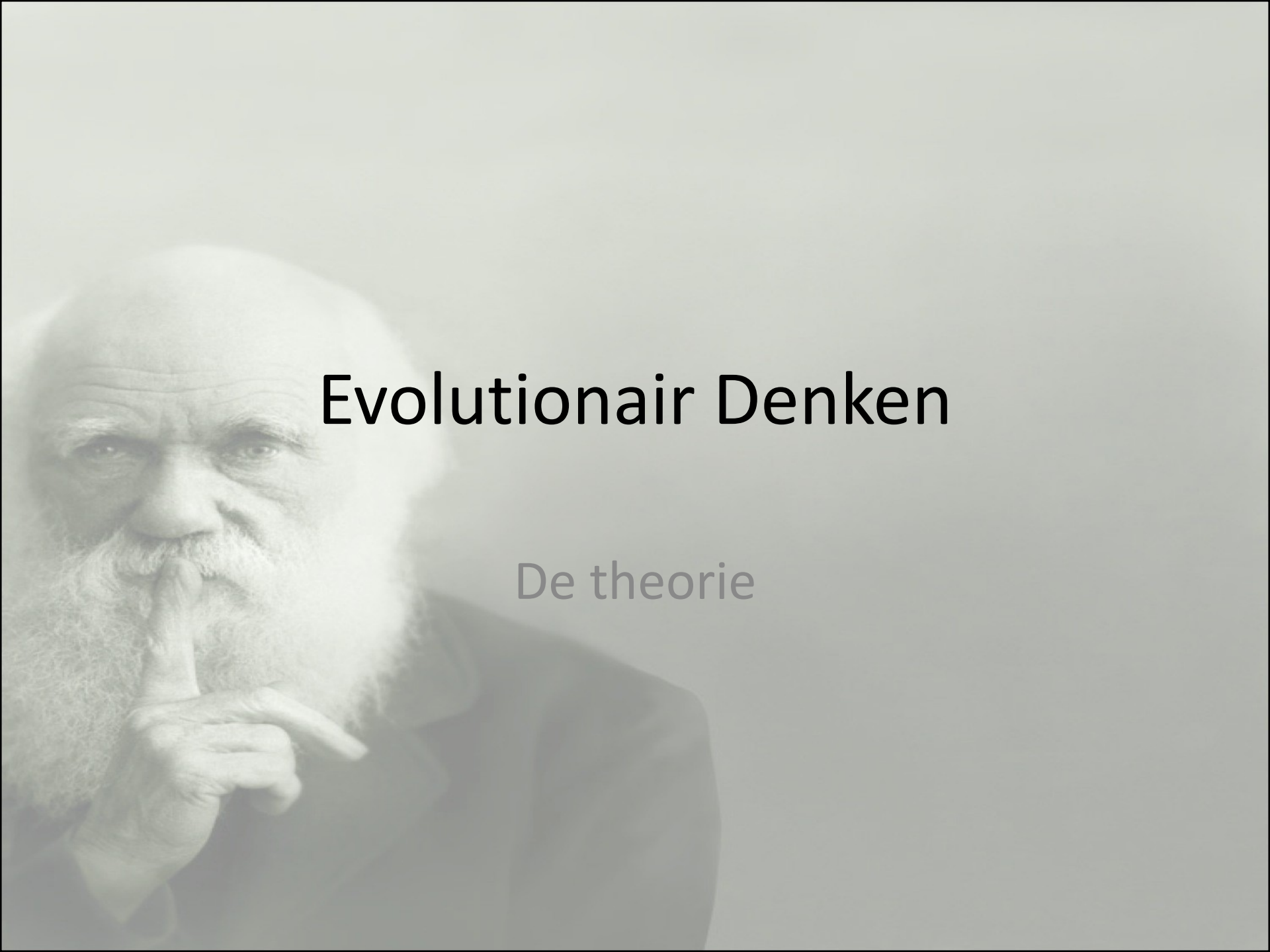
Oorzaken obesitas pandemie:

1. Globale toename welvaart / ongezonde leefomgeving

2. Mondiale vergrijzing (toename levensverwachting)

3. Krimpende hoog / (nog) groeiende laag-sociaal economische klasse





Evolutionair Denken

De theorie

Charles Darwin: Survival of the Fittest

THE ORIGIN OF SPECIES

BY MEANS OF NATURAL SELECTION,

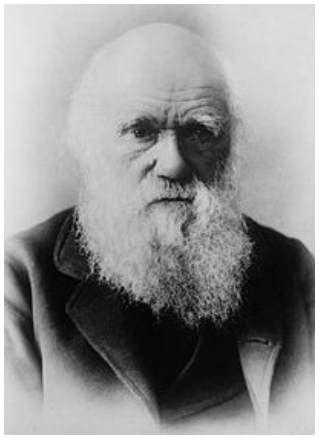
OR THE

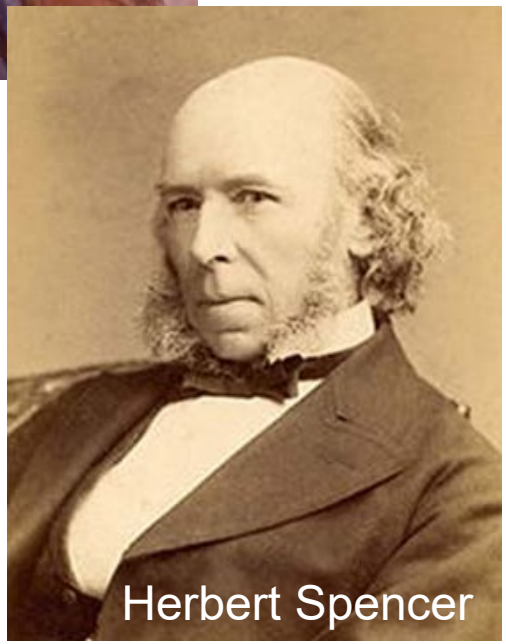
PRESERVATION OF FAVOURED RACES IN THE STRUGGLE FOR LIFE.

By CHARLES DARWIN, M.A.,

FELLOW OF THE ROYAL, GEOLOGICAL, LINNÆAN, ETC., SOCIETIES;

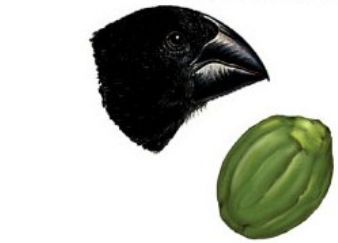
AUTHOR OF 'JOURNAL OF RESEARCHES DURING H. M. S. BEAGLE'S VOYAGE ROUND THE WORLD.'





Herbert Spencer

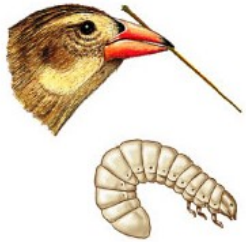
(Un)natural selection - veredeling



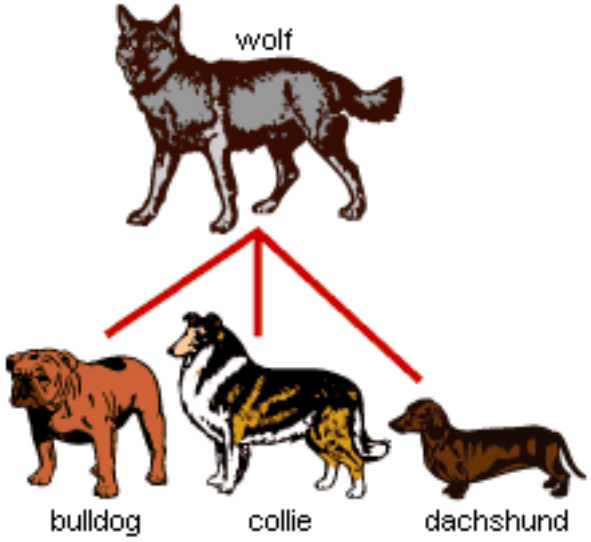
Large ground finch (seeds)

Cactus ground finch
(cactus fruits and flowers)

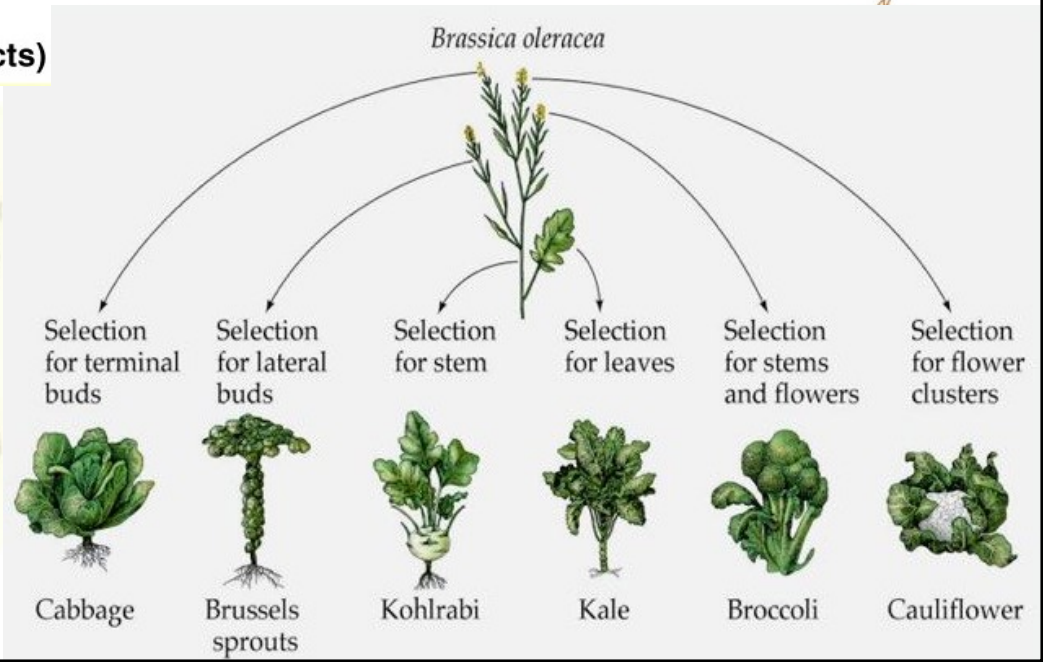
Vegetarian finch (buds)



Woodpecker finch (insects)



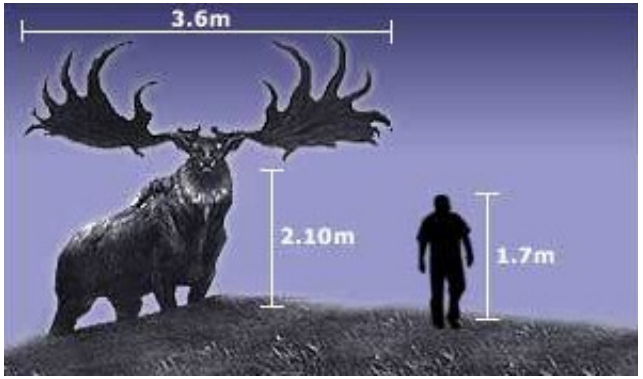
A selection of fancy pigeon breeds that Darwin studied

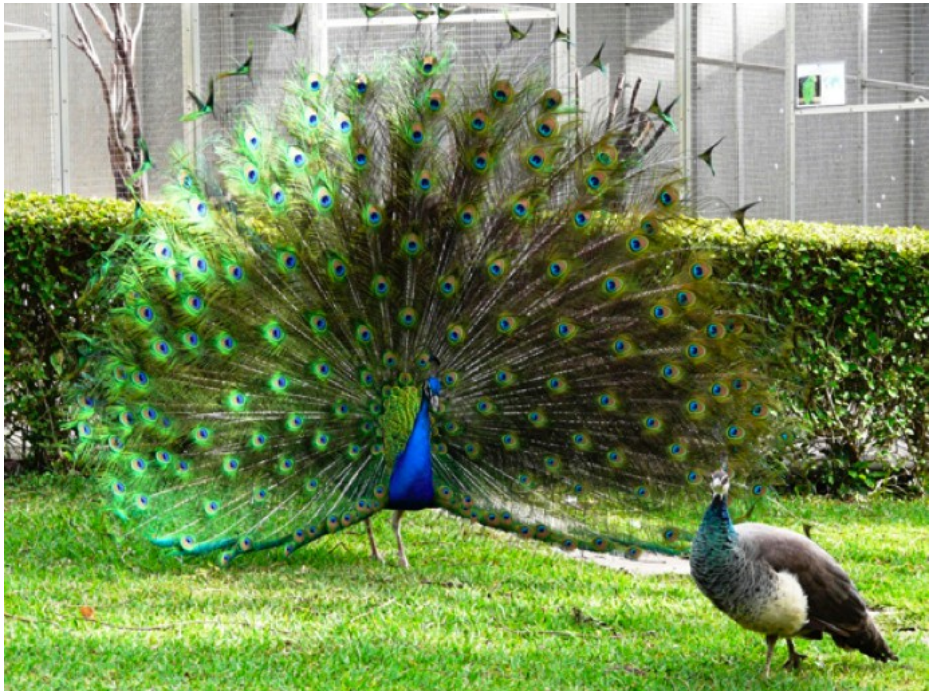


Sexual Selection

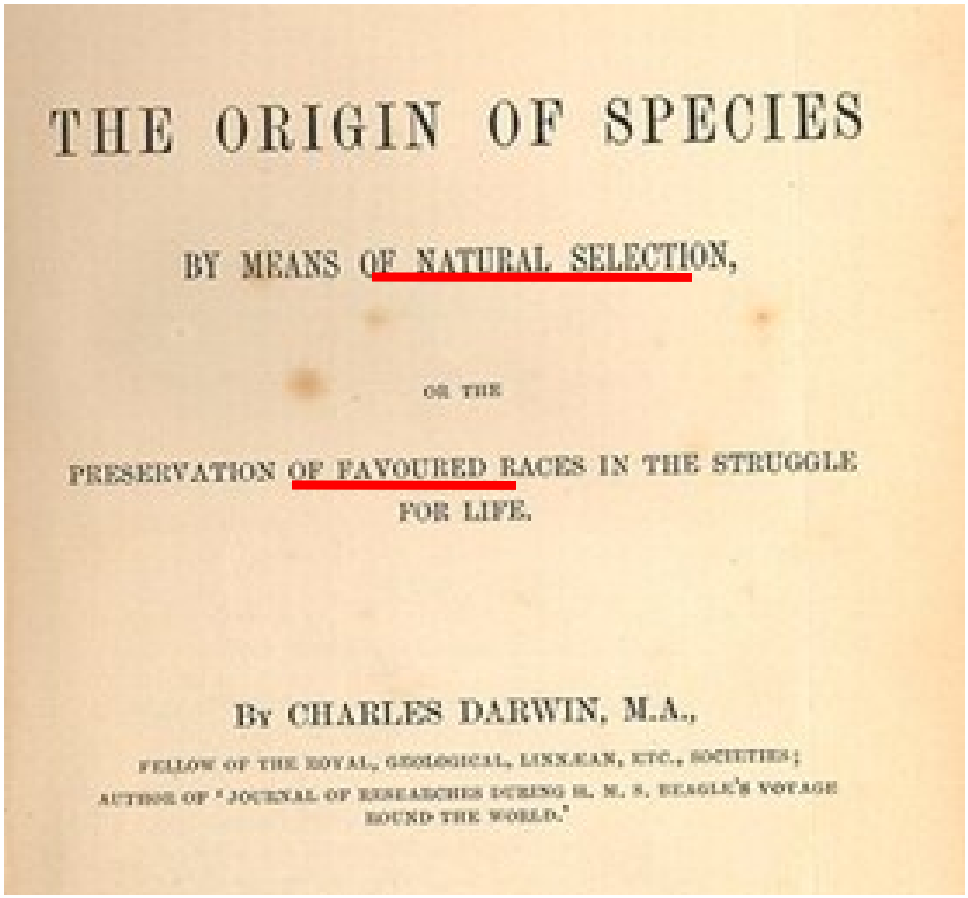
https://www.youtube.com/watch?v=YTR21os8gTA

https://www.youtube.com/watch?v=eI_quJRRGxk





Charles Darwin: Survival of the Fittest



THE ORIGIN OF SPECIES

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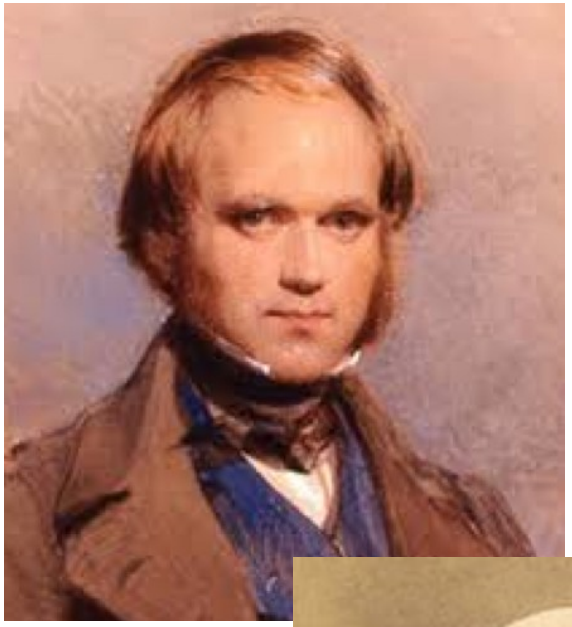
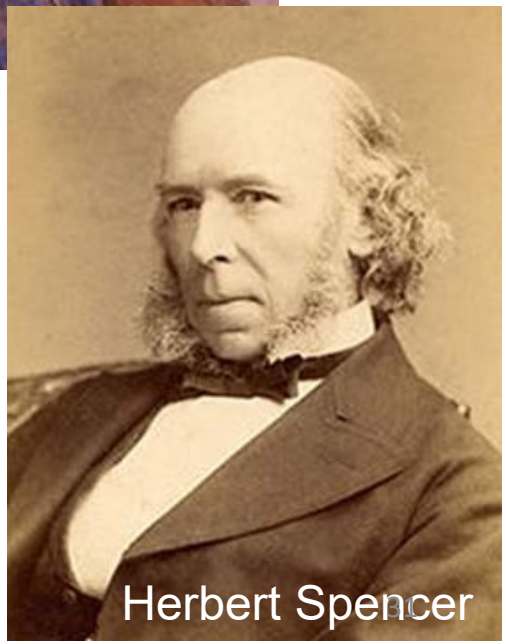




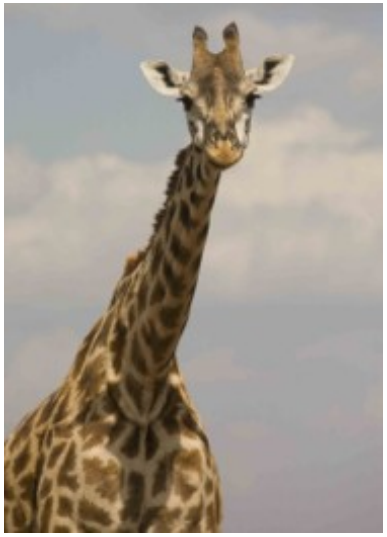
Herbert Spencer

Law 1. Conditions of existence

Law 2. Natural selection

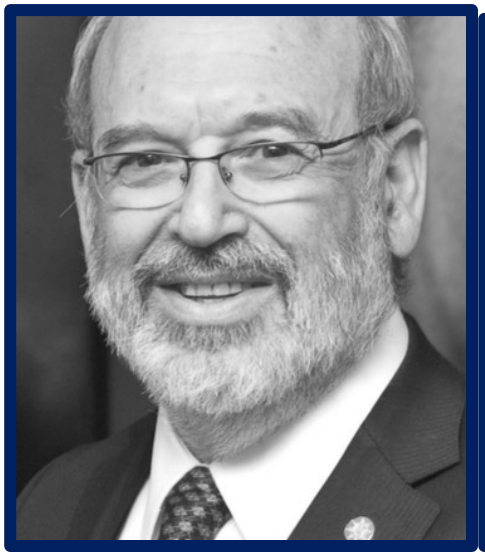
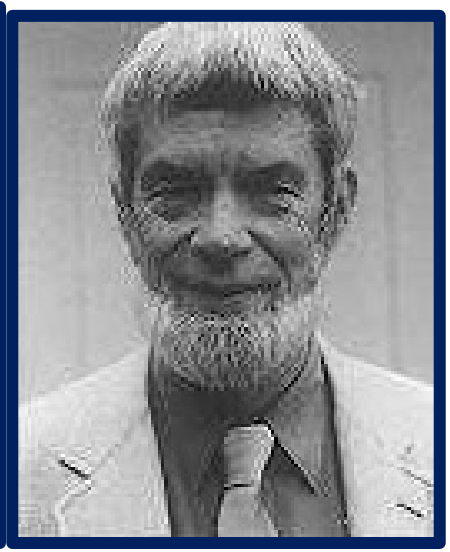
Theodosius Dobzhansky

- Nothing in biology makes sense except in the light of evolution



Evolutionary Medicine

- Nothing in human (patho) physiology makes sense except in the light of evolution

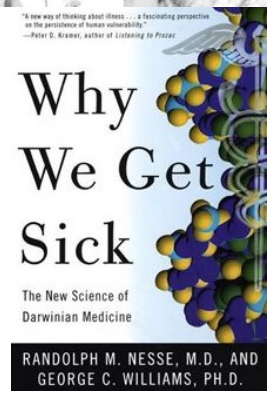



Waarom we ziek worden?

- Proximale versus Evolutionaire verklaringen voor ziekte
  - » Why we get sick, Nesse & Williams, 1994

- Proximale oorzaak = hoe
  - Oorzaak op moleculair niveau
  - Behandelen = pappen en nat houden

- Evolutionaire of ultieme oorzaak = waarom
  - Oorzaak op evolutionair niveau
  - Wegnemen oorzaak – wegnemen ziekte

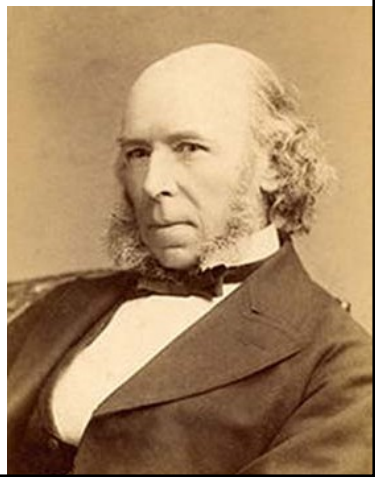


Take home message No. 5:

Gezondheidszorg 1.0

=

symptoombehandeling



VOLUME 66, NO. 1 MARCH 1991

THE QUARTERLY REVIEW *of* BIOLOGY

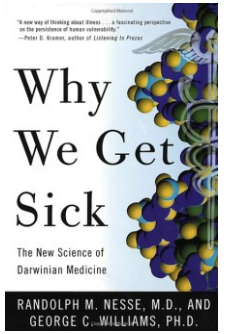
THE DAWN OF DARWINIAN MEDICINE

GEORGE C. WILLIAMS RANDOLPH M. NESSE

Randolph M. Nesse

George C. William
1926-2010

- Defense-mechanism
- Trade-offs/Conflicts
- Constraints
- Mismatches
- Genetics



Kuipers, Luxwolda, Muskiet. Medisch Contact 2010

Voorbeeld 1: Koorts

Proximaal: Hoe *genees* ik koorts met *medicijnen*?

Oorzaak?

↓

Gevolg

↓

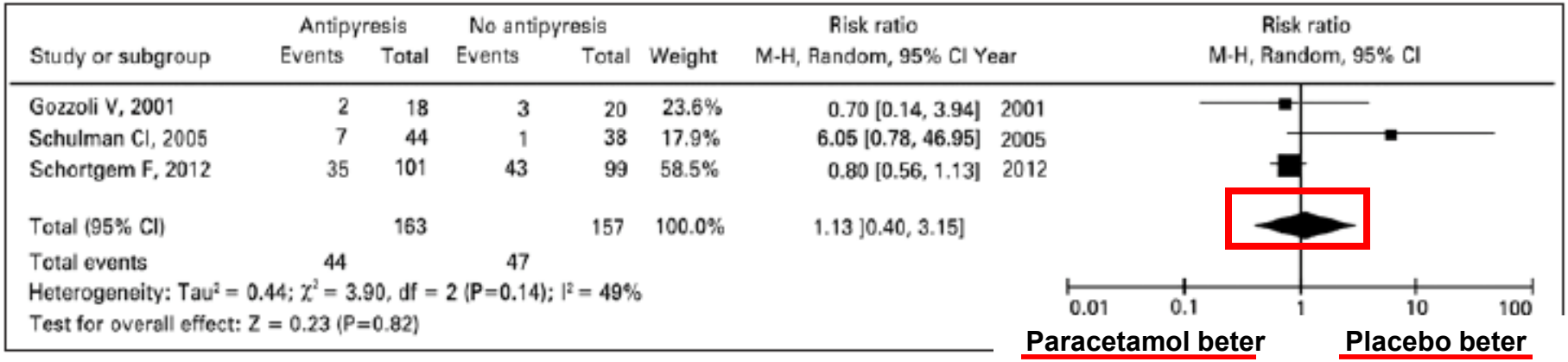
Oplossing

Evidence Based Medicine?

Should we treat fever in critically ill patients? A summary of the current evidence from three randomized controlled trials

Ary Serpa Neto[1], Victor Galvão Moura Pereira[1], Giancarlo Colombo[2], Farah Christina de la Cruz Scarin[2], Camila Menezes Souza Pessoa[2], Leonardo Lima Rocha[2]

einstein. 2014;12(4):518-23



Study or subgroup	Antipyresis Events	Total	No antipyresis Events	Total	Weight	Risk ratio M-H, Random, 95% CI Year
Gozzoli V, 2001	2	18	3	20	23.6%	0.70 [0.14, 3.94] 2001
Schulman CI, 2005	7	44	1	38	17.9%	6.05 [0.78, 46.95] 2005
Schortgem F, 2012	35	101	43	99	58.5%	0.80 [0.56, 1.13] 2012
Total (95% CI)		163		157	100.0%	1.13]0.40, 3.15]
Total events	44		47			

Heterogeneity: Tau² = 0.44; χ^2 = 3.90, df = 2 (P=0.14); I^2 = 49%

Test for overall effect: Z = 0.23 (P=0.82)

95% IC: 95% of confidence interval.

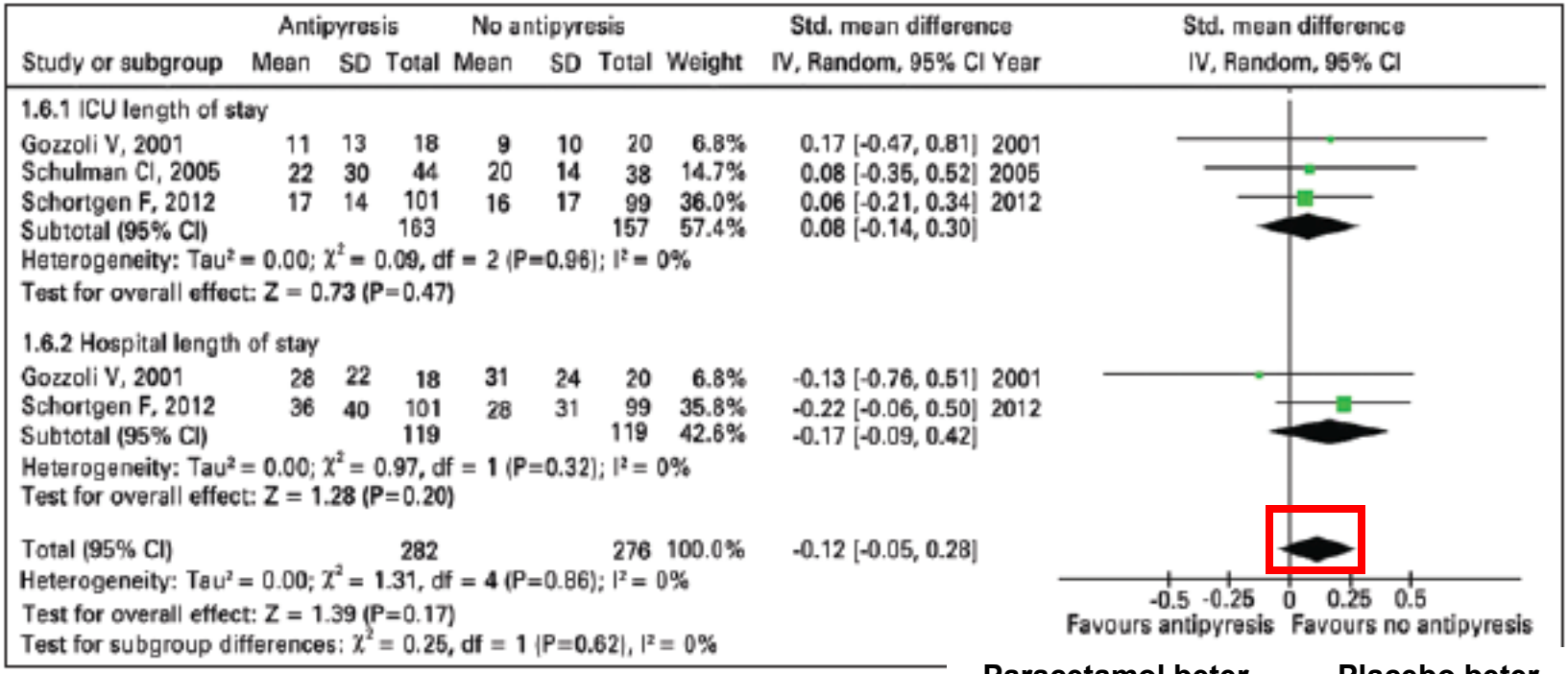
Figure 2. Meta-analysis of overall survival for antipyresis or no antipyresis in critically ill patients

Paracetamol geven aan IC patienten met koorts:
géén verschil in mortaliteit

Should we treat fever in critically ill patients? A summary of the current evidence from three randomized controlled trials

Ary Serpa Neto[1], Victor Galvão Moura Pereira[1], Giancarlo Colombo[2], Farah Christina de la Cruz Scarin[2], Camila Menezes Souza Pessoa[2], Leonardo Lima Rocha[2]

einstein. 2014;12(4):518-23



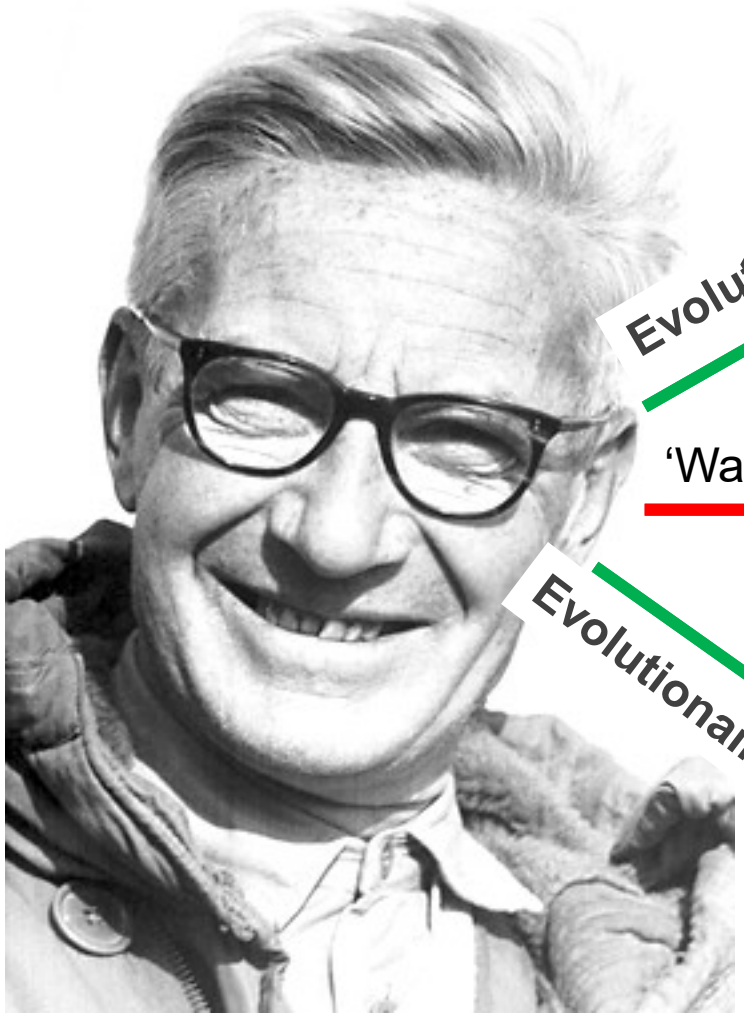
Study or subgroup	Antipyresis Mean	SD	Total	No antipyresis Mean	SD	Total	Weight	Std. mean difference IV, Random, 95% CI	Year
1.6.1 ICU length of stay									
Gozzoli V, 2001	11	13	18	9	10	20	6.8%	0.17 [-0.47, 0.81]	2001
Schulman CI, 2005	22	30	44	20	14	38	14.7%	0.08 [-0.35, 0.52]	2005
Schortgen F, 2012	17	14	101	16	17	99	36.0%	0.06 [-0.21, 0.34]	2012
Subtotal (95% CI)			163			157	57.4%	0.08 [-0.14, 0.30]	
Heterogeneity: $Tau^2 = 0.00$; $\chi^2 = 0.09$, df = 2 (P=0.96); $I^2 = 0\%$									
Test for overall effect: Z = 0.73 (P=0.47)									
1.6.2 Hospital length of stay									
Gozzoli V, 2001	28	22	18	31	24	20	6.8%	-0.13 [-0.76, 0.51]	2001
Schortgen F, 2012	36	40	101	28	31	99	35.8%	-0.22 [-0.06, 0.50]	2012
Subtotal (95% CI)			119			119	42.6%	-0.17 [-0.09, 0.42]	
Heterogeneity: $Tau^2 = 0.00$; $\chi^2 = 0.97$, df = 1 (P=0.32); $I^2 = 0\%$									
Test for overall effect: Z = 1.28 (P=0.20)									
Total (95% CI)			282			276	100.0%	-0.12 [-0.05, 0.28]	
Heterogeneity: $Tau^2 = 0.00$; $\chi^2 = 1.31$, df = 4 (P=0.86); $I^2 = 0\%$									
Test for overall effect: Z = 1.39 (P=0.17)									
Test for subgroup differences: $\chi^2 = 0.25$, df = 1 (P=0.62), $I^2 = 0\%$									

95% IC: 95% of confidence interval; SD: standard deviation; ICU: intensive care unit.

Figure 3. Meta-analysis of intensive care unit and hospital length of stay for antipyresis or no antipyresis in critically ill patients

Paracetamol geven aan IC patienten met koorts:
Geeft, if anything, een LANGERE opnameduur

Voorbeeld 1: Koorts



Evolutionaire benadering

Oorzaak

‘Waarom’ gebeurt het ?

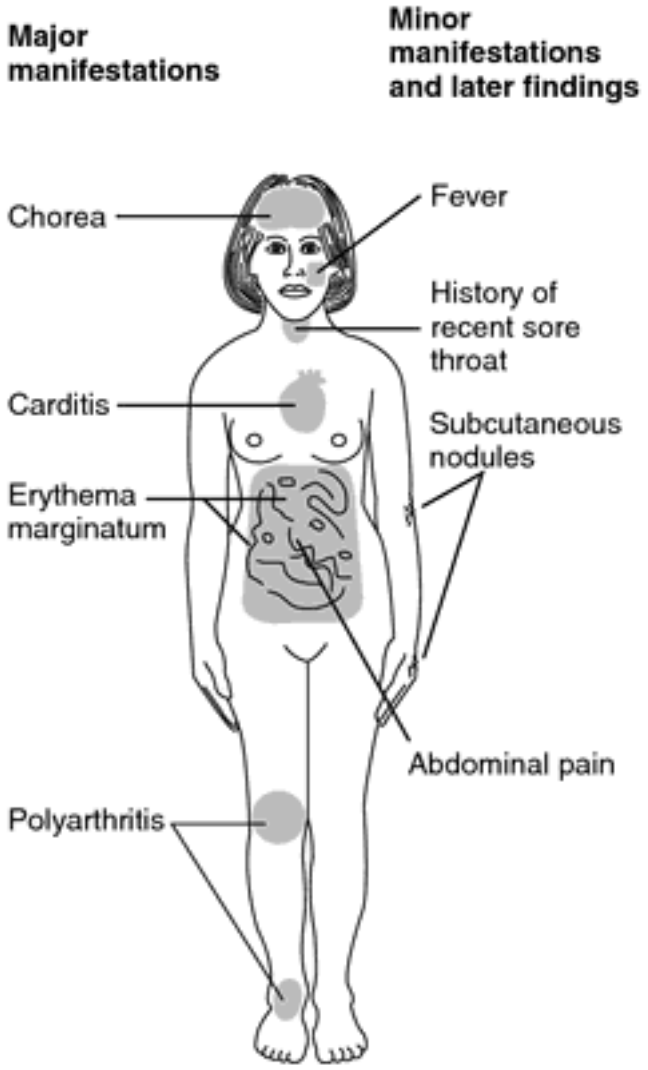
Gevolg

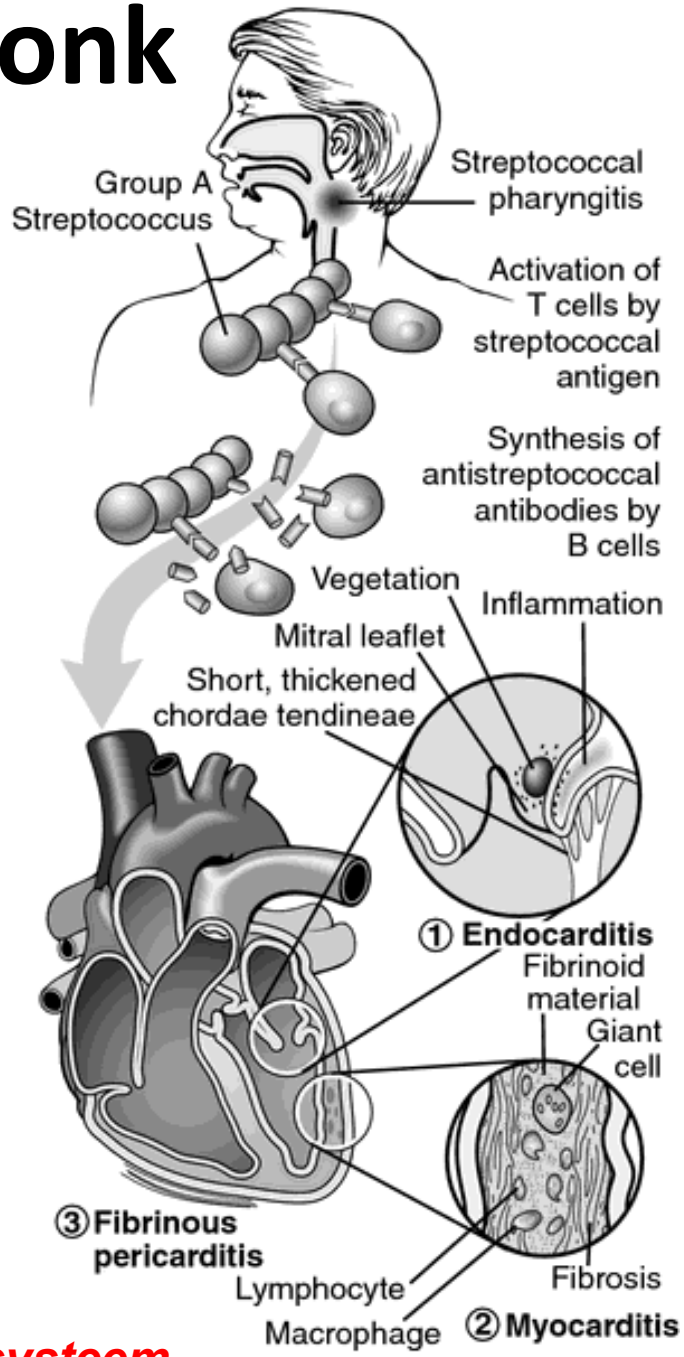
Evolutionaire benadering

Oplossing
= koorts!

Voorbeeld 2. Roodvonk

Bèta-hemolytische streptokok





Collateral damage van het ijverige immuunsysteem

Voorbeeld 3: IJzergebreksanemie

- Afrikaanse kinderen krijgen een onderzoek naar hun gezondheid
- Ze blijken voor een groot deel slecht gevoed
- Veelal is er ijzergebreksanemie
- De tropenarts schrijft ijzersupplementen voor
- Wel of geen goed idee?

Proximate vs Evolutionary

Iron Supplementation in HIV-Infected Malawian Children With Anemia: A Double-Blind, Randomized, Controlled Trial

Michael O. Esan,[1,3] Michael Boele van Hensbroek,[1] Ernest Nkhoma,[3] Crispin Musicha,[3] Sarah A. White,[3] Feiko O. ter Kuile,[2,4] and Kamiia S. Phiri[3,4]

Table 3. Morbidity Outcomes, by Study Arm and Period

Outcome	Iron		Placebo		Unadjusted IRR (95% CI)	*P*	Adjusted IRR[b] (95% CI)	*P*
	Events, No. (%)	Incidence[a]	Events, No. (%)	Incidence[a]				
All-cause outpatient sick visits								
All events over 6 mo follow-up	133 (58)	350.0	135 (67)	383.0	0.95 (.68–1.33)	.76	0.98 (.67–1.43)	.91
Intervention period (0–3 mo)	63 (27)	275.4	47 (26)	206.6	1.35 (.83–2.19)	.22	1.48 (.81–2.68)	.20
Postintervention period (>3–6 mo)	70 (31)	323.7	88 (41)	460.1	0.79 (.50–1.26)	.32	0.83 (.51–1.35)	.45
All-cause hospital admissions								
All events over 6 mo follow-up	14 (14)	28.6	20 (19)	42.3	0.61 (.31–1.20)	.15	0.62 (.27–1.42)	.26
Intervention period (0–3 mo)	8 (8)	31.6	6 (6)	23.8	1.43 (.54–3.78)	.47	1.56 (.48–5.09)	.46
Postintervention period (>3–6 mo)	6 (6)	24.2	14 (13)	61.9	0.40 (.16–1.00)	.05	0.35 (.11–1.14)	.08
Malaria								
All events over 6 mo follow-up	52 (37)	120.2	33 (24)	71.7	1.73 (1.04–2.85)	.03	1.81 (1.04–3.16)	.04
Intervention period (0–3 mo)	20 (15)	78.1	9 (8)	36.0	2.39 (1.08–5.28)	.03	2.68 (1.08–6.63)	.03
Postintervention period (>3–6 mo)	32 (22)	140.7	24 (16)	107.9	1.25 (.68–2.31)	.47	1.44 (.73–2.84)	.29
Respiratory infections								
All events over 6 mo follow-up	21 (17)	43.5	36 (26)	79.1	0.59 (.32–1.09)	.09	0.59 (.29–1.22)	.16
Intervention period (0–3 mo)	14 (12)	56.6	13 (11)	52.8	1.16 (.55–2.44)	.70	1.42 (.56–3.63)	.46

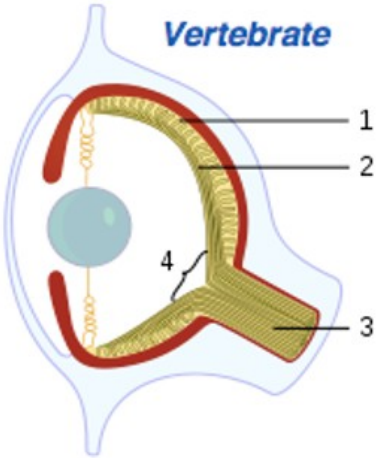
Het middel is erger dan de kwaal…

Voorbeelden

Evolutionair denken

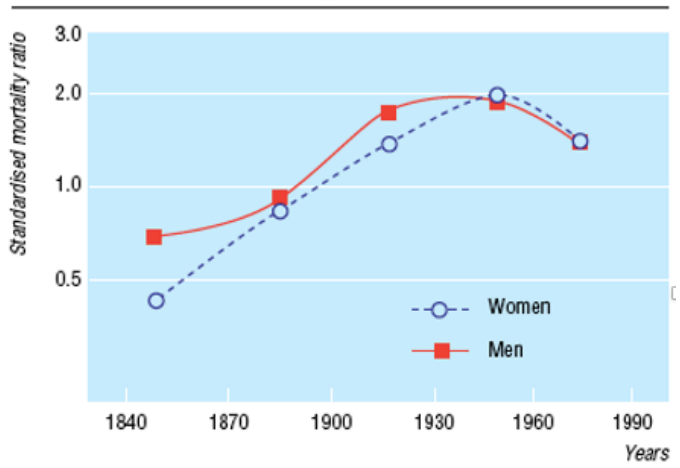
Het dierenrijk

- De grijze haren van de silverback gorilla
- Het oog van de octopus



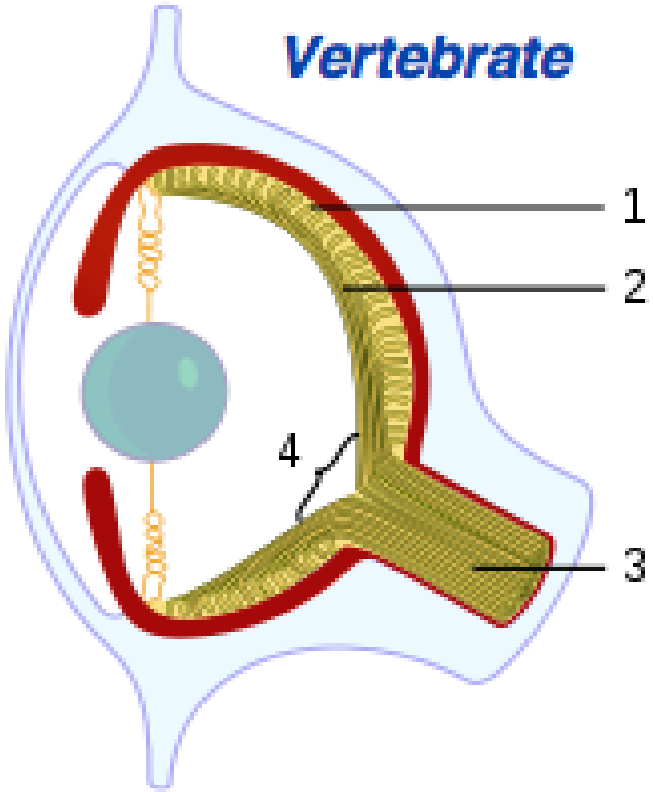
De mens

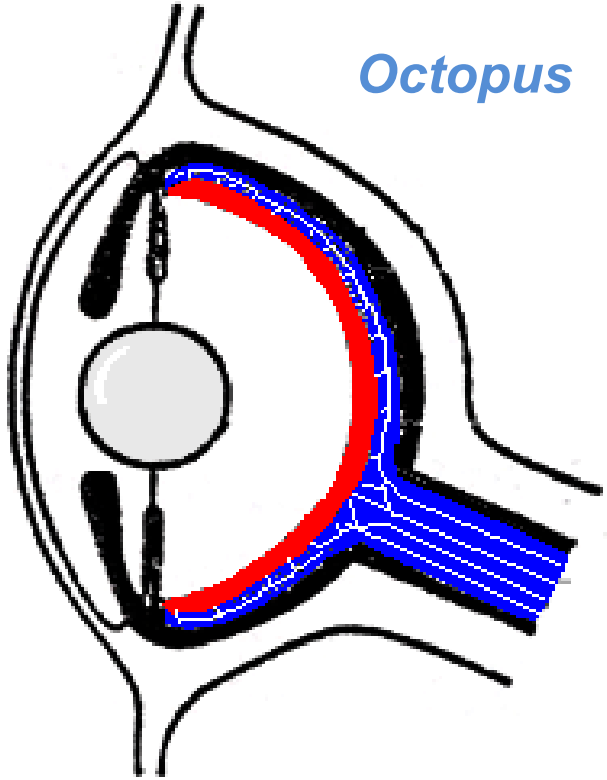
- Bipedalisme
- Menopauze
- Bilirubine
- FH



Evolution has no way back

https://www.youtube.com/watch?v=cO1a1Ek-HD0





1. Retina
3. Nervus opticus

2. Zenuwuiteinden
4. Blinde vlek

Bipedalism & Body hair

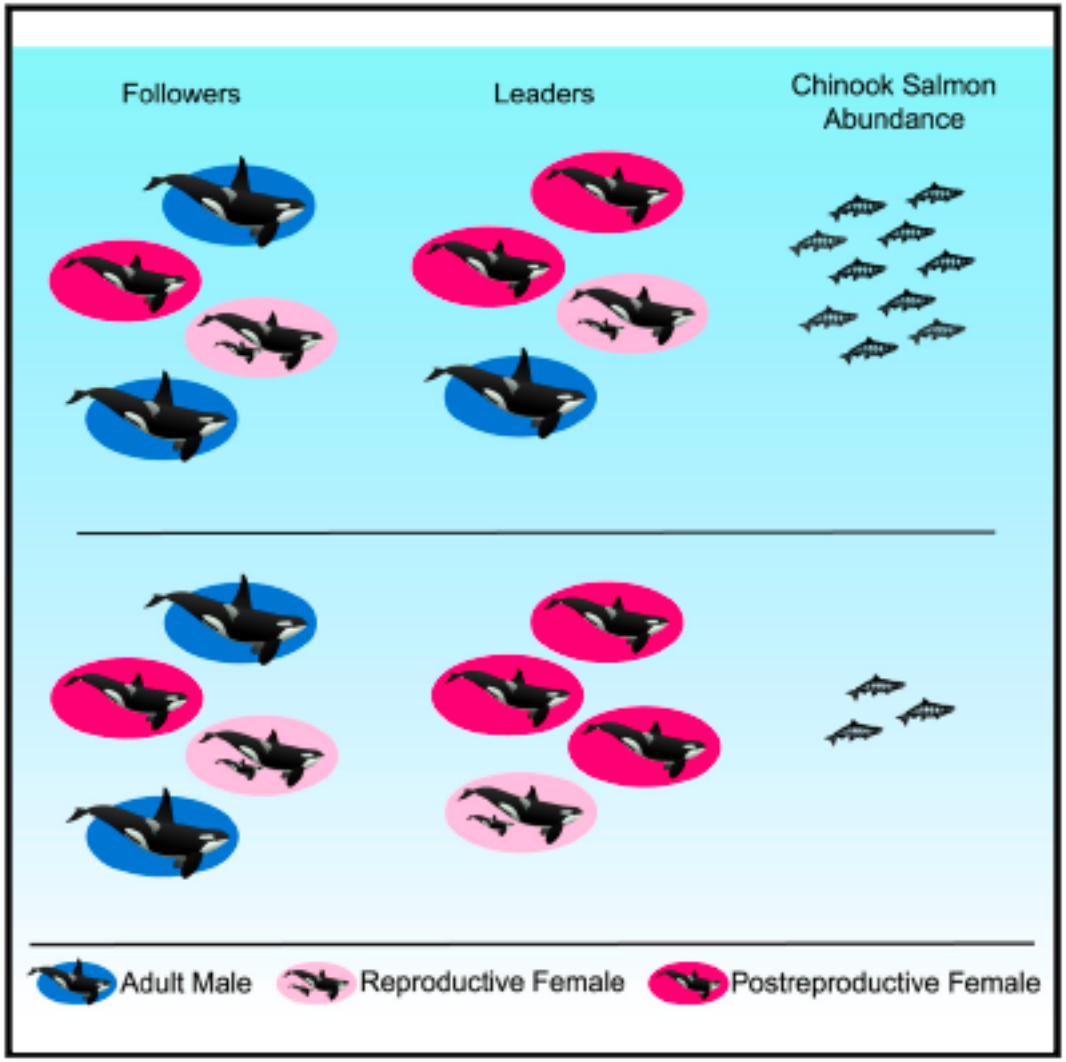
Chimpanzee

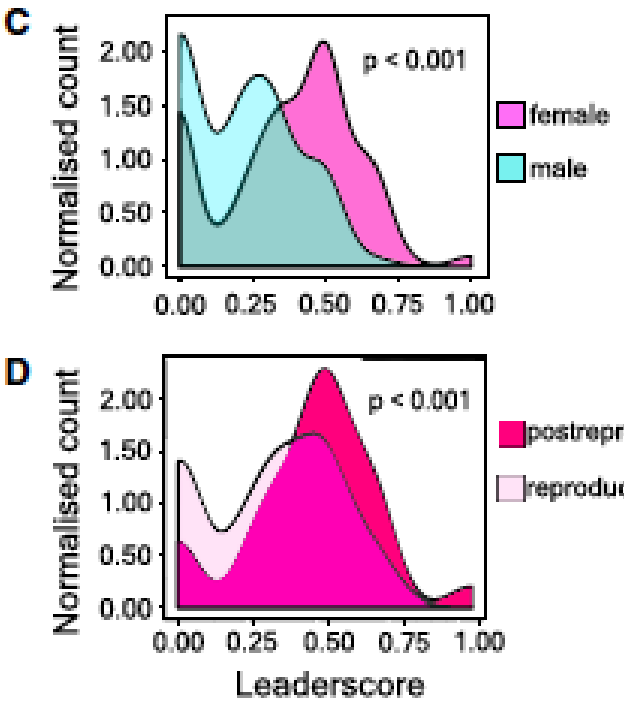
- Skull attaches posteriorly
- Spine slightly curved
- Arms longer than legs and also used for walking
- Long, narrow pelvis
- Femur angled out

Australopithecine

- Skull attaches inferiorly
- Spine S-shaped
- Arms shorter than legs and not used for walking
- Bowl-shaped pelvis
- Femur angled in

Kin selection

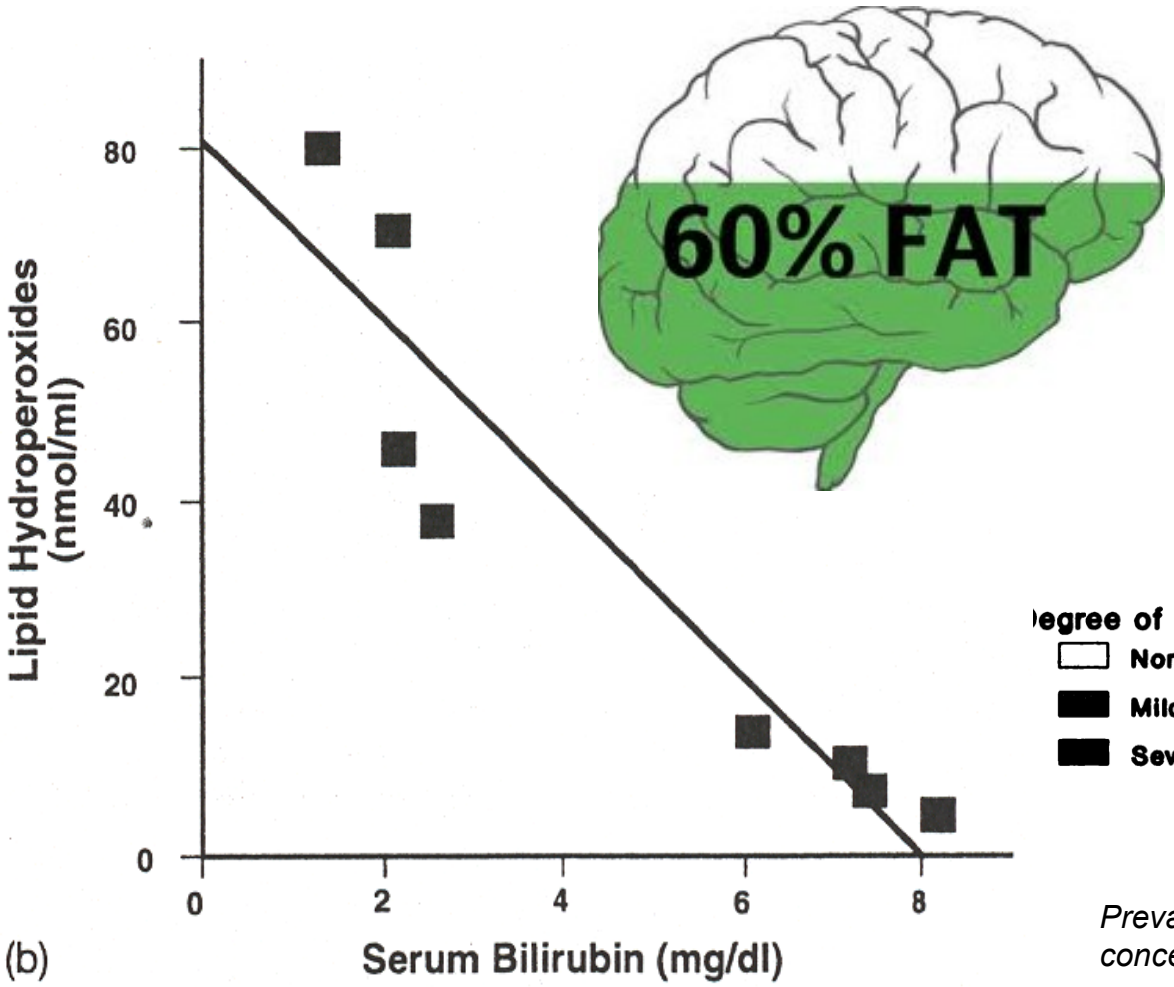


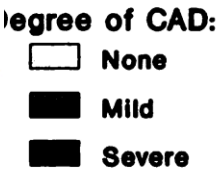


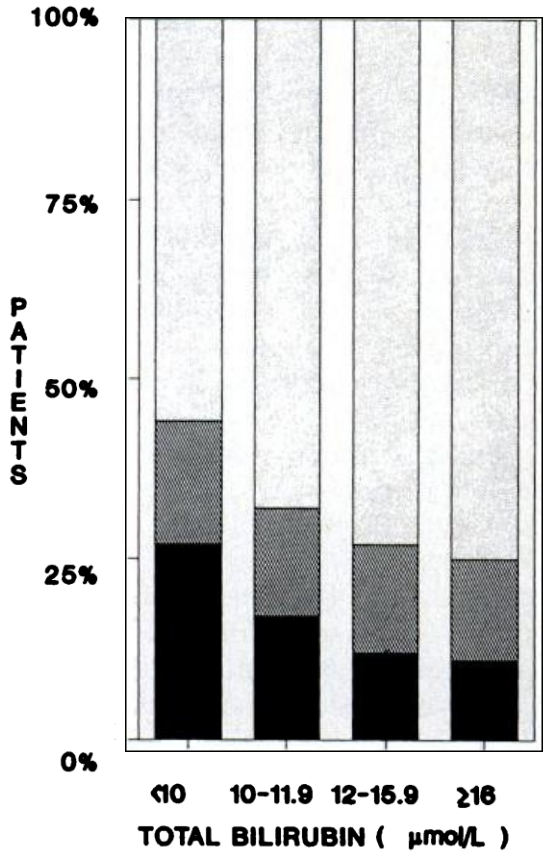
Menopauze is een aanpassing aan een meer succesvolle overleving van het nageslacht

Brent et al., 2015, Current Biology *25*, 746–750

Bilirubine en atherosclerose







Prevalence of coronary artery disease, according to concentration of total bilirubin in 877 patients.

Dennery PA, McDonagh AF, Spitz DR, Rodgers PA, & Stevenson DK. (1995). Hyperbilirubinemia results in reduced oxidative injury in neonatal Gunn rats exposed to hyperoxia. *Free Radic Biol Med.,* **19**: 395-404.

Schwertner HA, Jackson WG, & Tolan G. (1994). Association of low serum concentration of bilirubin with increased risk of coronary artery disease. *Clinical Chemistry*, **40**(1): 18-23.

Familiaire Hypercholesterolemie

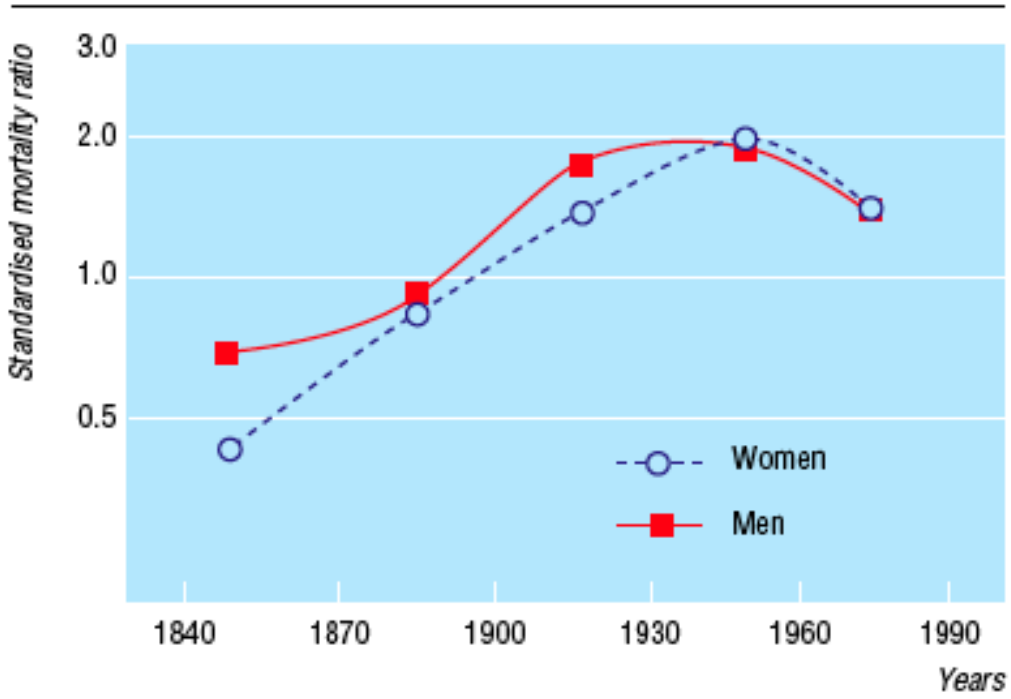
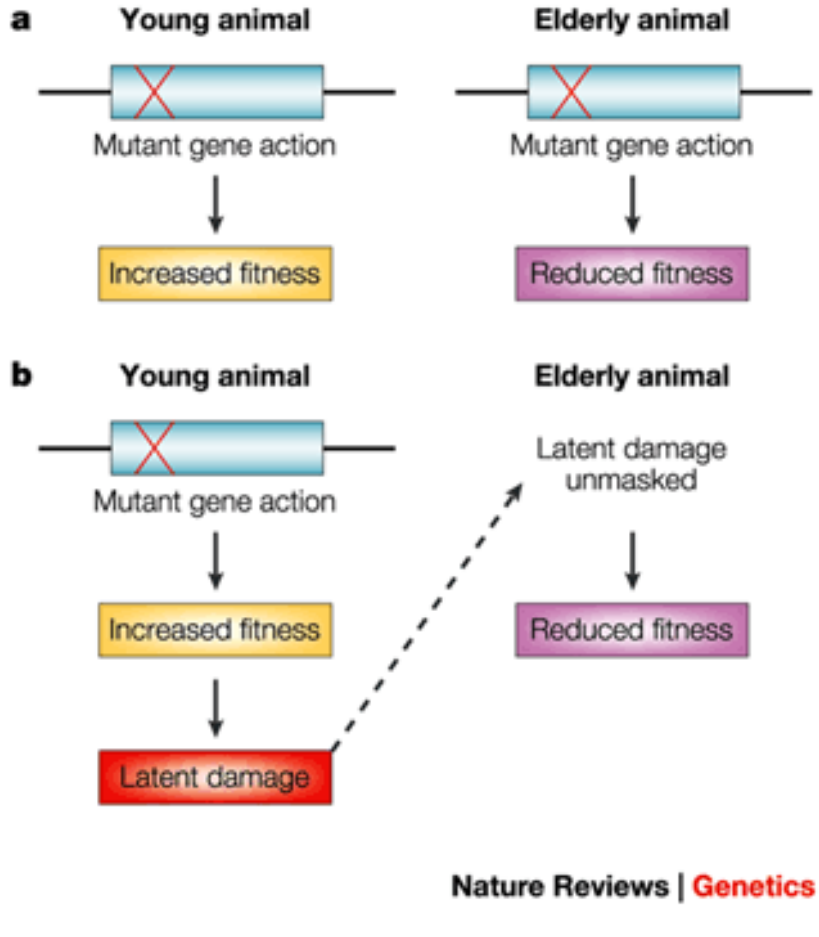


Fig 2 Mortality from familial hypercholesterolaemia according to sex and time. Mortality was estimated among 250 persons with 0.5 probability of carrying the V408M. Probands and the first 20 years of life were ignored



Sijbrands BMJ 2001

Linda Partridge & David Gems

Nature Reviews Genetics **3**, 165-175 (March 2002)

VOLUME 66, NO. 1 MARCH 1991

THE QUARTERLY REVIEW *of* BIOLOGY

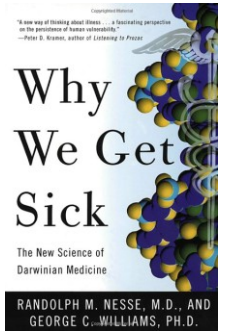
THE DAWN OF DARWINIAN MEDICINE

GEORGE C. WILLIAMS RANDOLPH M. NESSE

Randolph M. Nesse

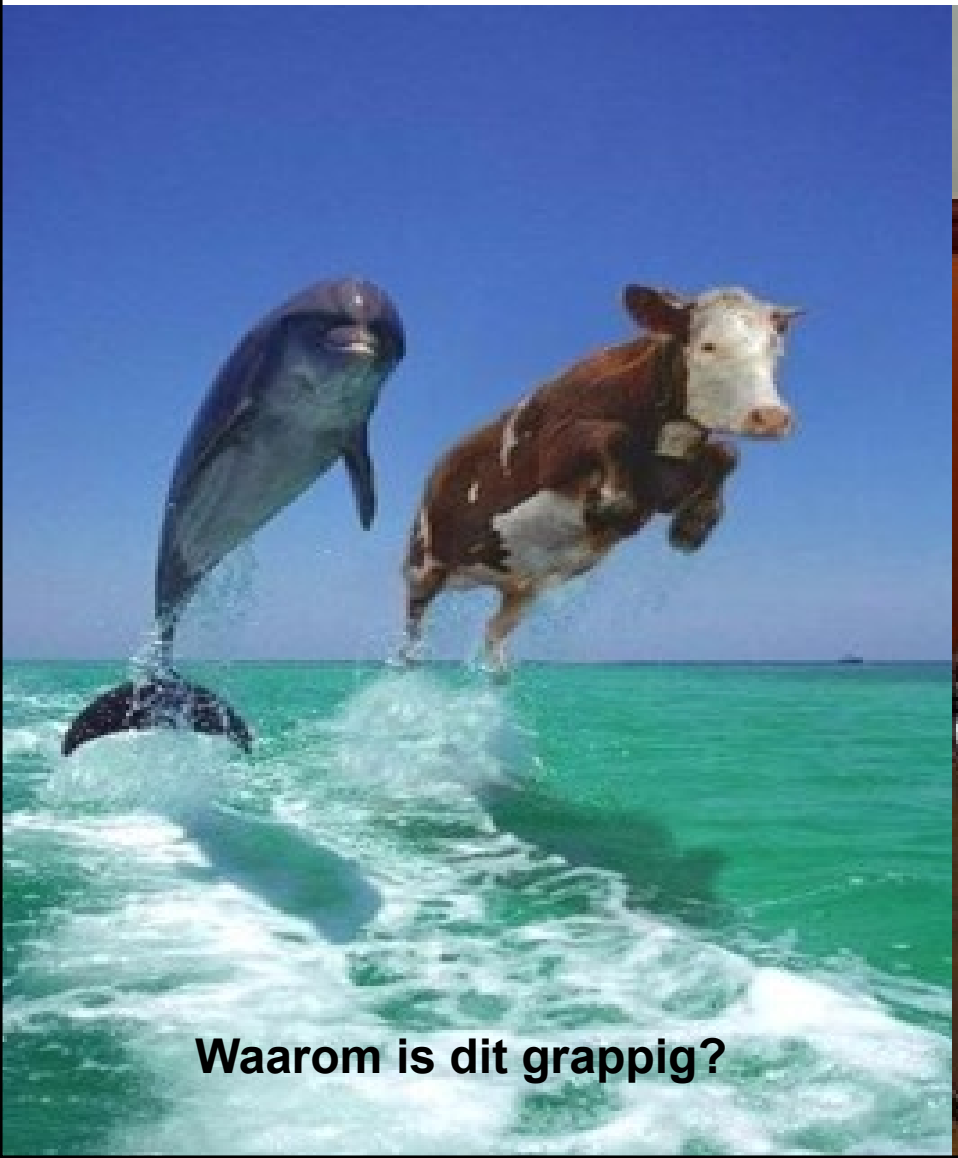
George C. William
1926-2010

- Defense-mechanism
- Trade-offs/Conflicts
- Constraints
- **Mismatch**
- Genetics



Kuipers, Luxwolda, Muskiet. Medisch Contact 2010

Evolutionary Mismatch



Waarom is dit grappig?

En dit niet?

Evolutionair onweerstaanbaar

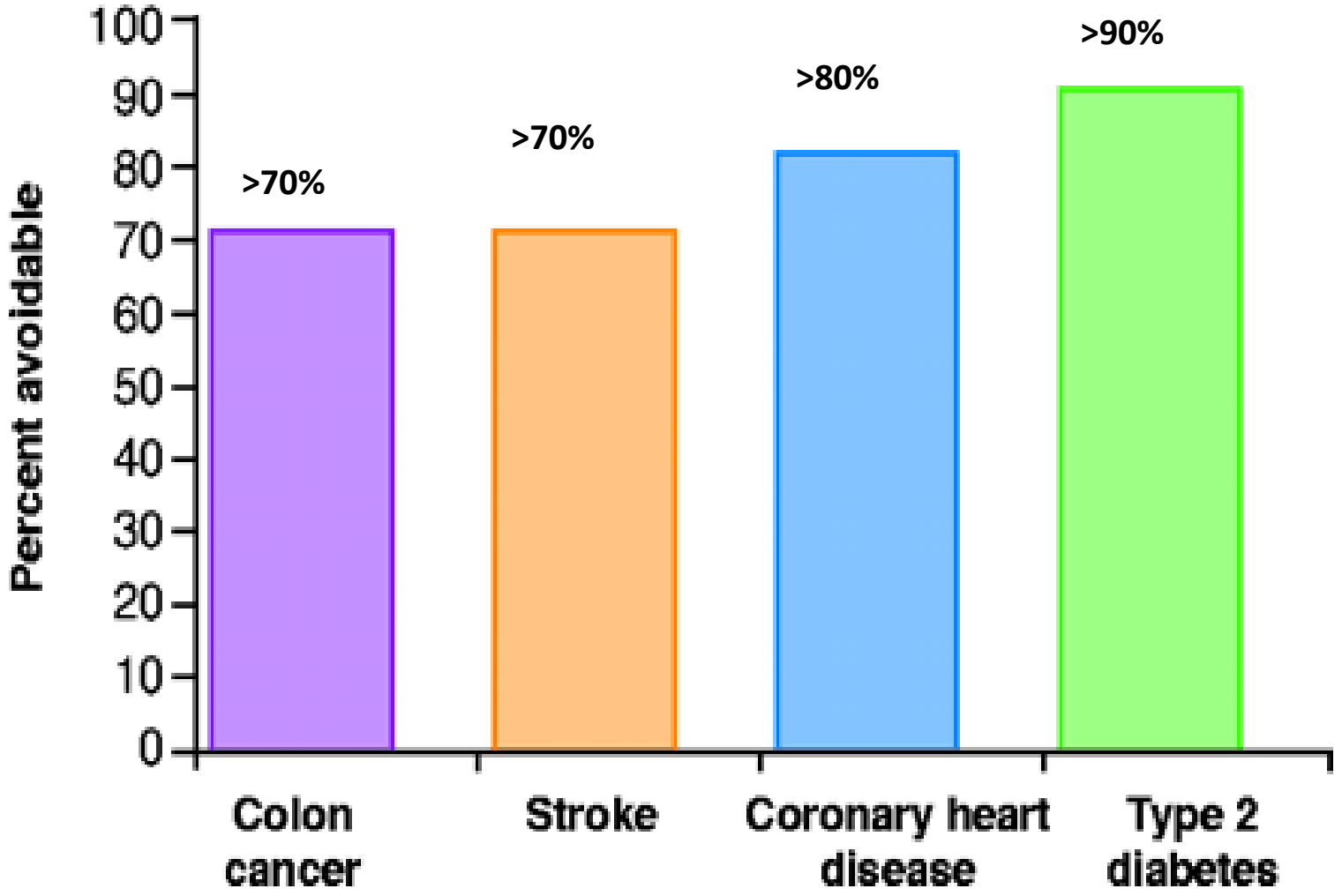
the thrifty-gene hypothesis – hongerwinter epigenetics

- Zoet -> .....
- Vet -> .....
- Zout -> .....
- Vers -> .....

KFC sogood™

SUPERSTIMULI

Welvaartsziekten:
Meer “Nurture” dan “Nature”



Willett, Science, 2001

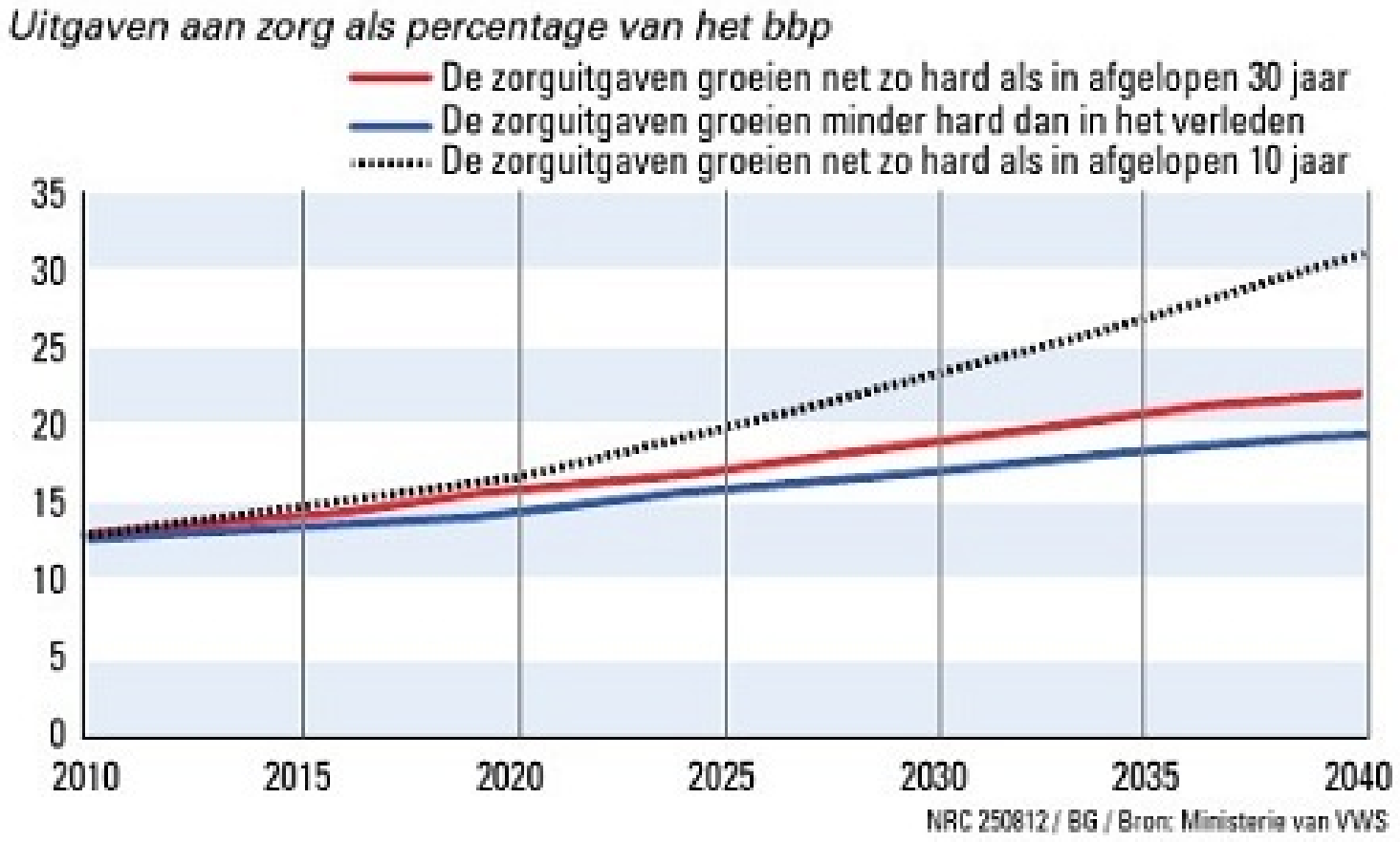
Marktwerking in de zorg…

(wie verdient er niet aan?)

Big Pharma

Gevolgen Gezondheidszorg 1.0

Wat er ook gebeurt, de uitgaven aan zorg stijgen



Wie verdient er niet aan?

Take home message No. 3:

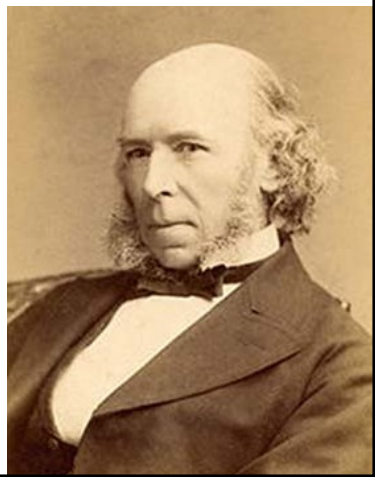
Gezondheidszorg 2.0

=

preventie

=

jouw eigen verantwoordelijkheid



Wat is ONgezond?

Wat is Ongezond?

Tabel 21: De impact van ziekten op de levensverwachting

Ziekte	Aantal verloren levensjaren	
	Mannen	Vrouwen
Roken	-12	-7
Suikerziekte	-10	-8
Inactiviteit	-6	-8
Chronische stress	-6	-6
Hoge bloeddruk	-5	-6
Overgewicht	-4	-4
Teveel alcohol	-4	X
Groente/fruit tekort	-3	-2
Hoog cholesterol	-3	-2
Slaaptekort/teveel	-2	-2

Uit: Kuipers, *Oergezond*

Maar wat komt het meeste voor?

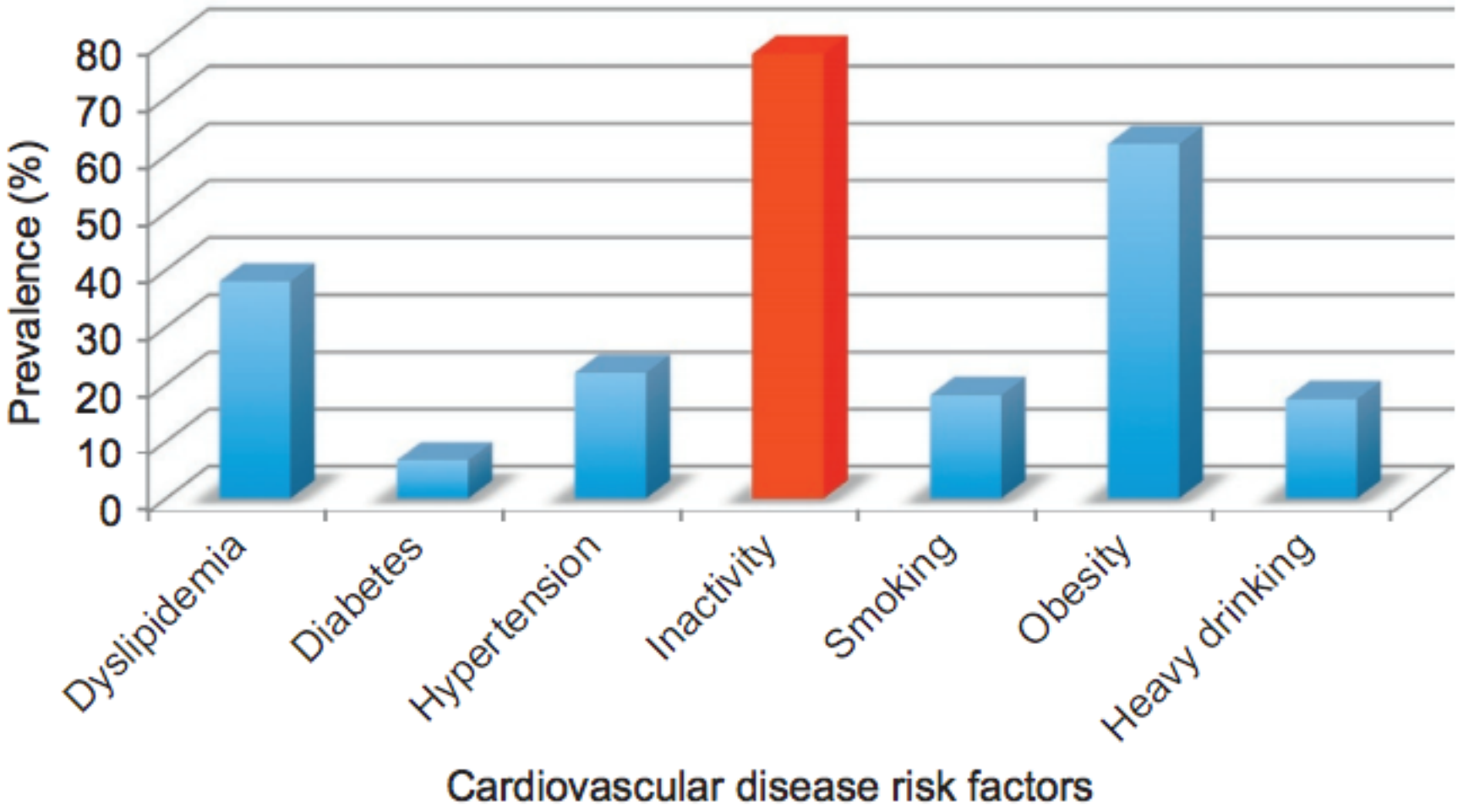
Tabel 21: De impact van ziekten op de levensverwachting

Ziekte
Roken
Suikerziekte
Inactiviteit
Chronische stress
Hoge bloeddruk
Overgewicht
Teveel alcohol
Groente/fruit tekort
Hoog cholesterol
Slaaptekort/teveel

Maar wat komt het meeste voor?

Warburton & Bredin. Lifestyle in heart health and disease. 2018

Maar wat komt het meeste voor?



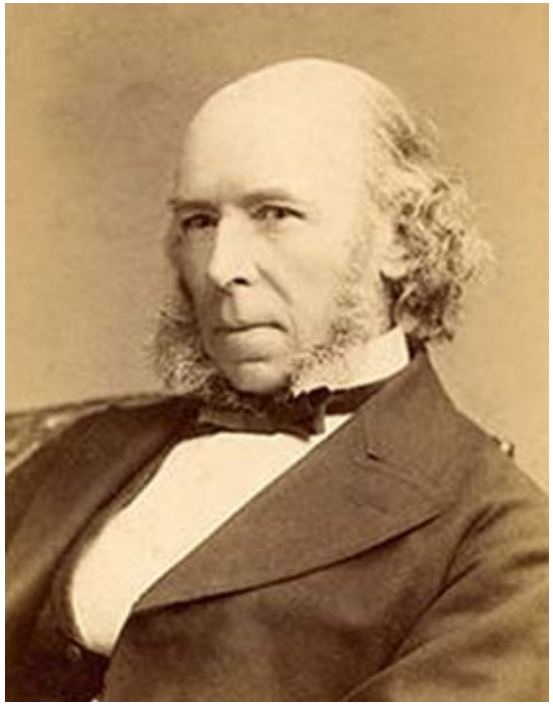
Warburton & Bredin. Lifestyle in heart health and disease. 2018


Preventie?
Maar hoe dan?

Conditions of existence

(= oorzaak)

Natural Selection

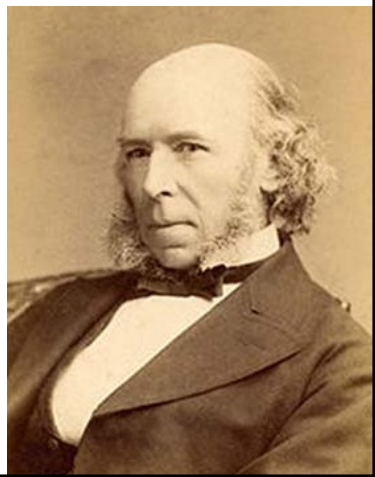


Survival of the Fittest

(= gevolg)

Take home message No. 4:

Om gezond te blijven
moeten we onze
‘conditions of existence’
of OER-omgeving
(onder)kennen



Laatste gemeenschappelijke voorouder met Chimpansee:
6 miljoen jaar geleden

17.9 Myr

13.9 Myr

7.2 Myr

5.9 Myr

200.000 yr

Hacia. Trends in Genetics 2001

Onze ‘Conditions of Existence’

- Laaste gemeenschappelijke vooroudermet de chimpanzee: 6 miljoen jaar geleden

- 3rd Out of Africa Diaspora: 100.000 jaar geleden

- **100.000/6.000.000 => 0.02 = 2% => 98% van de menselijke evolutie vond plaats in Oost Afrika**

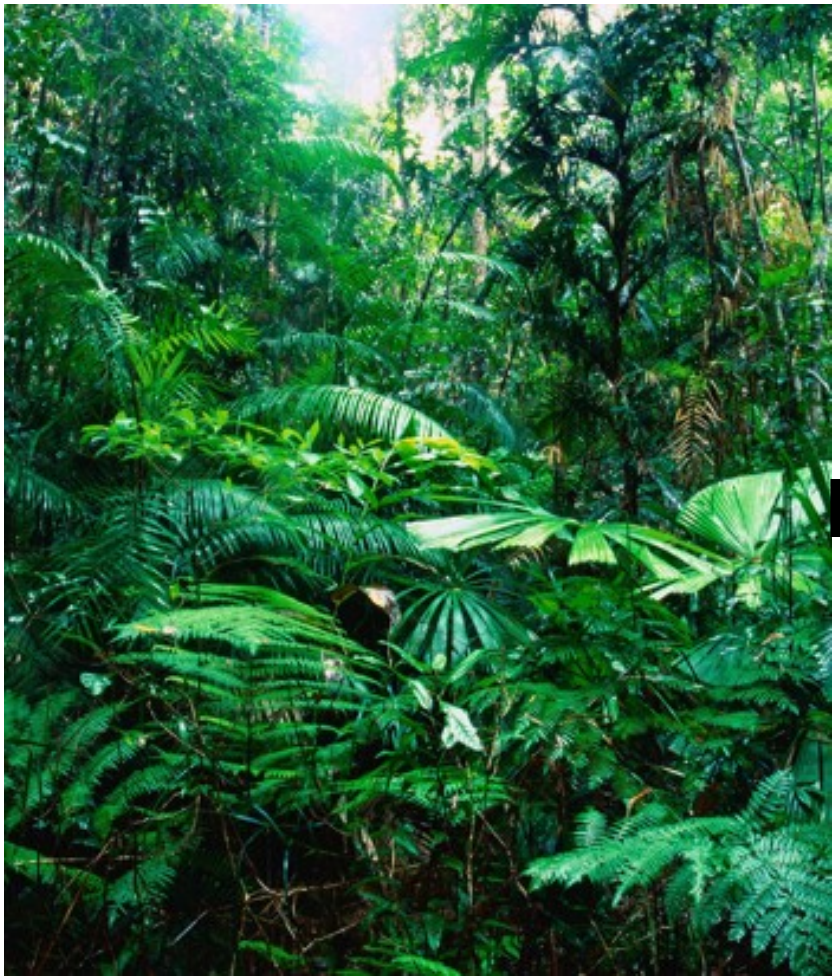
Cradle of Mankind: Africa


T·997 ANT


22-XL-VG

Klimaatverandering

6-7 mya

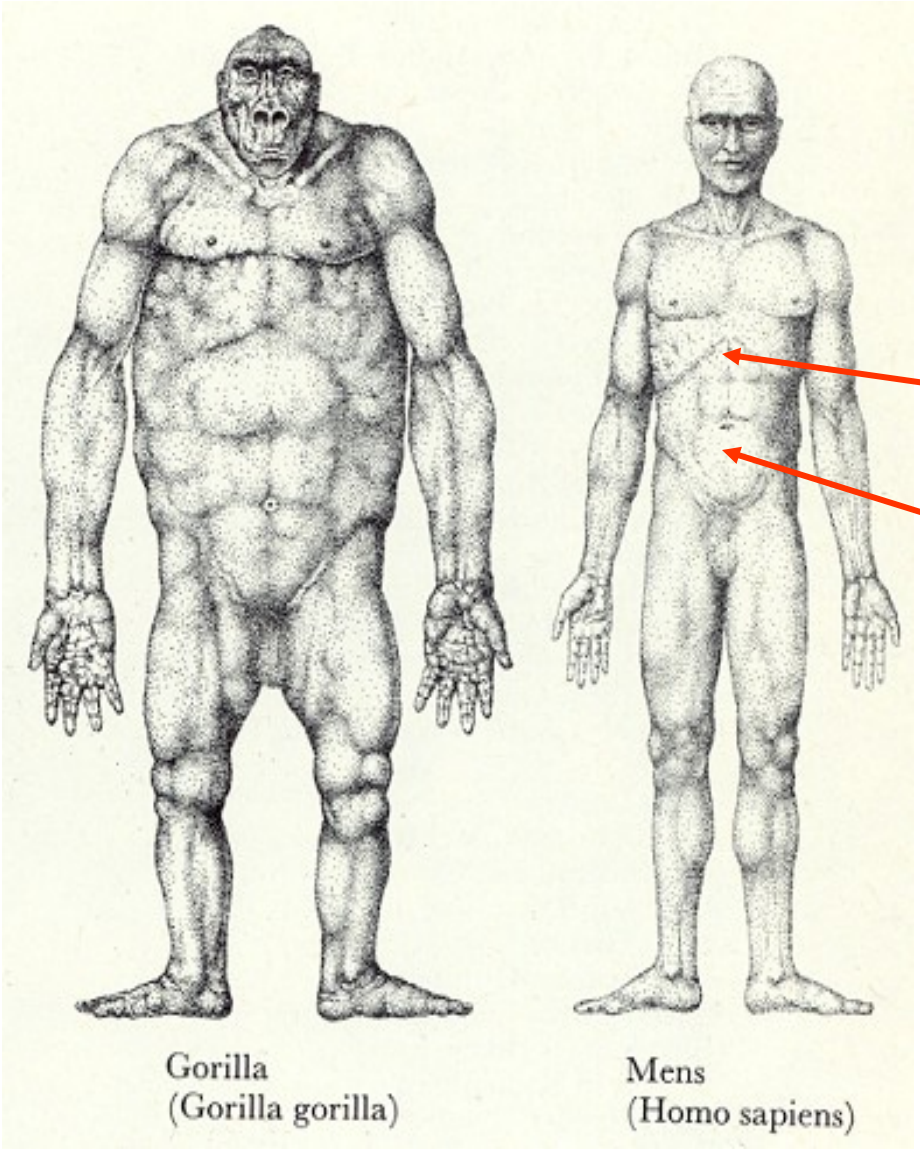


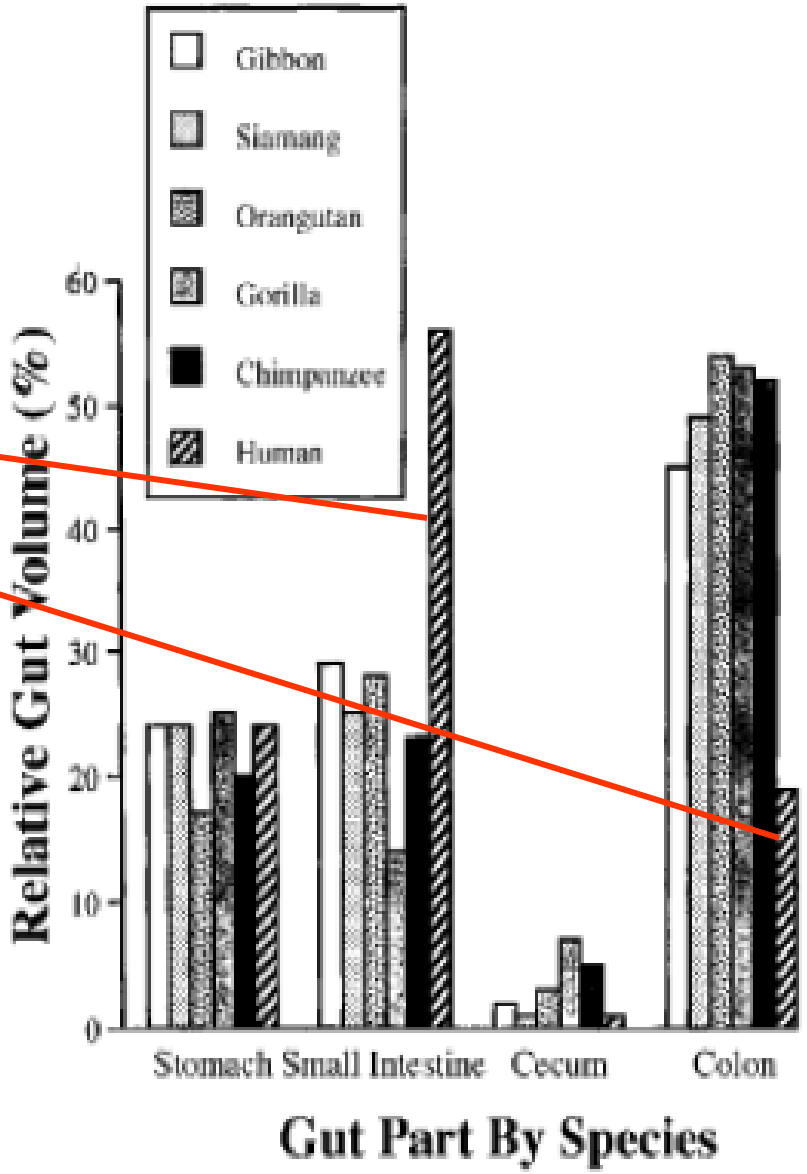
Oerwoud

Savanne/steppe

Vegetariër -> Omnivoor

Waarom wij GEEN vegetariërs zijn





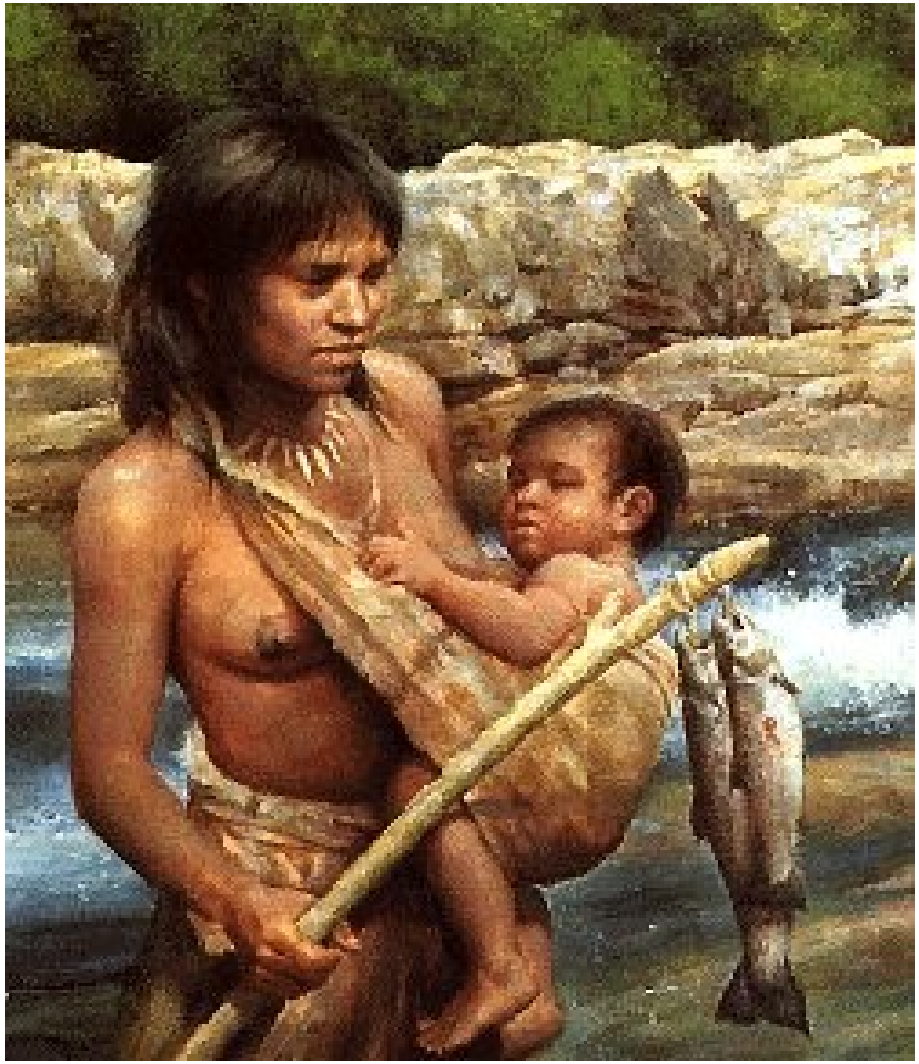
Horrobin. Madness Adam and Eve, 2001 p23

Milton J Nutr 2003

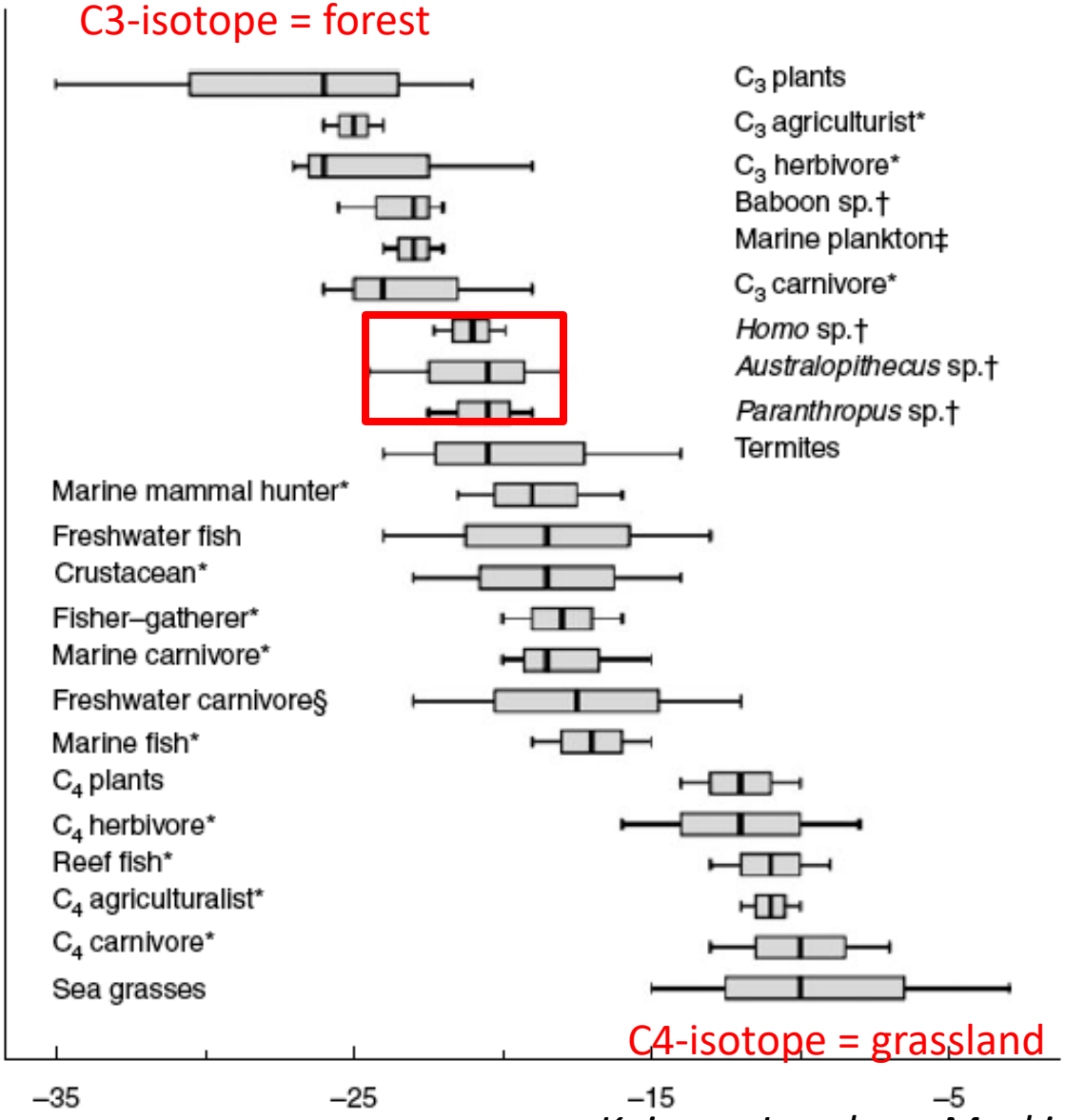
Man the Hunter…

Maar ondertussen aan het kampvuur…

Of ‘Woman the Gatherer’



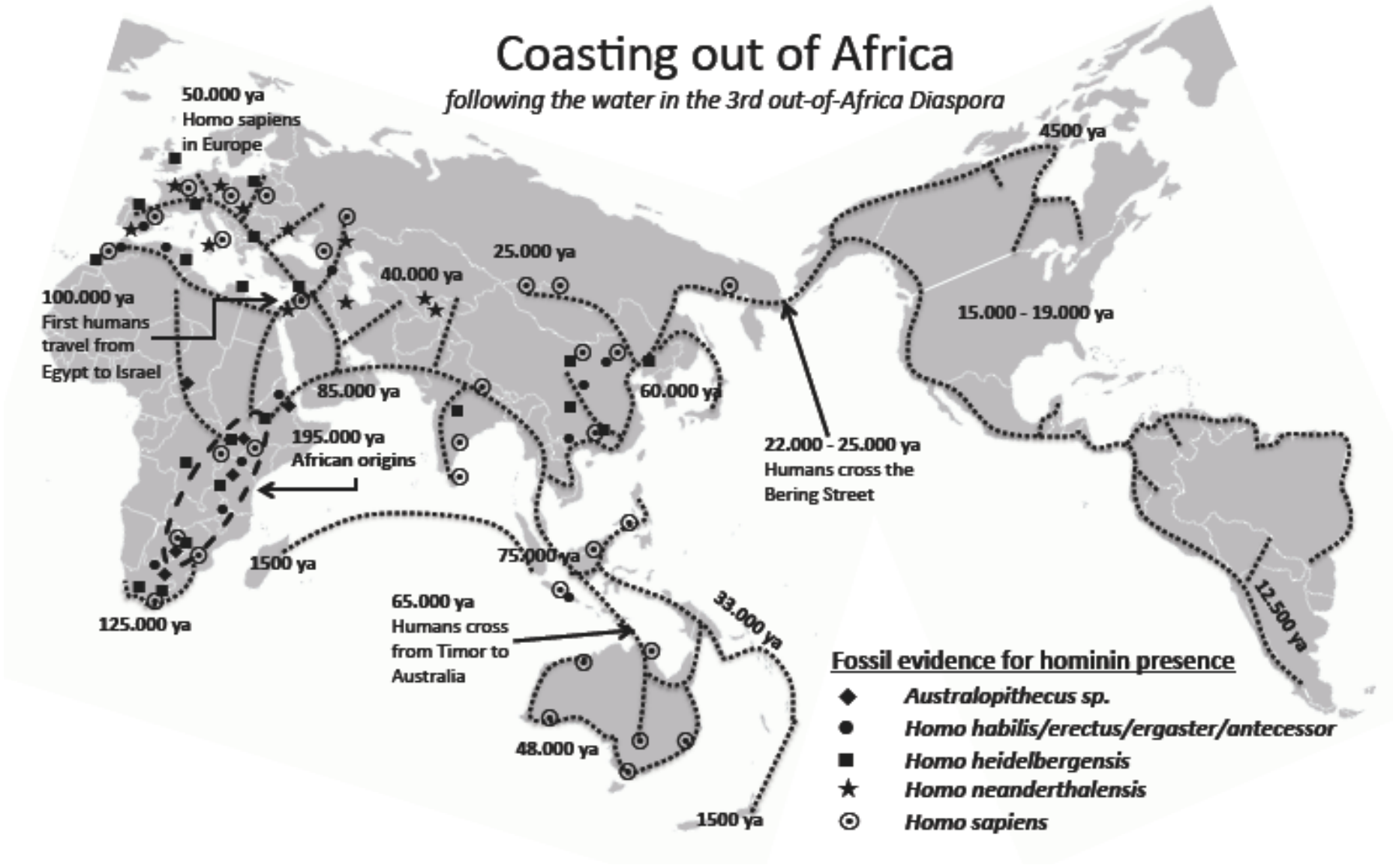
What do the isotopes tell us?



- Onze isotope-signatures lijken op:
  - Termites
  - Marine mammal hunter
  - C3-carnivore
  - Freshwater fish
  - Crustaceans
  - Fisher-gatherer
  - Freshwater carnivore
- Our isotopic signature does NOT resemble
  - C4-agriculturalist
  - C4-carnivore

Kuipers, Joordens, Muskiet, Nutrition Research Reviews, 2012

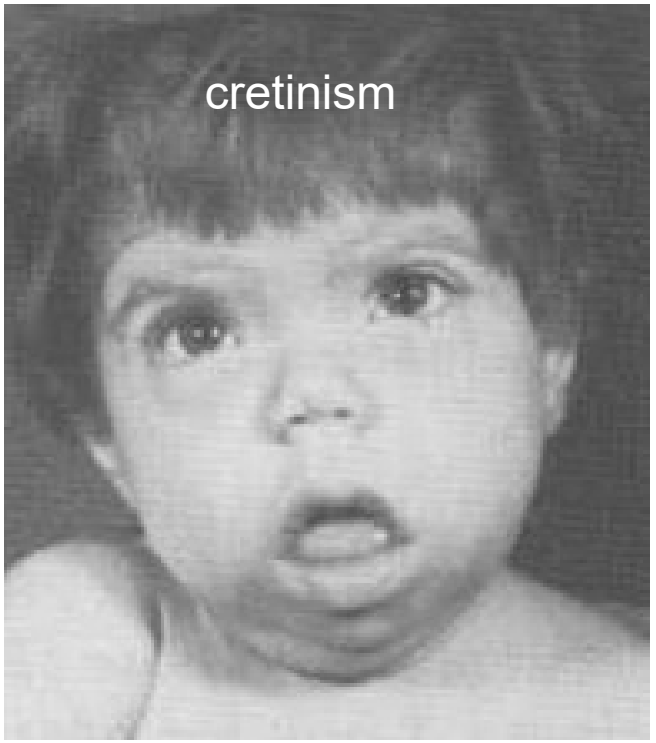
Archeologische opgravingen



Kuipers, Joordens, Muskiet, Nutrition Research Reviews, 2012

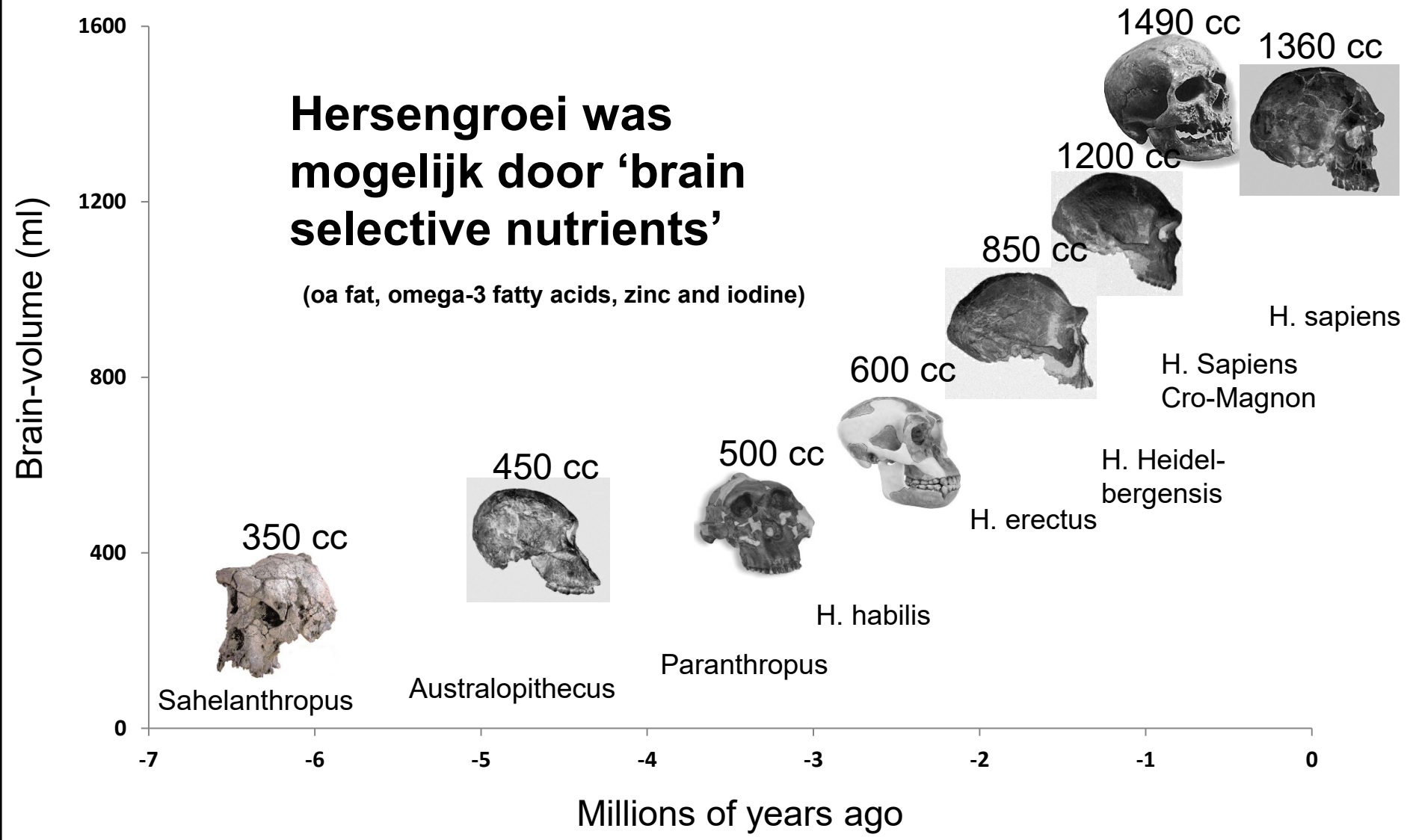
Het water-land ecosysteem:

- **Een rijke bron van**
  - Jodium
  - Chroom
  - IJzer
  - Zink
  - Vitamine A and D
  - ω3-visvetzuren
    - DHA en EPA



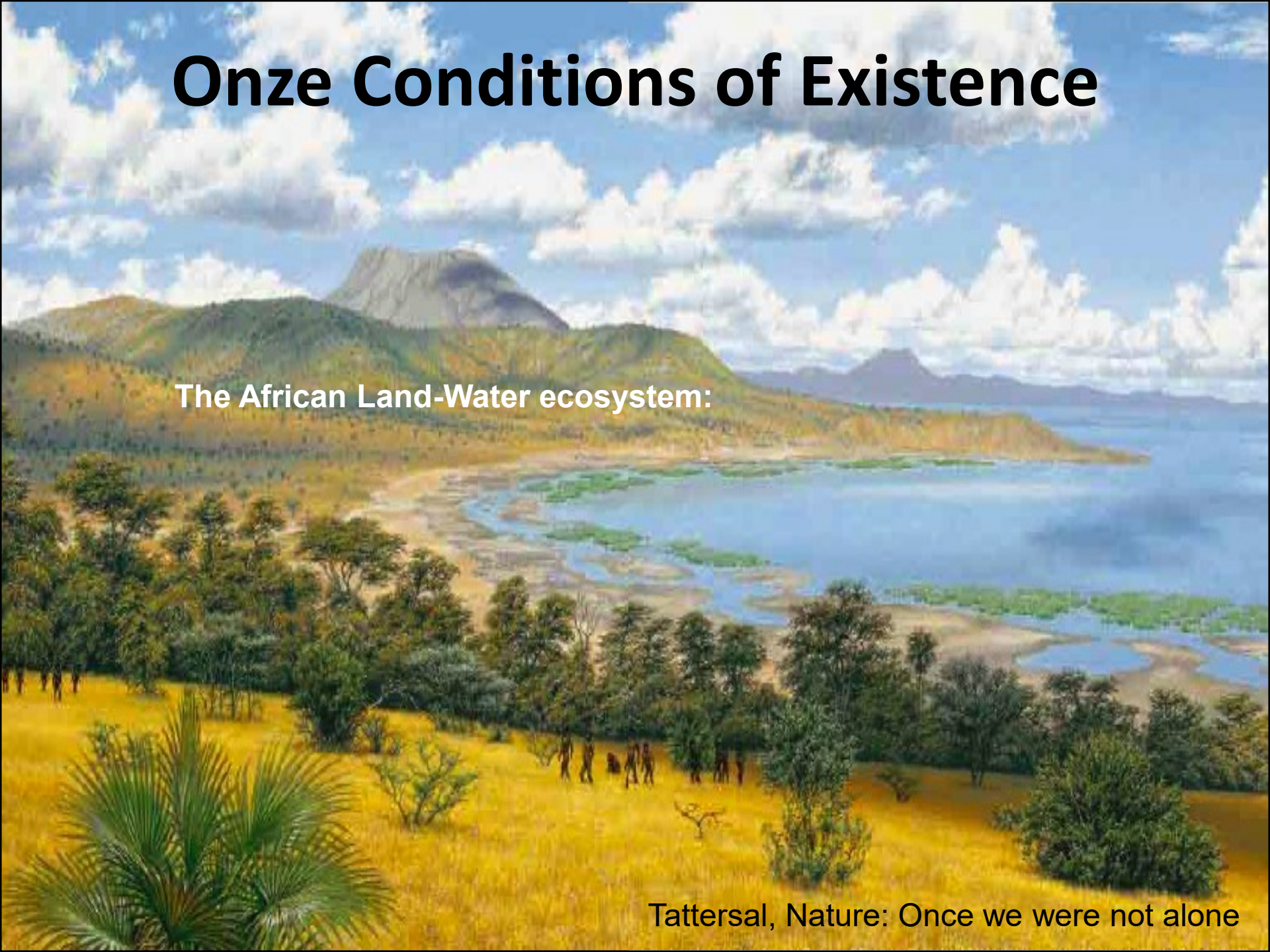
Hersenbouwstenen

Van aap naar mens



From: Kuipers, Het Oerdieet

Onze Conditions of Existence



Tattersal, Nature: Once we were not alone









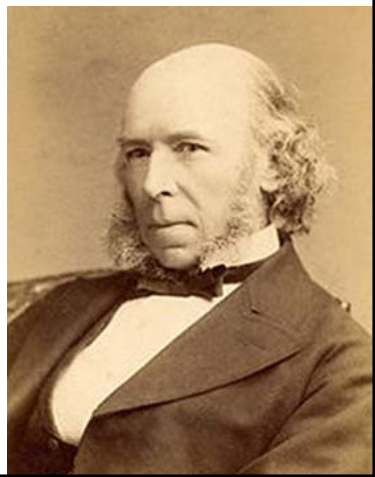
Take home message No. 5:

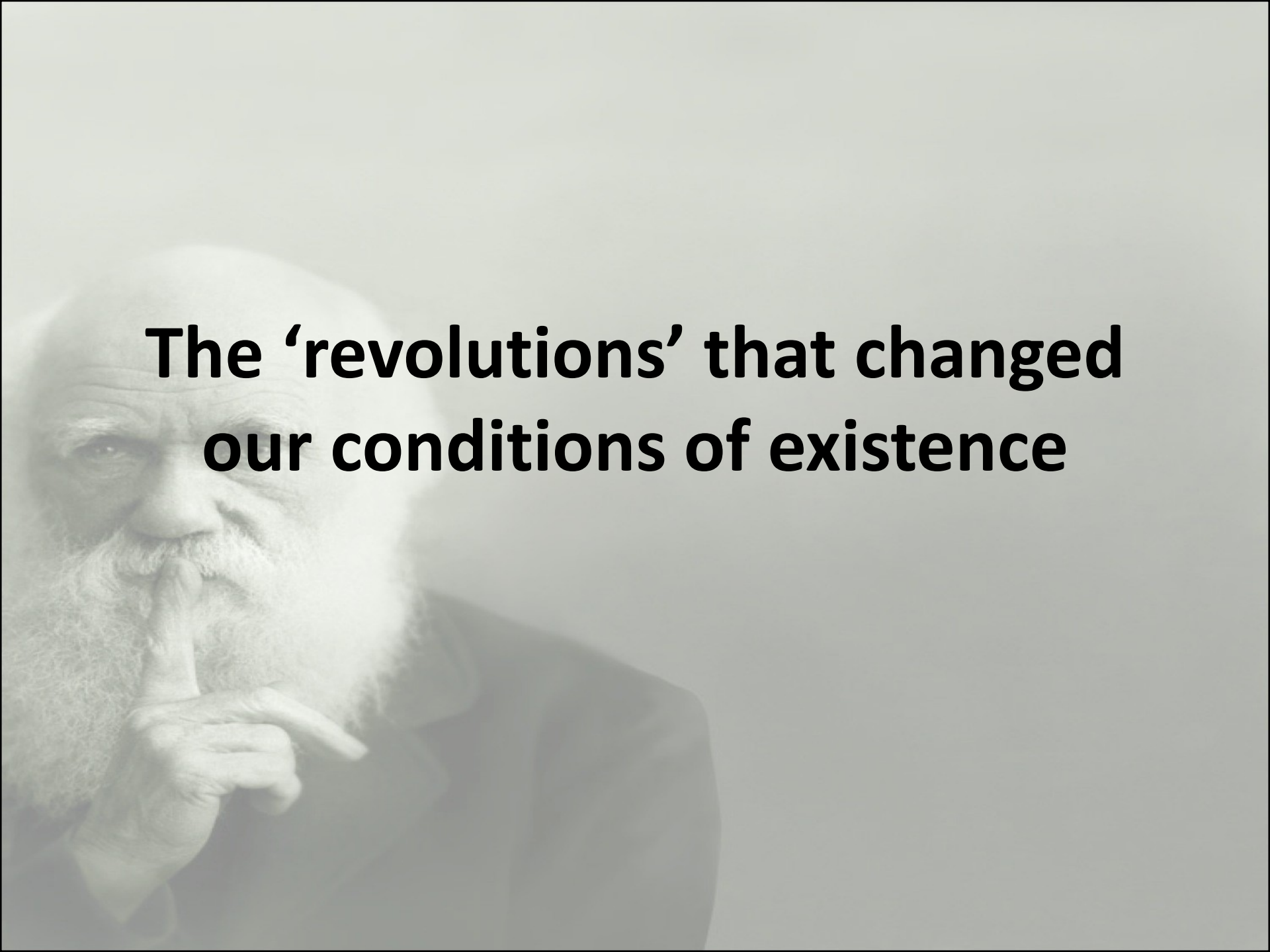
Onze

‘conditions of existence’

=

land-water ecosysteem





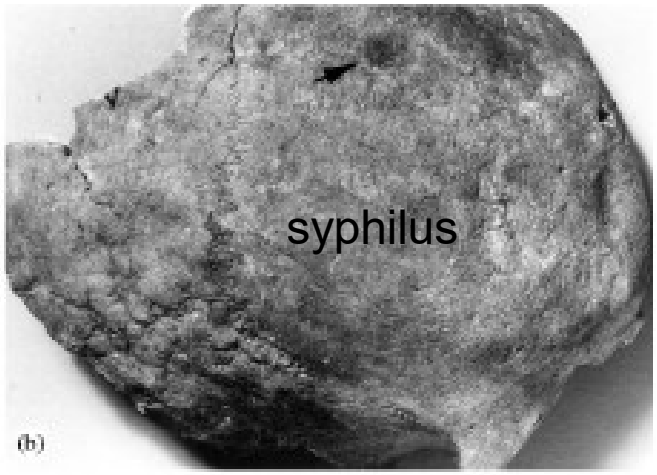
The ‘revolutions’ that changed our conditions of existence

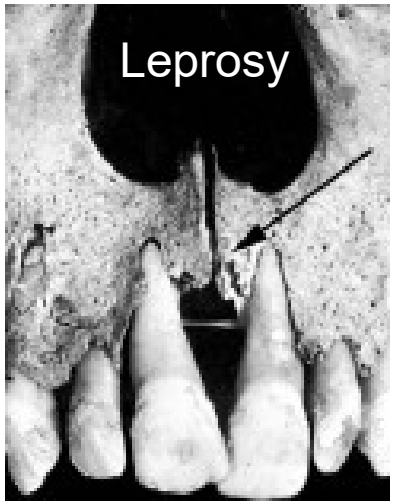
50 jaar geleden

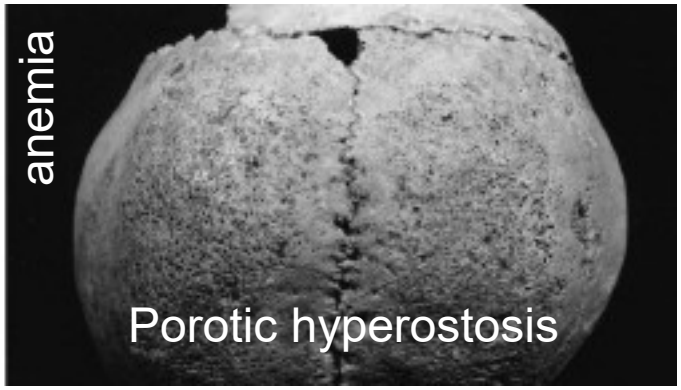
The Creation of a Mismatch

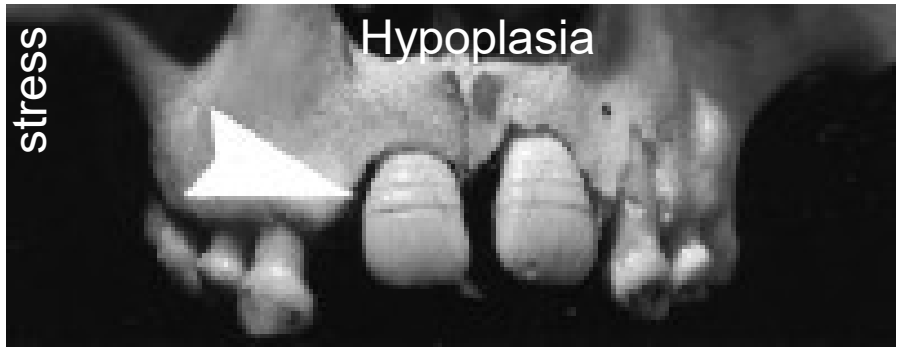
The agricultural revolution as environmental catastrophe: Implications for health and lifestyle in the Holocene

Clark Spencer Larsen*





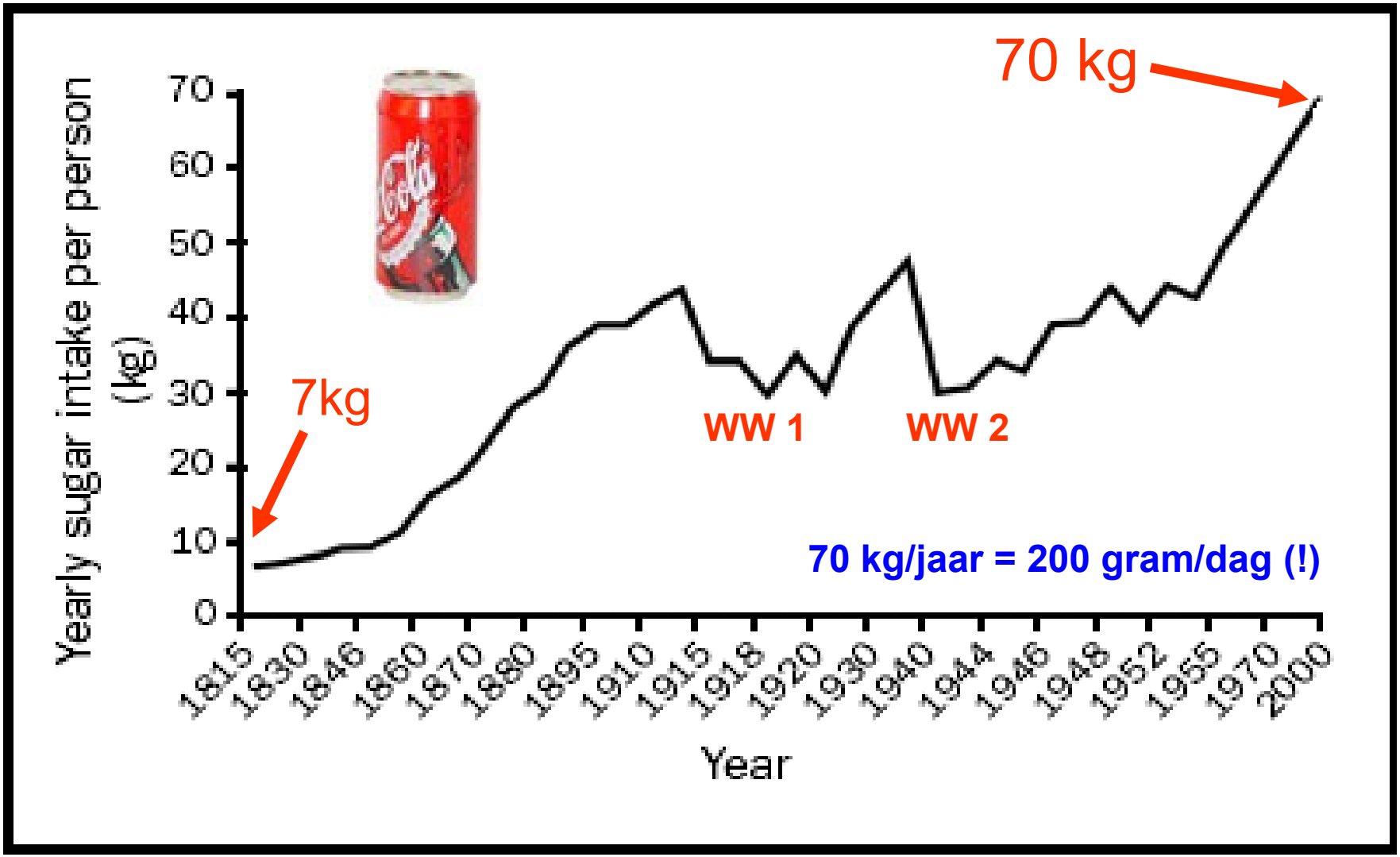




Quaternary International 150 (2006) 12–20

Industriële revolutie

Jaarlijkse Suikerinname 1815-2000



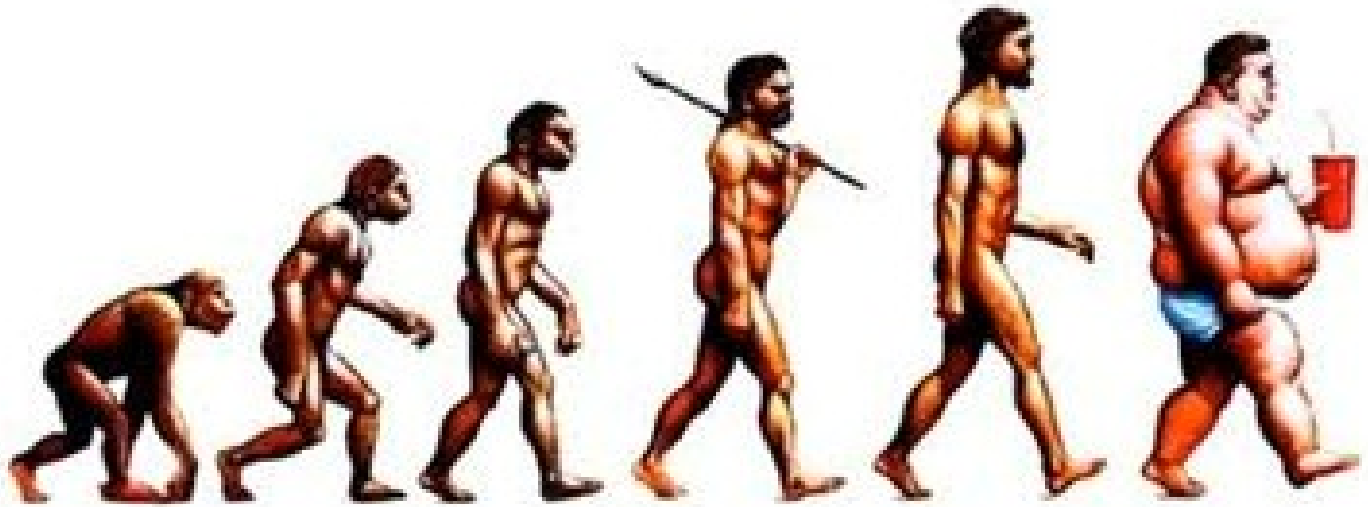
Keefe, Cordain. Mayo Clin Proc 2004

What went Wrong?

Increasing loss of physical activity, loss of realistic reference

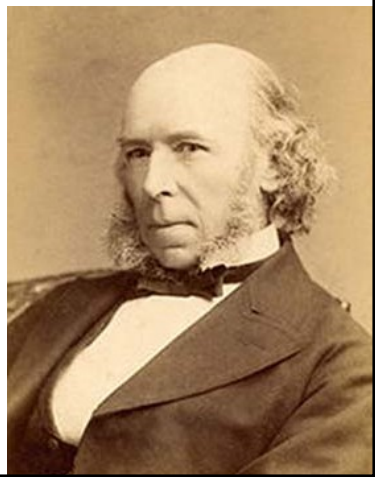
Digital Revolution: 10 years ago

De **MISMATCH**



Take home message No. 6:

Onze genen leven nog in de Steentijd



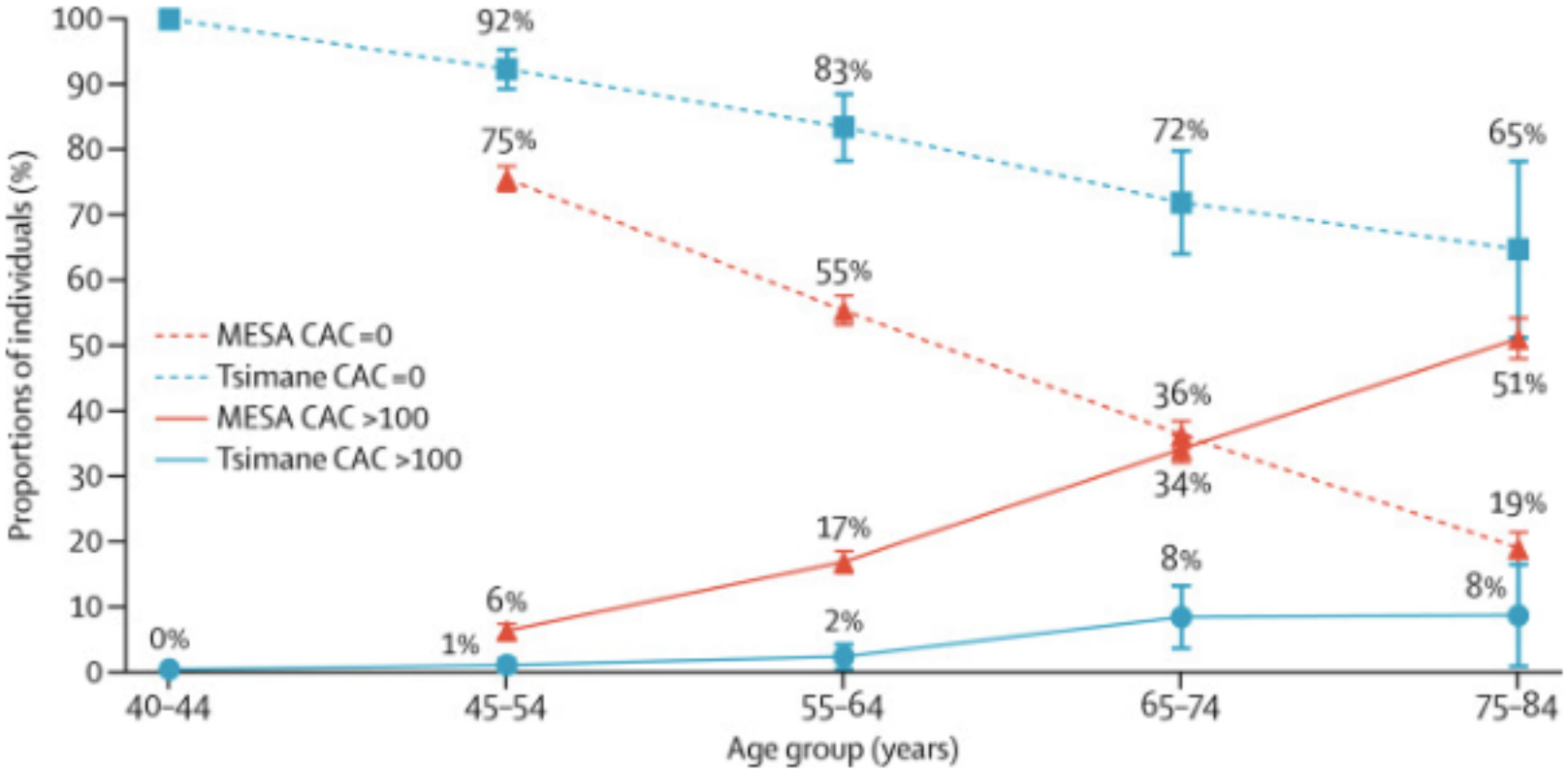


Figure 2.

CAC scores by age for US MESA, and Tsimane samples

Tsimane have significantly lower CAC for each age category (all p ≤0·0001). Raw data and *t* tests for differences between Tsimane and MESA [23] are given in the appendix. Error bars show 95% CI.

CAC=coronary artery calcium.

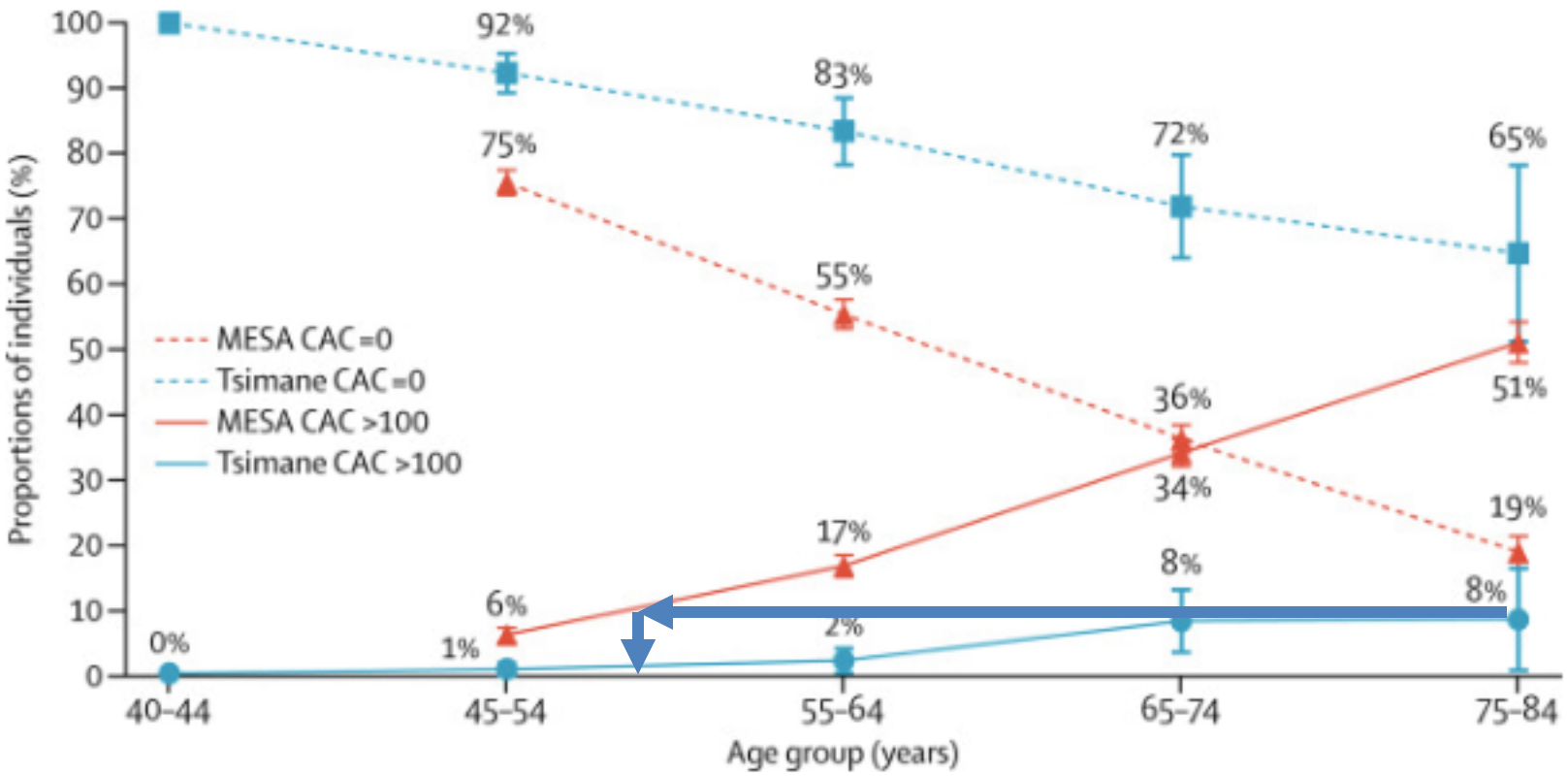


Figure 2.

CAC scores by age for US MESA, and Tsimane samples

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Take home message No. 7:

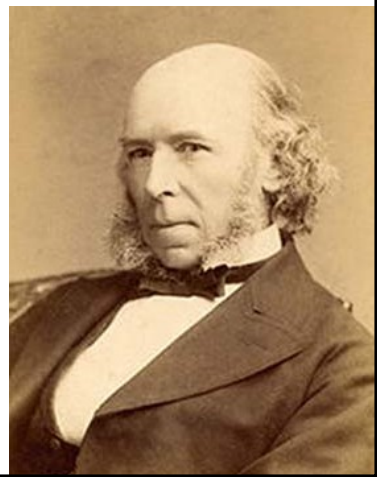
Welvaartsziekten

zijn op steeds jongere leeftijd optredende

ouderdomsziekten

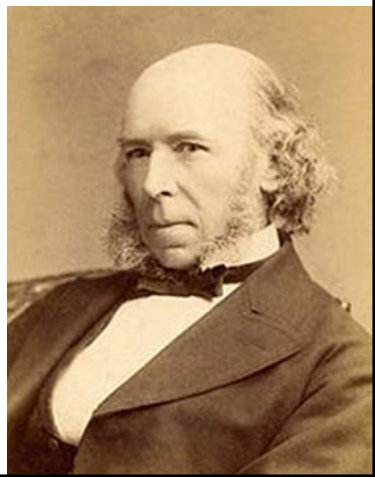
veroorzaakt door langdurige blootstelling aan risicofactoren en daarmee

lage graad ontsteking



Take home message No. 8:

Om gezond te blijven
moeten we terug naar onze
‘conditions of existence’
of OER-omgeving



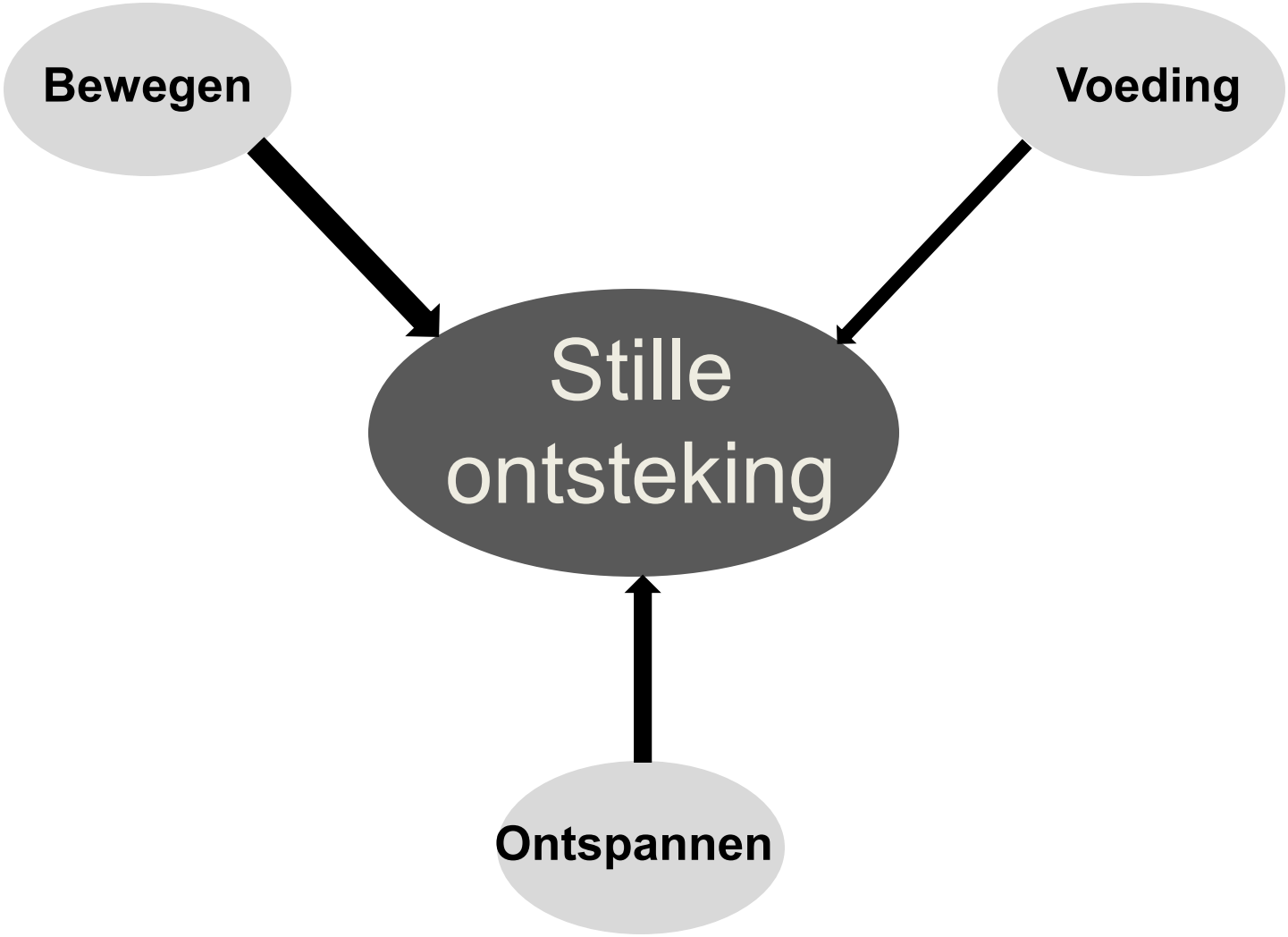
Evolutionair Denken

Lage graad ontsteking

en

een oerleefstijl

Een verbindende ‘risico-factor’

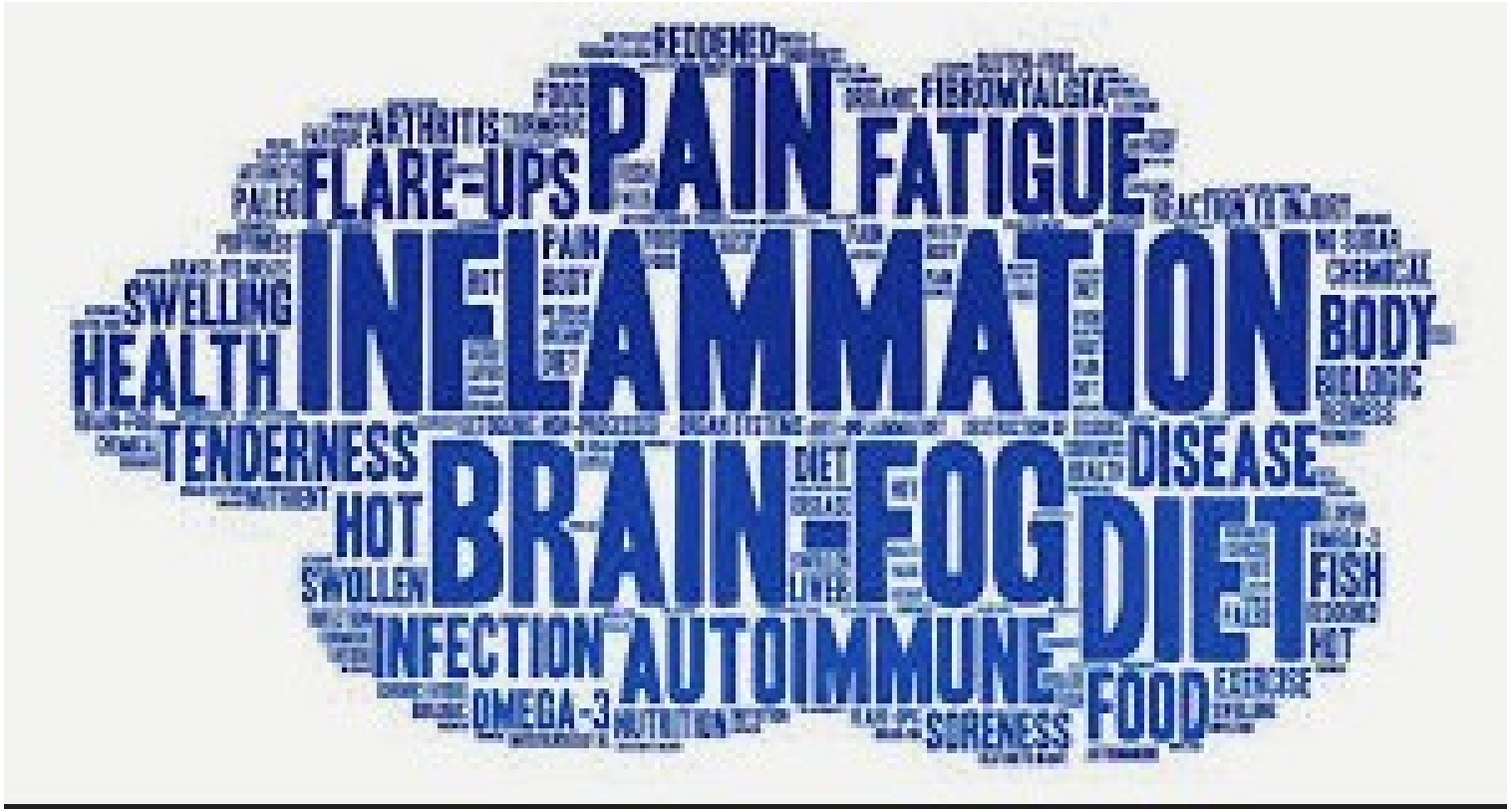



Stille ontsteking
Kanker
Hoog cholesterol
Hart- en vaatziekten
Suiker-ziekte
Prikkelbare darmsyndroom
Hoge bloeddruk
Alzheimer
Depressie
Auto-immuun ziektes
Chronische pijn

Lage graad ontsteking

Low-grade inflammation (LGI)

- **Hoe moet ik me dit voorstellen?**



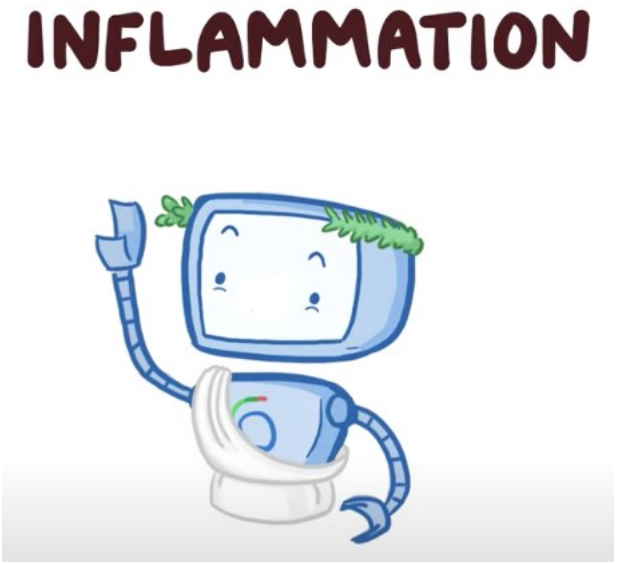
LGI in de praktijk

Point measures

- Age
- Sexe
- Education
- Location of living (Urban/n)
- Smoking
- Waist-to-hip ratio
- Leasure Time
- Hypertension
- High TG/HDL ratio
- Glucose-intolerance
- Vegetable/fruit intake

Only in sequence

- hsCRP
- Leukocytes
- Trombocytes
- Ferritine

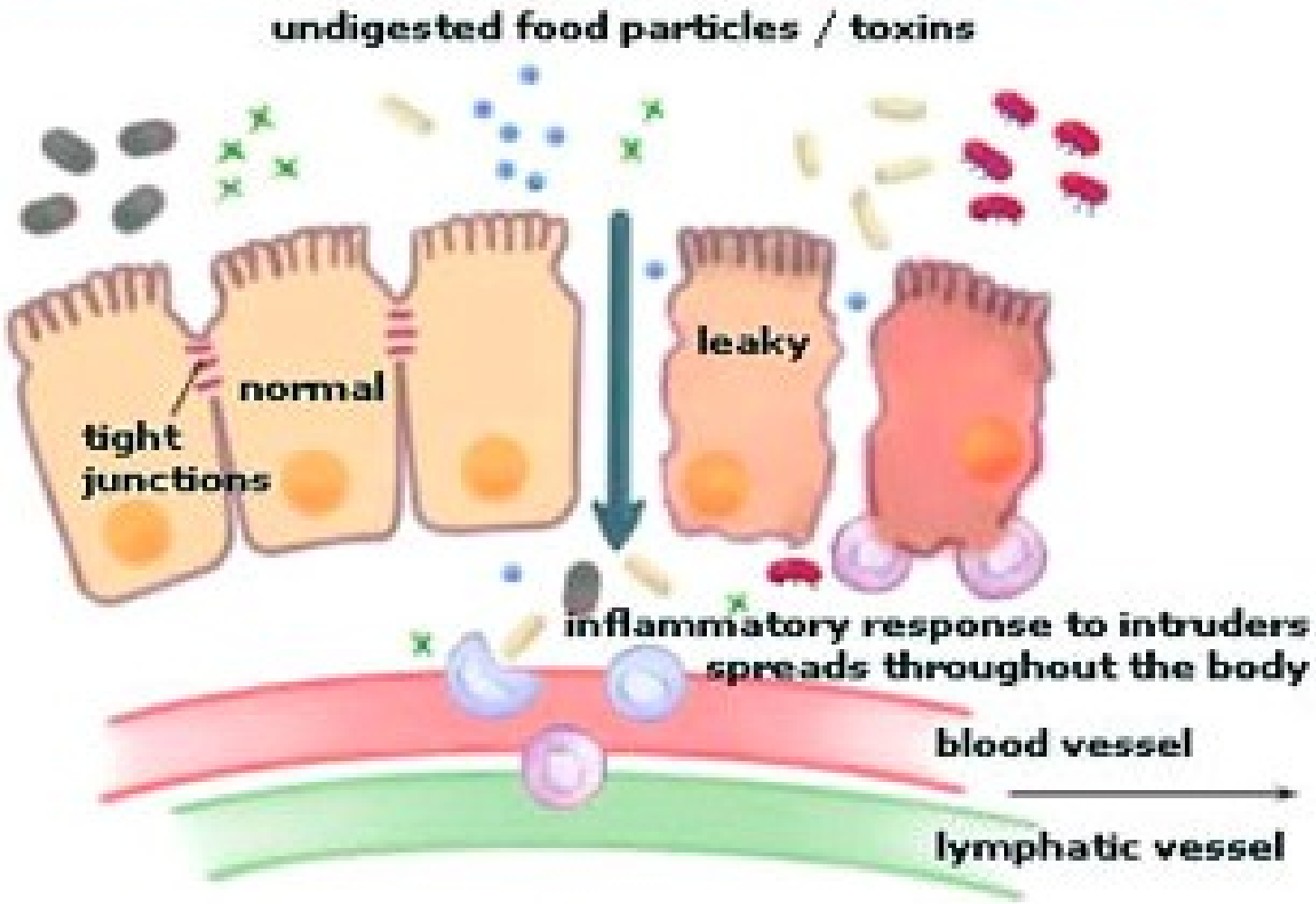


INFLAMMATION

It's all about '<u>barrières</u>'

- Oral Cavity and skin
  - Microbial translocation
- Lungs
  - Inflammatory particles (rook, fijnstof)
- **Digestive system**
  - Translocation of microbes and pro-inflam particles
- **Blood vessels**
  - Disruption of the endothelial barrier / glycocalyx

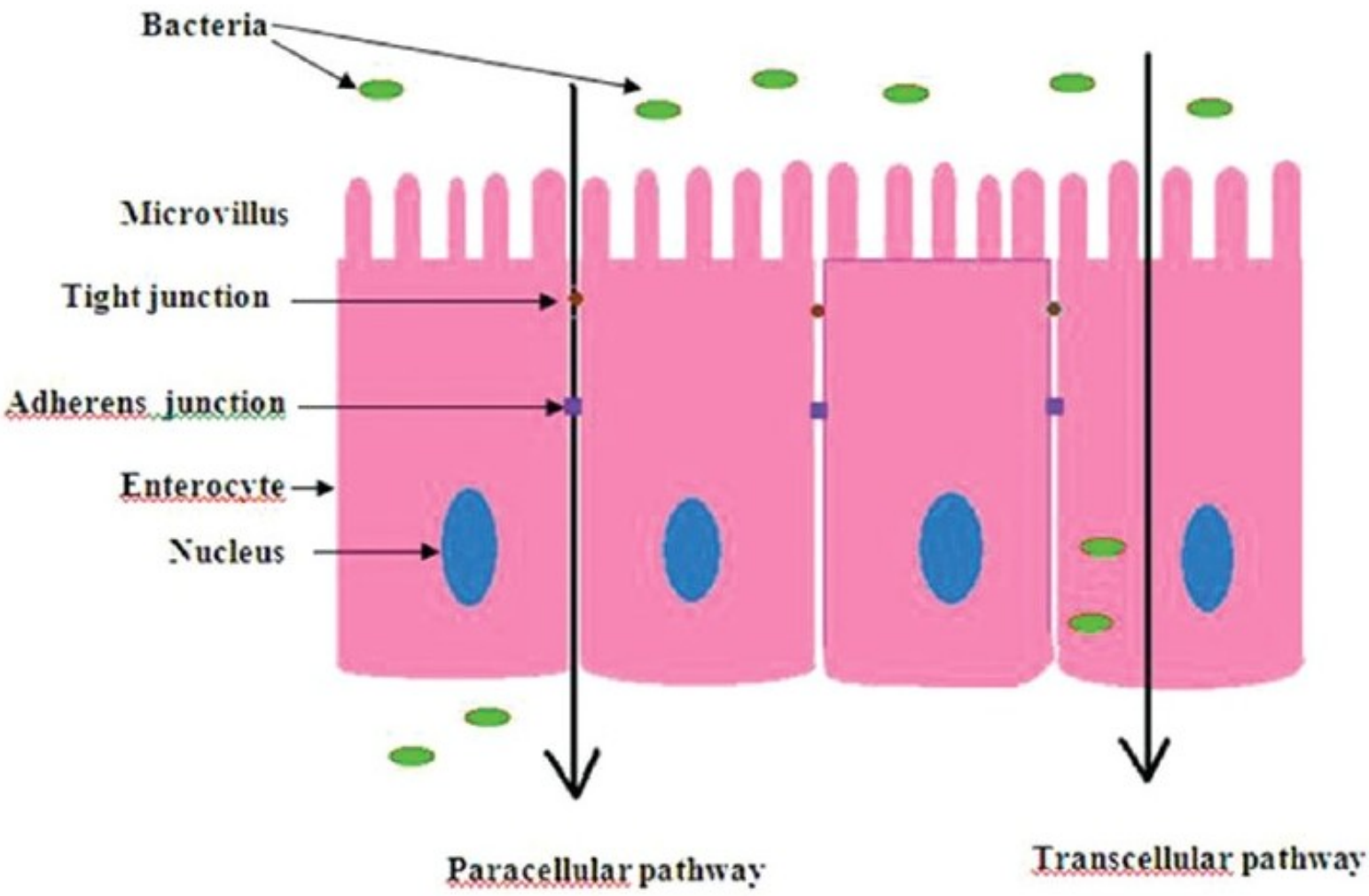
LEAKY GUT


undigested food particles / toxins
normal
tight
junctions
leaky
inflammatory response to intruders
spreads throughout the body
blood vessel
lymphatic vessel

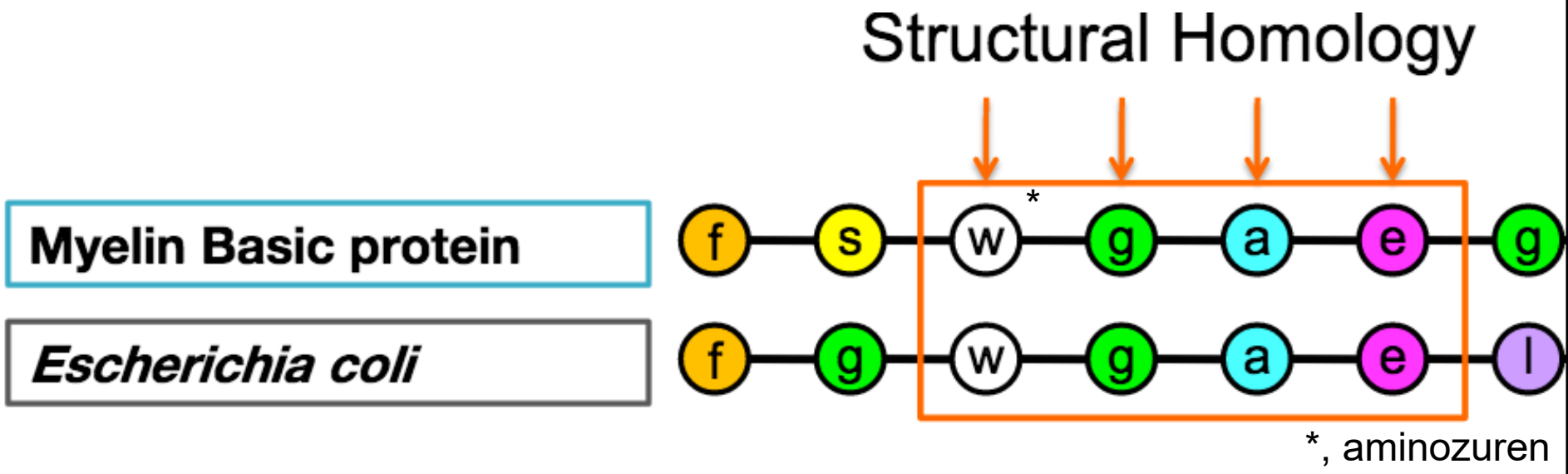
Digestive system – Evolutionaire stress

Ongewenste gevolgen

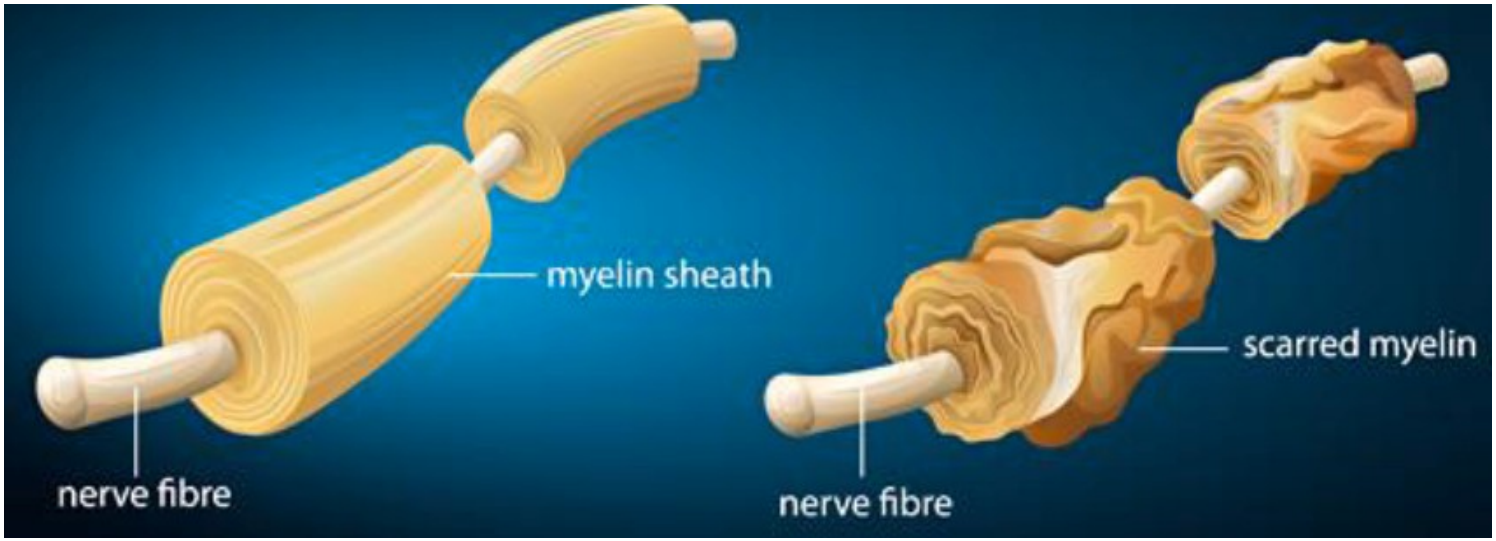
- ***Bacterial translocation / Sepsis***



Mutiple Sclerosis



*, aminozuren



Cordain et al. Brit J Nutr 2000

De Santis et al. Front Immunol 2015

Barrierefunctie related disease

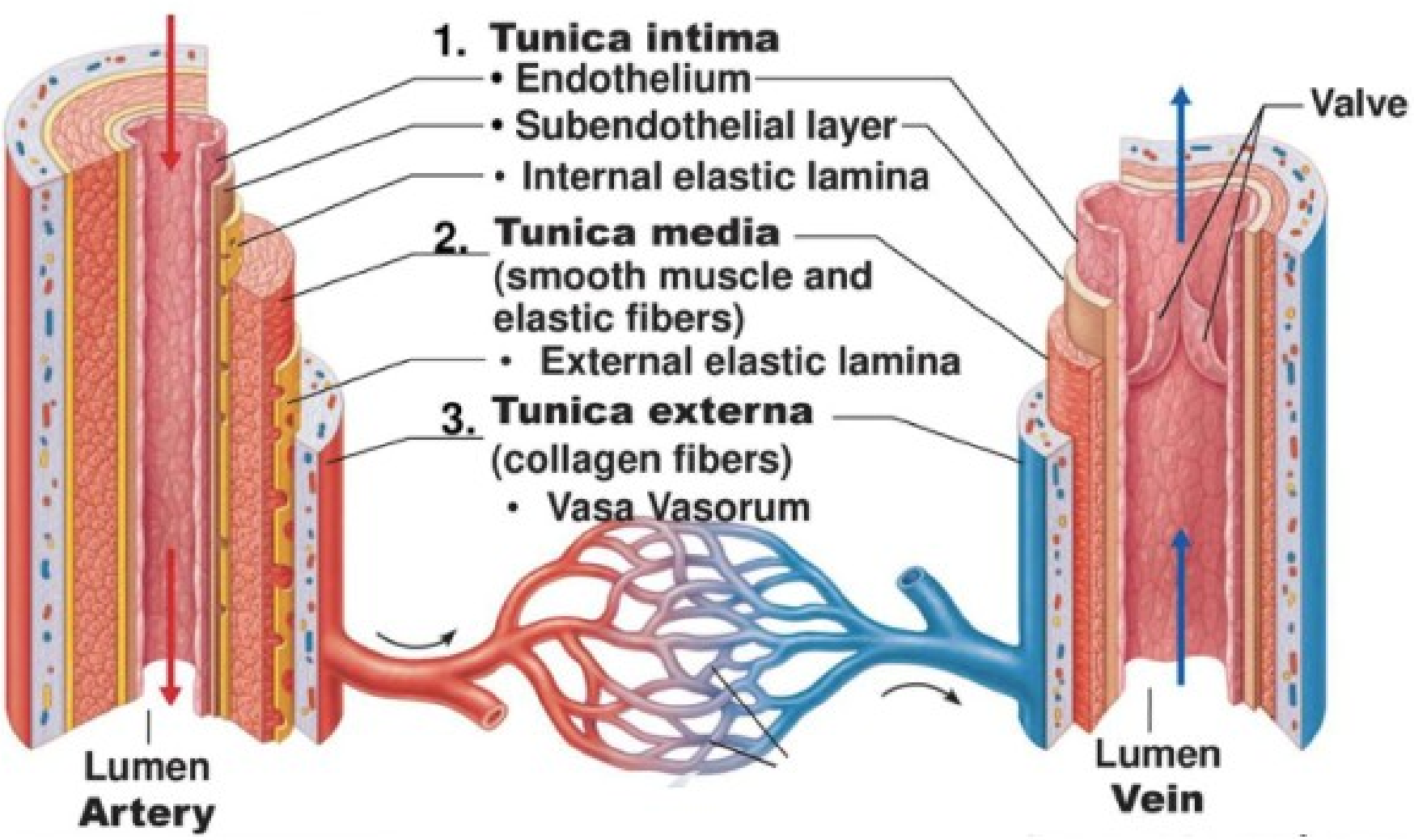
Disease	Reference
Ankylosing spondilitis	Vaile JH et al. J Rheumatol 1999;26:128-35
Autoimmune gastritis	Greenwood DL et al. Eur J Pediatr 2008;167:917-25
Autoimmune hepatitis	Terjung B Clin Rev Allergy Immunol 2009;36:40-51
Behcet's syndrome	Fresko I et al. Ann Rheum Dis 2001;60:65-6
Celiac disease	Schulzke JD et al. Pediatric Res 1998;43:435-41
Crohn's disease	Caradonna L et al. J Endotoxin Res 2000;6:205-14
Dermatitis herpetiformis	Kieffer M et al. Br J Dermatol 1983;108:673-8
Diabetes type 1	Sapone A et al. Diabetes 2006;55:1443-49
Hashimoto Thyroiditis	Sasso FC et al. Gut 2004;53:1878-80
Juvenil Arthritis	Picco P et al. Clin Exp Rheumatol 2000;18:773-8
Lupus	Apperloo HZ et al. Epidemiol Infect 1994;112:367-73
Multiple Sclerosis	Yacyshyn B et al. Dig Dis Sci 1996;41:2493-98
Psoriasis	Hamilton et al. Q J Med 1985;56:559-67
Rheumatoid Arthritis	Smith MD et al. J Rheumatol 1985;12:299-305
Ulcerative Colitis	Caradonna L et al. J Endotoxin Res 2000;6:205-14
Uveitis	Benitez JM et al. Eye 2000 14(pt 3A):340-3

Reference: presentation Pedro Bastos, Grosetto, november 2014

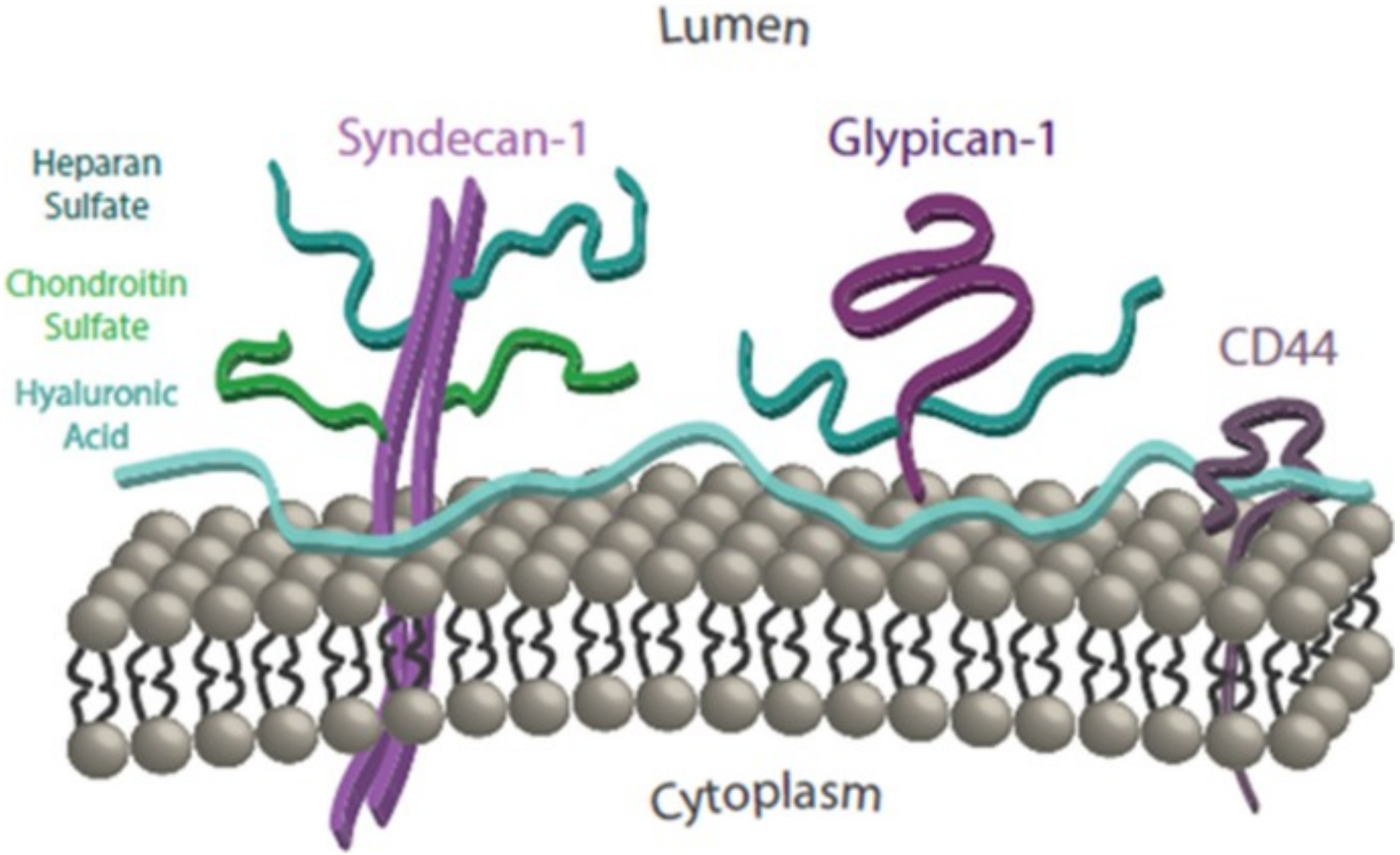
It's all about '<u>barrières</u>'

- Oral Cavity and skin
  - Microbial translocation
- Lungs
  - Inflammatory particles (rook, fijnstof)
- **Digestive system**
  - Translocation of microbes and pro-inflam particles
- **Blood vessels**
  - Disruption of the endothelial barrier / glycocalyx

The blood vessel wall

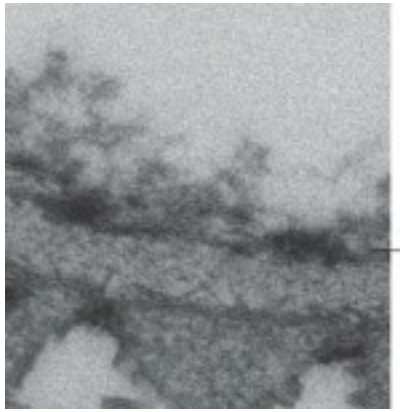


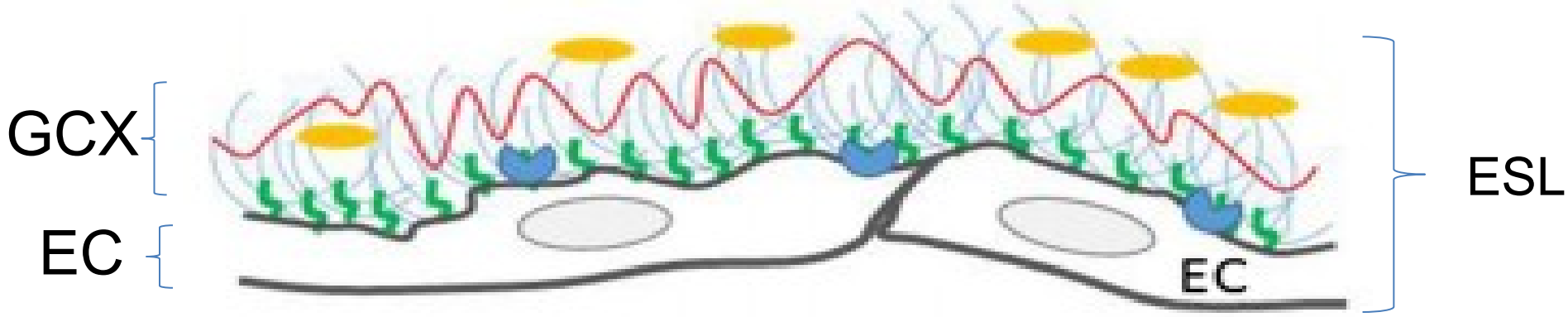
Glycocalyx: the forgotten layer…..



Biology of the glycocalyx

- Barriere tussen bloed en endotheel
- Transmissie van shear-stress
- Afstoten RBC, WBC, platelets
- Remming van de Stolling





GCX = glycocalyx; EC = endothelial cell; ESL = endothelial surface layer

Een verbindende ‘risico-factor’

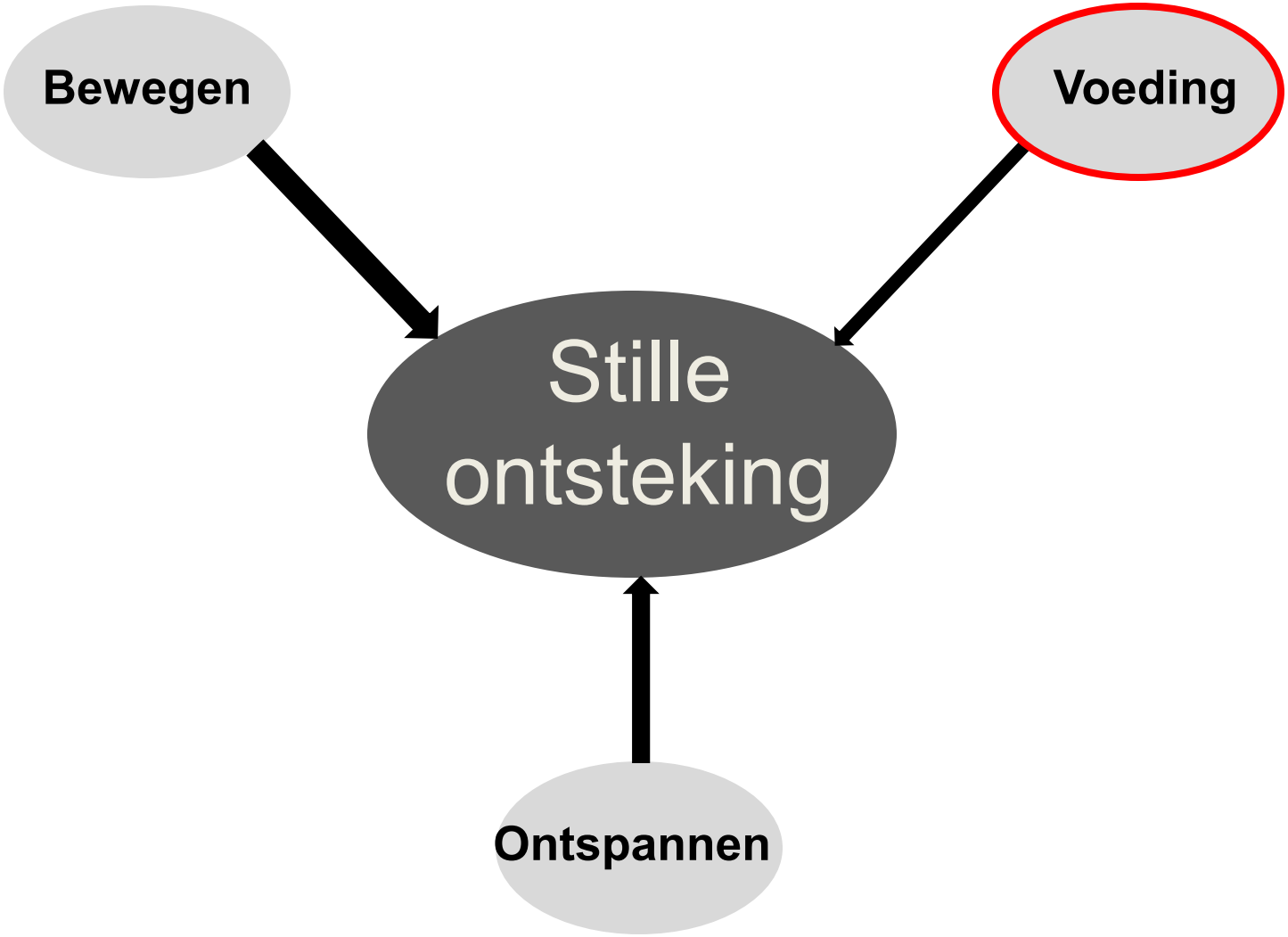
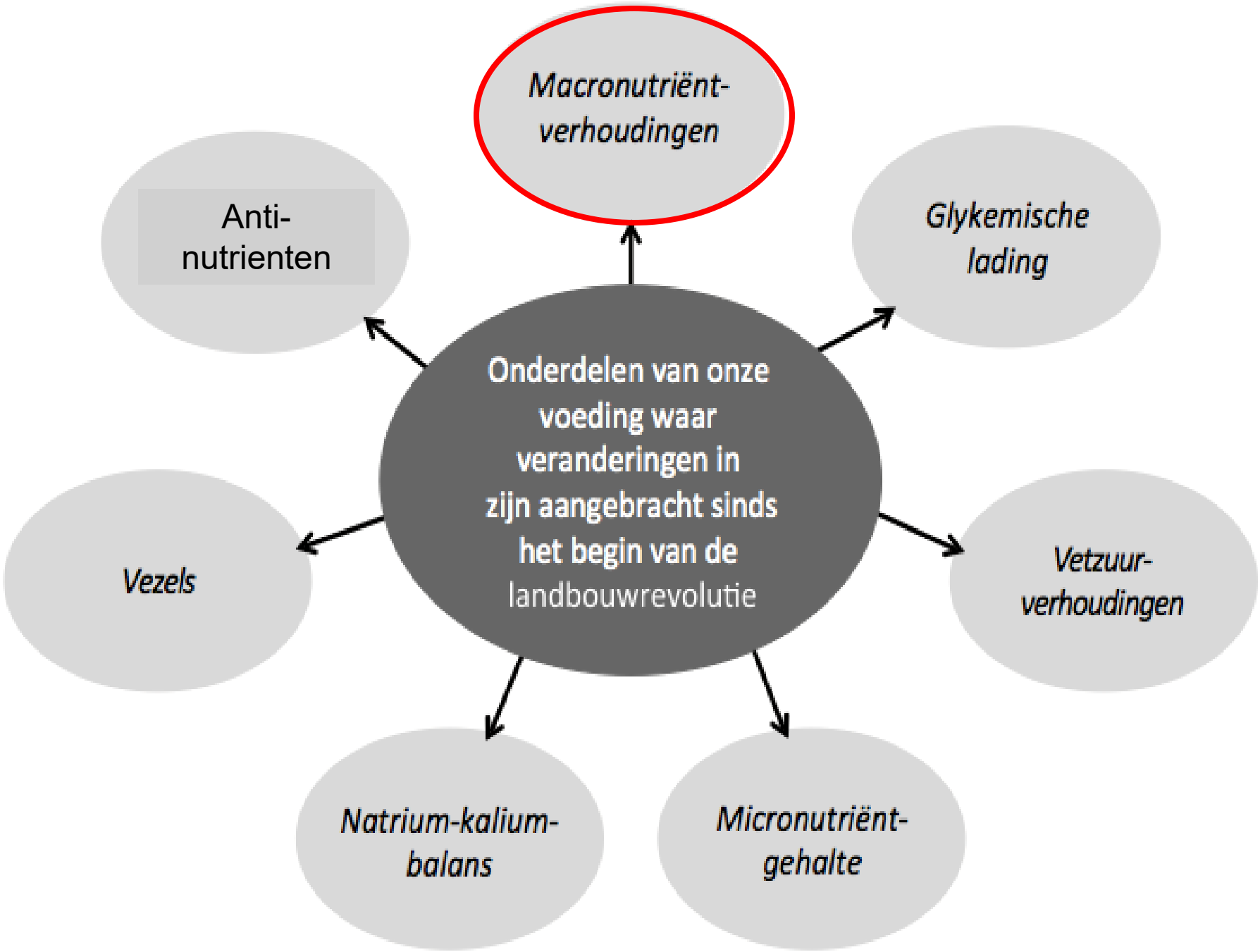


TABLE 1
Food and food types found in Western diets generally unavailable to preagricultural hominins[1]

Food or food group		Value
Dairy products		*% of energy*[2]
Whole milk		1.6
Low-fat milk		2.1
Cheese	**Zuivel**	3.2
Butter		1.1
Other		2.6
Total		10.6
Cereal grains		
Whole grains		3.5
Refined grains	**Graan**	20.4
Total		23.9
Refined sugars		
Sucrose		8.0
High-fructose corn syrup		7.8
Glucose		2.6
Syrups	**Suiker**	0.1
Other		0.1
Total		18.6
Refined vegetable oils		
Salad, cooking oils		8.8
Shortening	**Olie**	6.6
Margarine		2.2
Total		17.6
Alcohol		1.4
Total energy		72.1
Added salt, as sodium chloride		9.6[3]

Onze huidige voeding bestaat voor 72% uit ‘onbekend’ voedsel

Cordain et al, AJCN 2005


Macronutriënt-verhoudingen
Anti-nutrienten
Glykemische lading
Onderdelen van onze voeding waar veranderingen in zijn aangebracht sinds het begin van de landbouwrevolutie
Vezels
Vetzuur-verhoudingen
Natrium-kalium-balans
Micronutriënt-gehalte

Macro-nutriënten

Koolhydraten

Snelle Koolhydraten

Langzame Koolhydraten

Eiwitten (proteine)

Vetten

Verzadigd vet

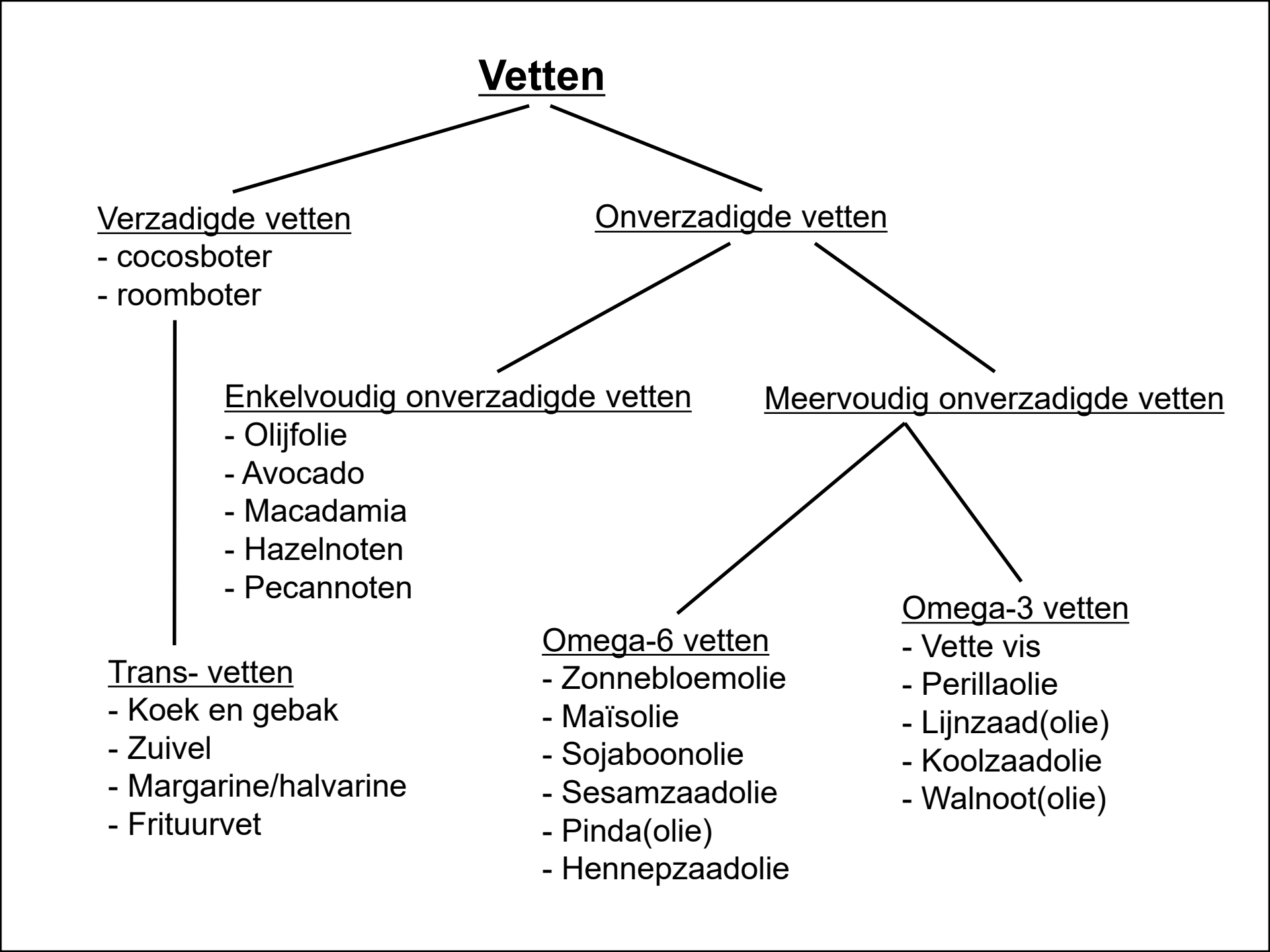
Onverzadigd vet

Enkelvoudig onverzadigd vet

Meervoudig onverzadigd vet

Gezonde eiwitten (vnl plant)

- Eiwitrijke diëten zijn gezond omdat
  - Verzadigend, ondanks negatieve energiebalans
  - Persisterend energiek, ondanks gewichtsverlies
  - Behouden van spiermassa bij afvallen


Vetten
Verzadigde vetten
- cocosboter
- roomboter
Onverzadigde vetten
Enkelvoudig onverzadigde vetten
- Olijfolie
- Avocado
- Macadamia
- Hazelnoten
- Pecannoten
Meervoudig onverzadigde vetten
Trans- vetten
- Koek en gebak
- Zuivel
- Margarine/halvarine
- Frituurvet
Omega-6 vetten
- Zonnebloemolie
- Maïsolie
- Sojaboonolie
- Sesamzaadolie
- Pinda(olie)
- Hennepzaadolie
Omega-3 vetten
- Vette vis
- Perillaolie
- Lijnzaad(olie)
- Koolzaadolie
- Walnoot(olie)

Why are we so afraid of fat?

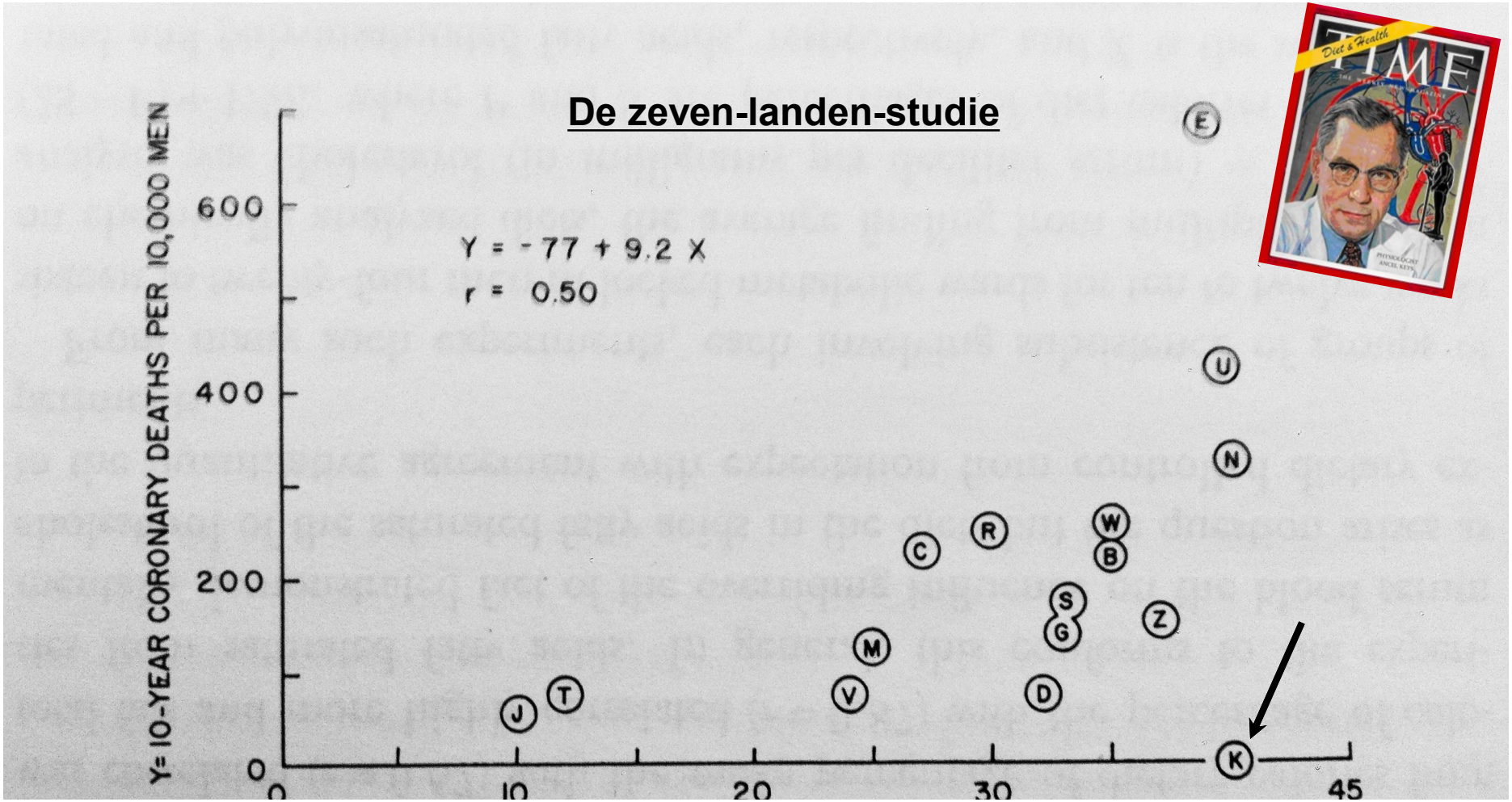
Meer eiwit, meer vet?

- Eet minder vet:

- LET op VET
- Verzadigd = Verkeerd

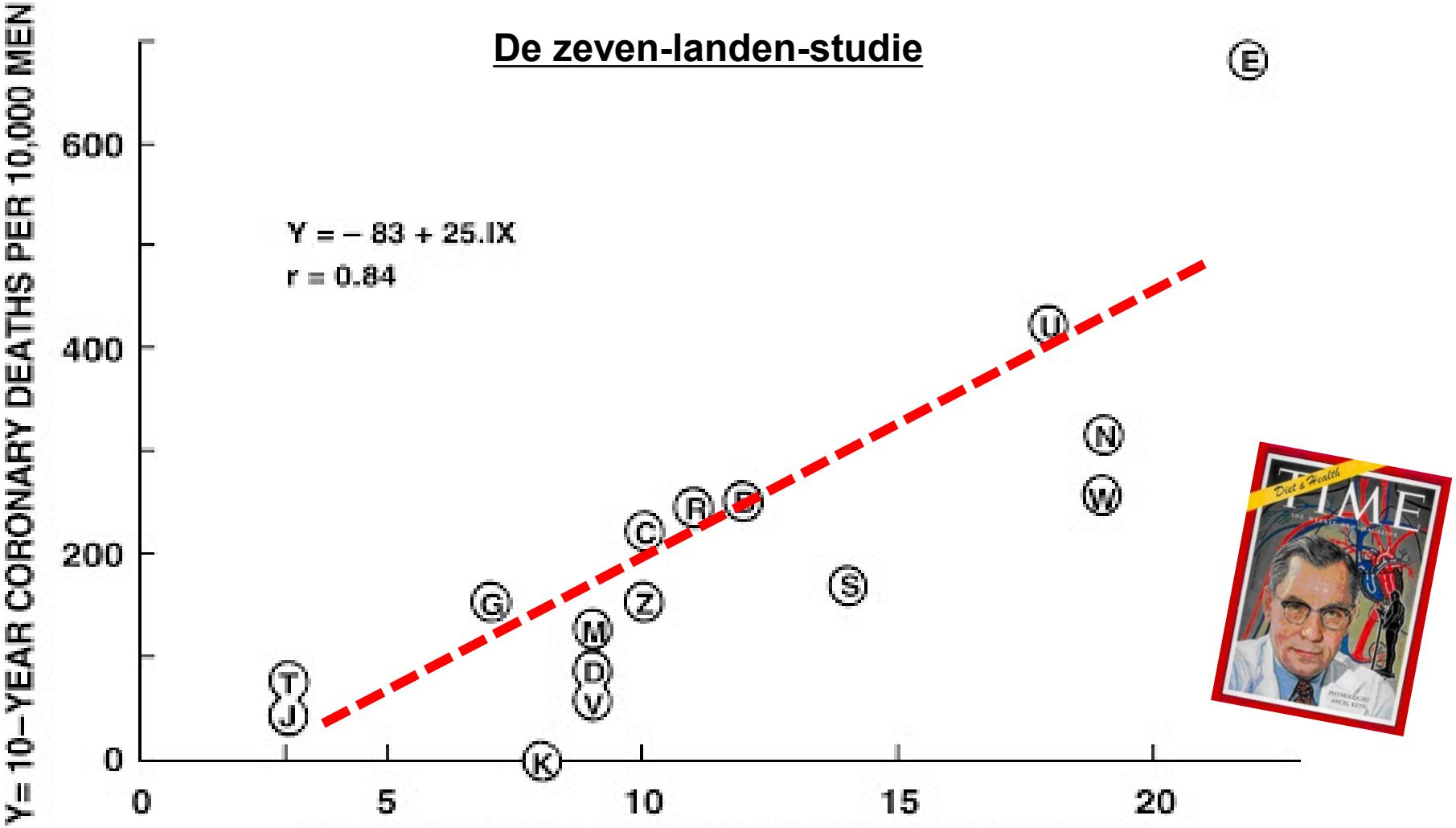
- Tussen 1987 en 1997 zijn Nederlanders minder vet en verzadigd vet gaan eten

Vet ongezond?



Figuur: De hoeveel dodelijke hartaanvallen als functie van de inname van vet

Ancel Keys Circulaion 1980



Figuur: De hoeveel dodelijke hartaanvallen als functie van de inname van VERZADIGD vet

Ancel Keys Circulaion 1980

Verzadigd vet vervangen door koolhydraten

Major types of dietary fat and risk of coronary heart disease: a pooled analysis of 11 cohort studies[1–3]

Marianne U Jakobsen, Eilis J O'Reilly, Berit L Heitmann, Mark A Pereira, Katarina Bälter, Gary E Fraser, Uri Goldbourt, Göran Hallmans, Paul Knekt, Simin Liu, Pirjo Pietinen, Donna Spiegelman, June Stevens, Jarmo Virtamo, Walter C Willett, and Alberto Ascherio

During 4-10 y of follow-up, 5249 coronary events and 2155 coronary deaths occurred among 344,696 persons

Vervangen van verzadigd vet door koolhydraten geeft een …..

7% hogere kans op HVZ

Jakobsen AJCN 2009

Type koolhydraten?

Intake of carbohydrates compared with intake of saturated fatty acids and risk of myocardial infarction: importance of the glycemic index[1–3]

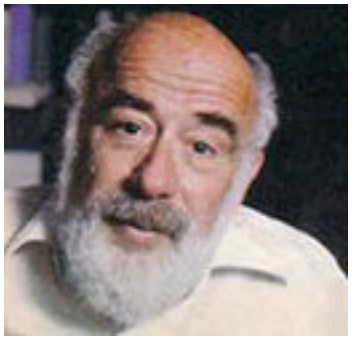
Marianne U Jakobsen, Claus Dethlefsen, Albert M Joensen, Jakob Stegger, Anne Tjønneland, Erik B Schmidt, and Kim Overvad

prospective cohort study included 53,644 women and men

- Lage glycemische index: niet sign. 12% verlaagd HVZ risico
- Hoge glycemische index: 33% verhoogd HVZ risico

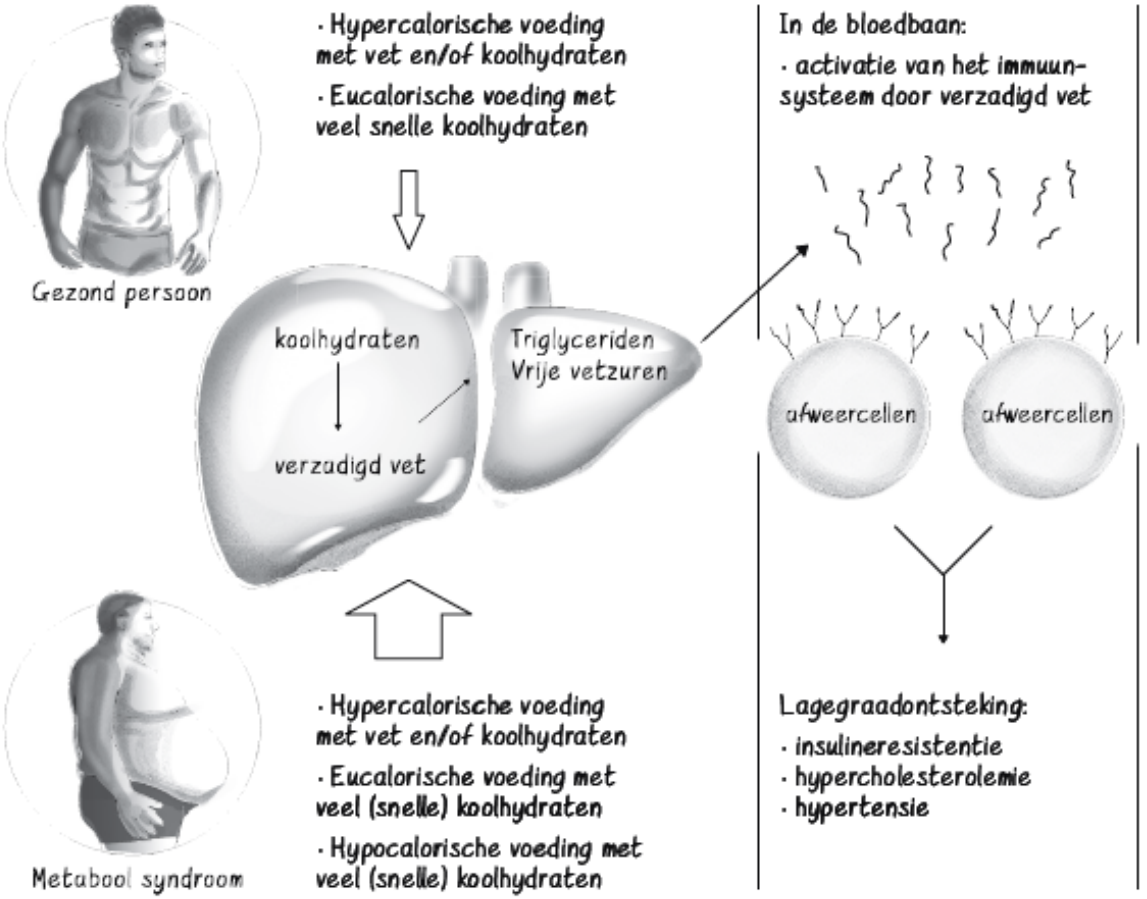
Jakobsen AJCN 2010

De link tussen koolhydraten en inflammatie



John Gofman

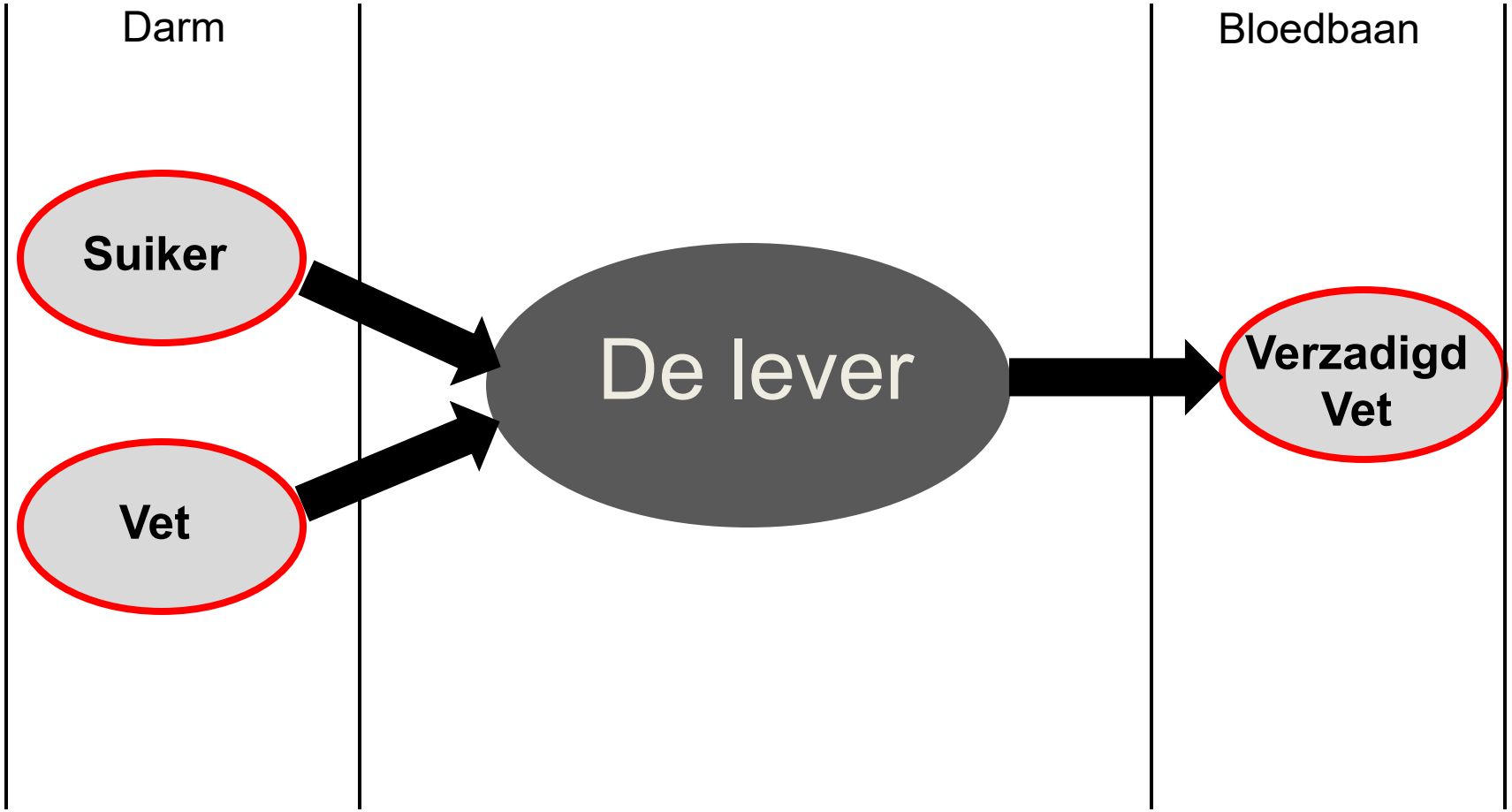
Carbohydrate induced hyper-TG



Figuur 21. De gevolgen van de inname van verschillende soorten voeding op de triglyceriden, het cholesterol, op insulineresistentie, overgewicht (obesitas) en hoge bloeddruk (hypertensie) via lagegraadontsteking in gezonde personen en personen met het metaboolsyndroom.[489]

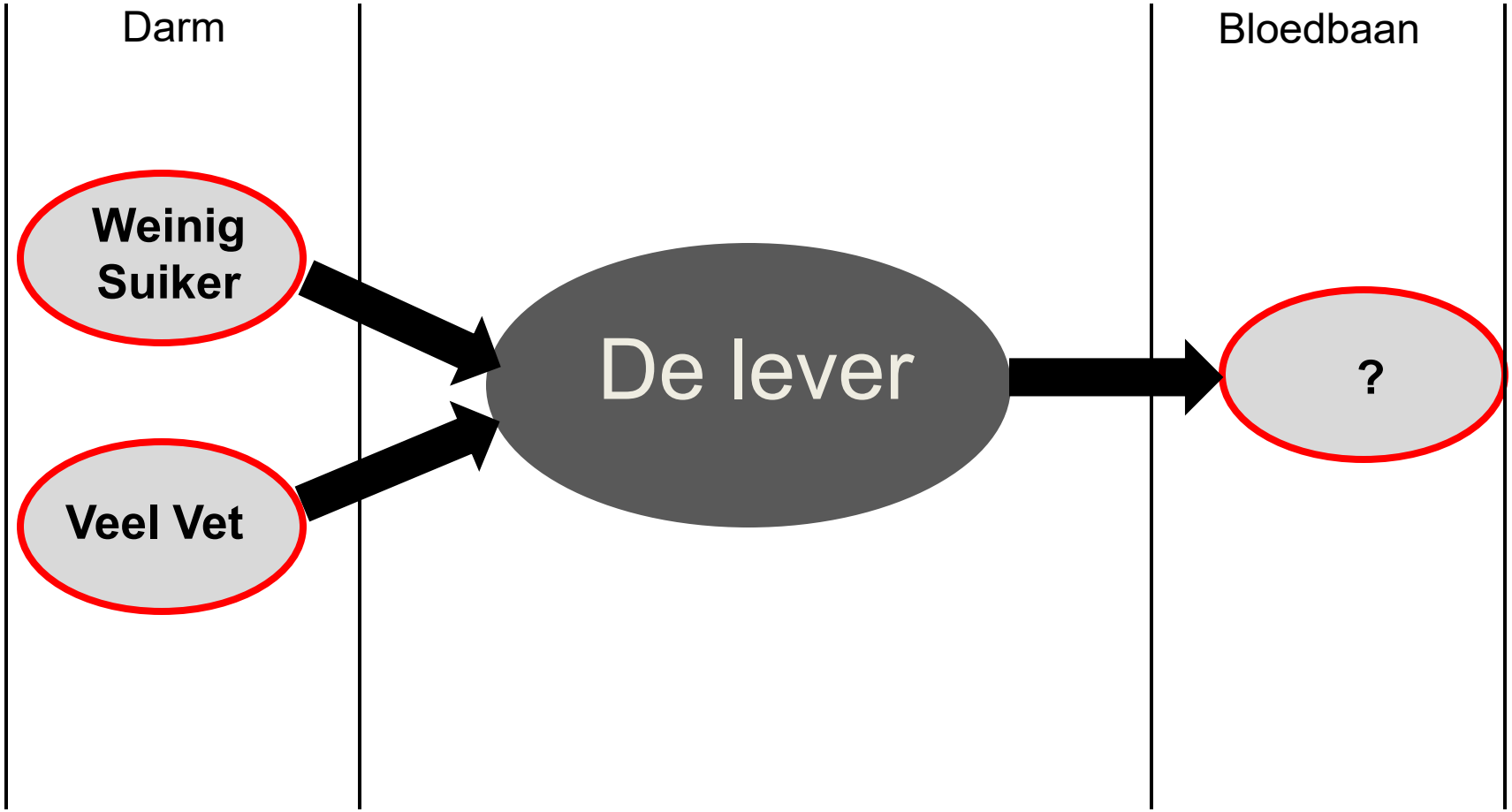
Kuipers, het Oerdieet, 2014

Verzadigd vet en aderverkalking



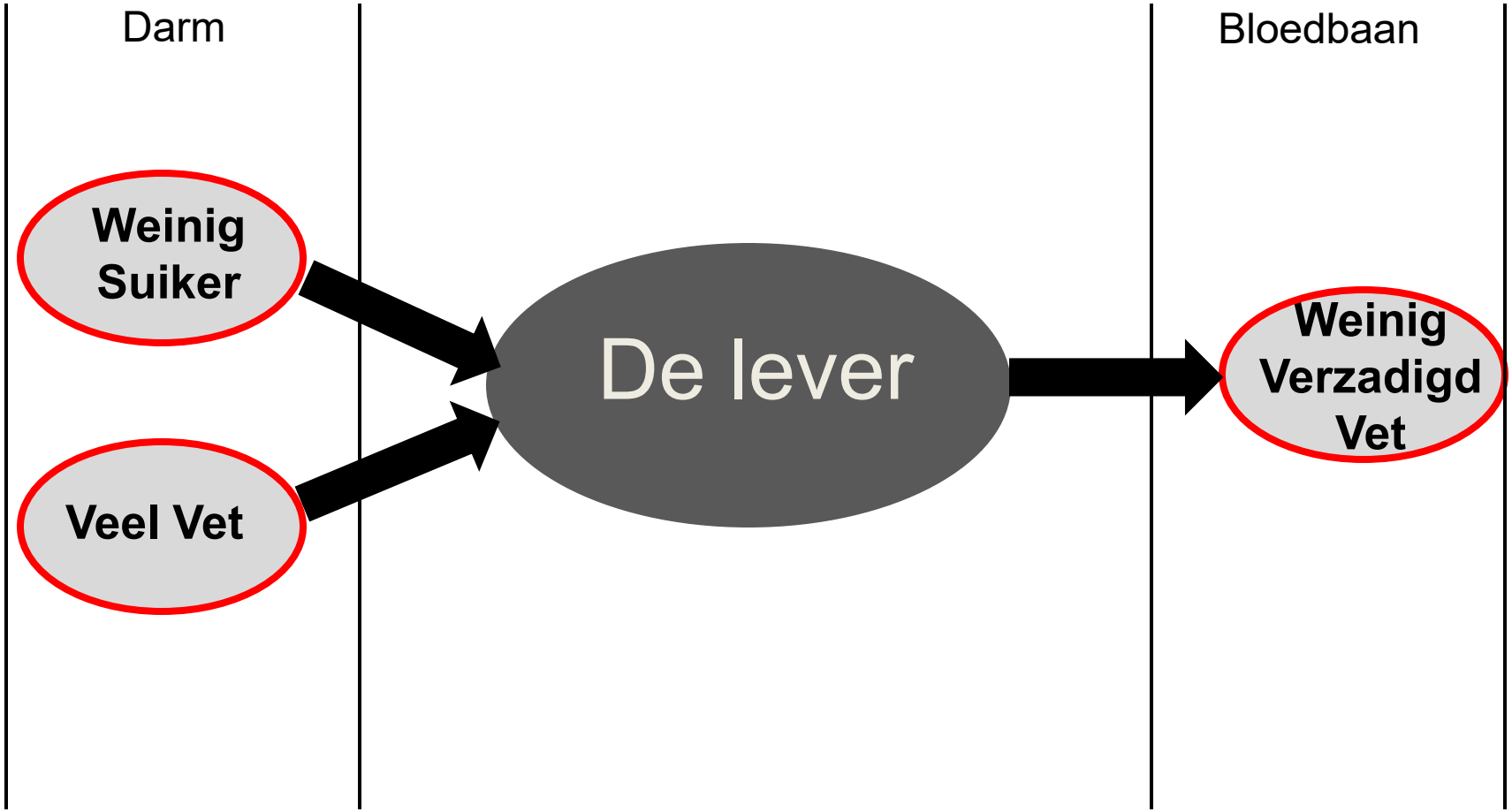
Endotoxin-lipoprotein hypothese Samaan *Diabetology & Metabolic Syndrome 2011*

Verzadigd vet en aderverkalking



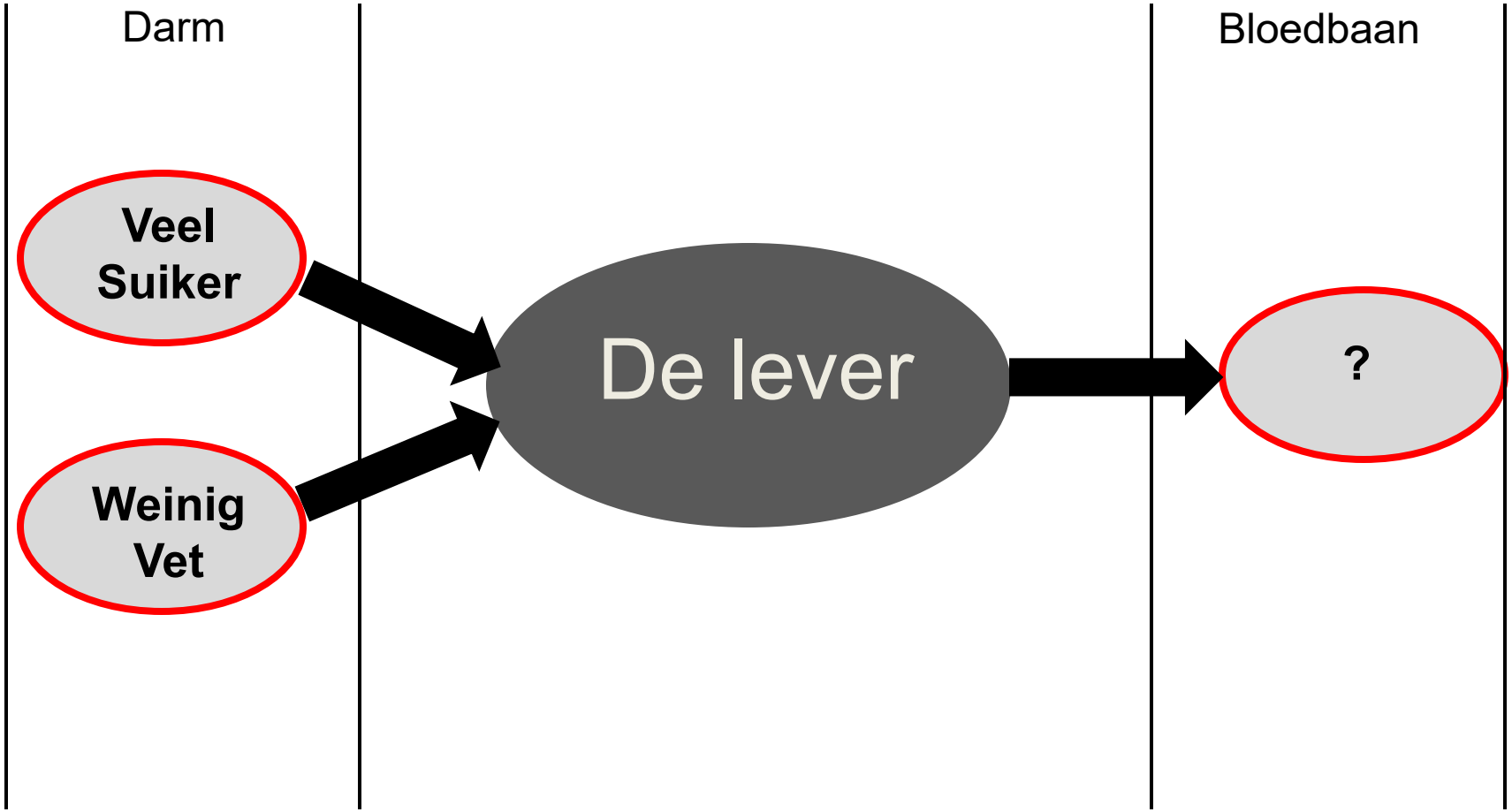
Endotoxin-lipoprotein hypothese Samaan *Diabetology & Metabolic Syndrome 2011*

Verzadigd vet en aderverkalking



Endotoxin-lipoprotein hypothese Samaan *Diabetology & Metabolic Syndrome 2011*

Verzadigd vet en aderverkalking



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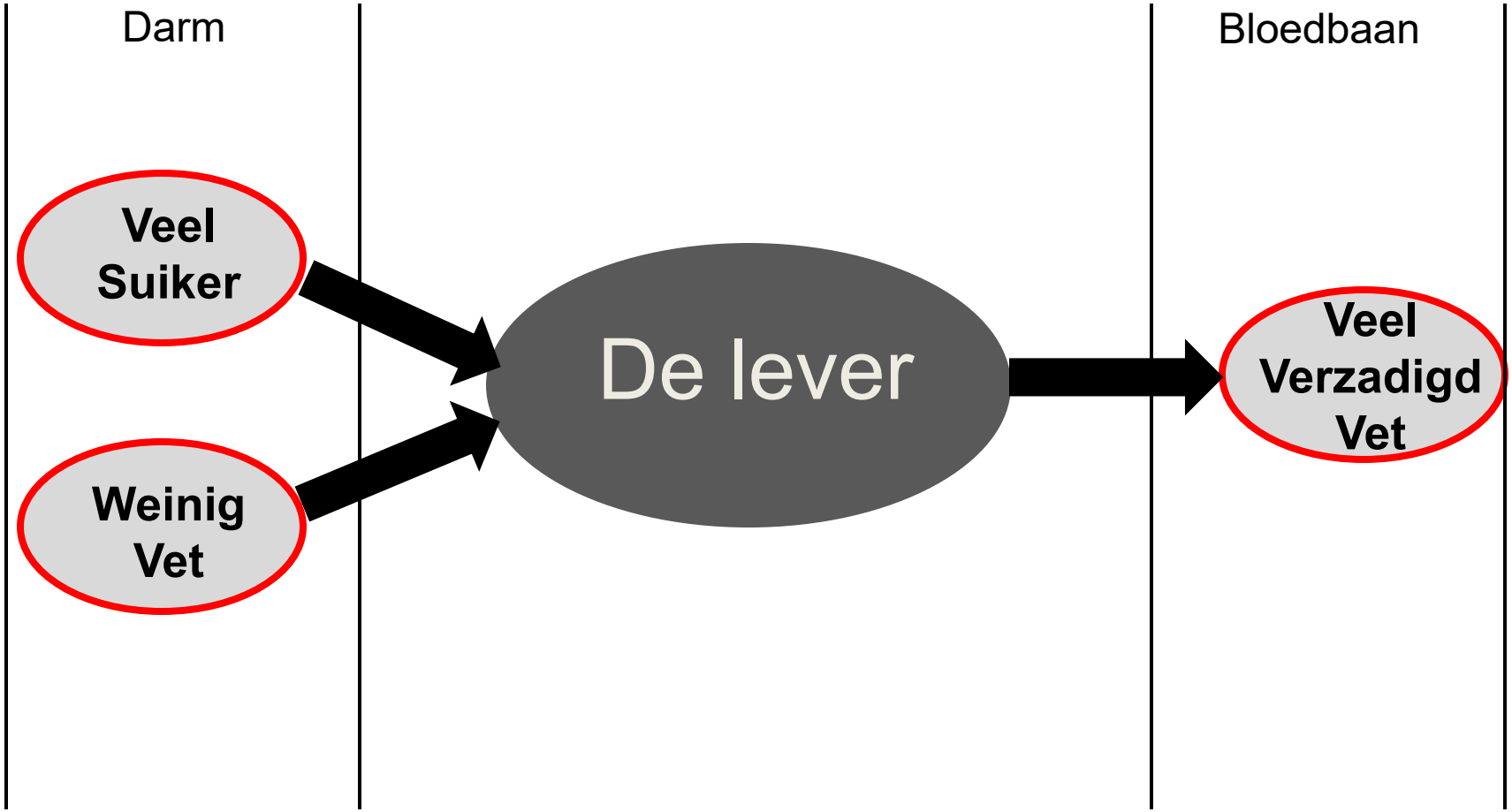


Endotoxin-lipoprotein hypothese Samaan *Diabetology & Metabolic Syndrome 2011*

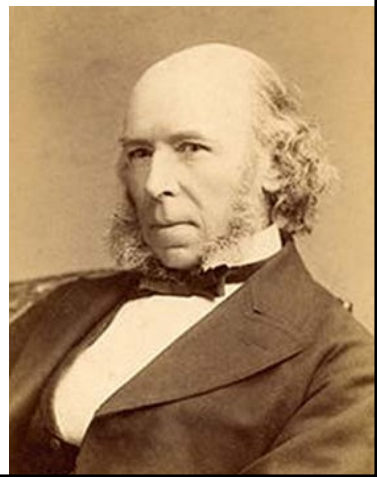
Take home message No. 11:

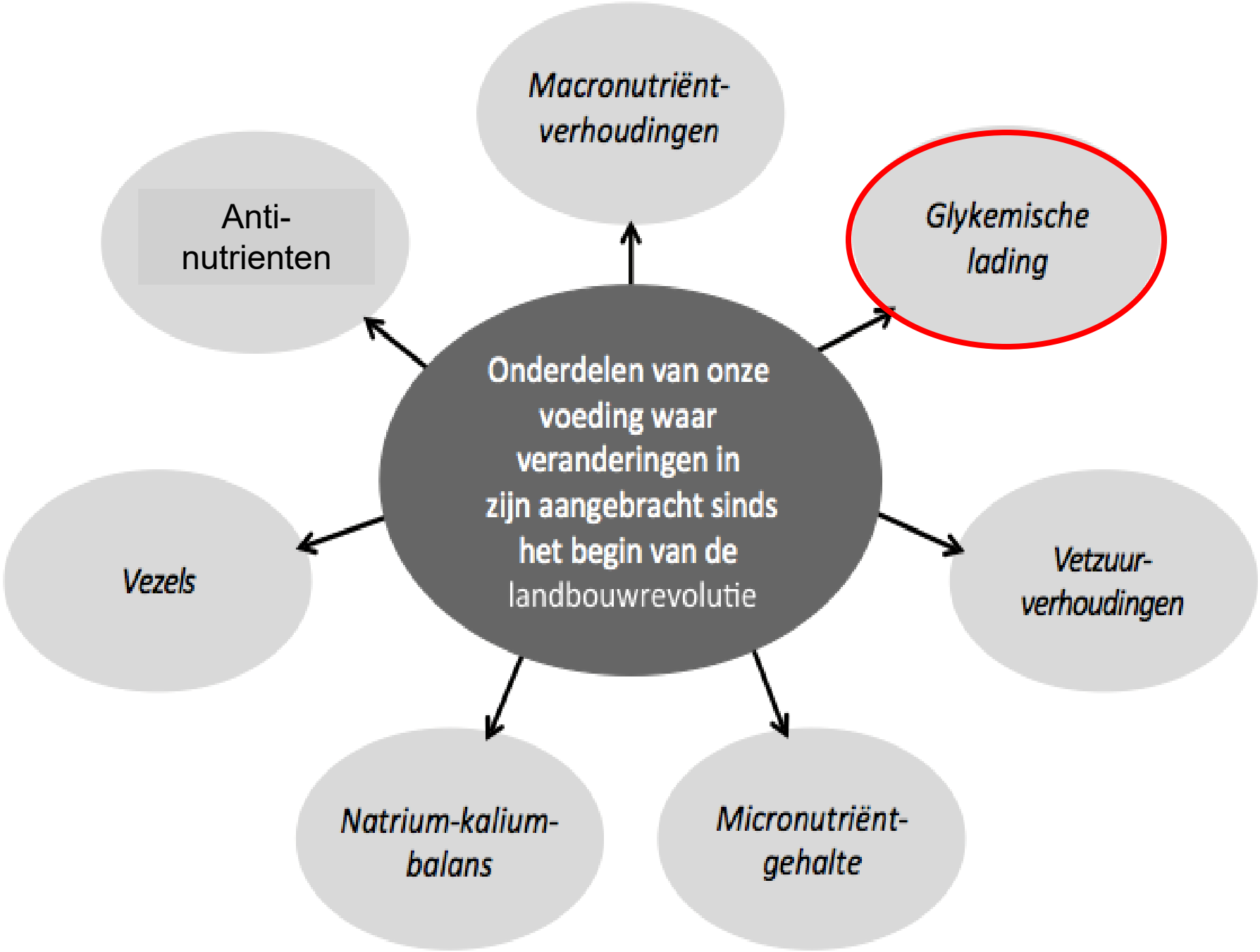
Vervang

ongezonde (snelle) koolhydraten (fastfood en frisdrank) en verzadigd vet (rood vlees)

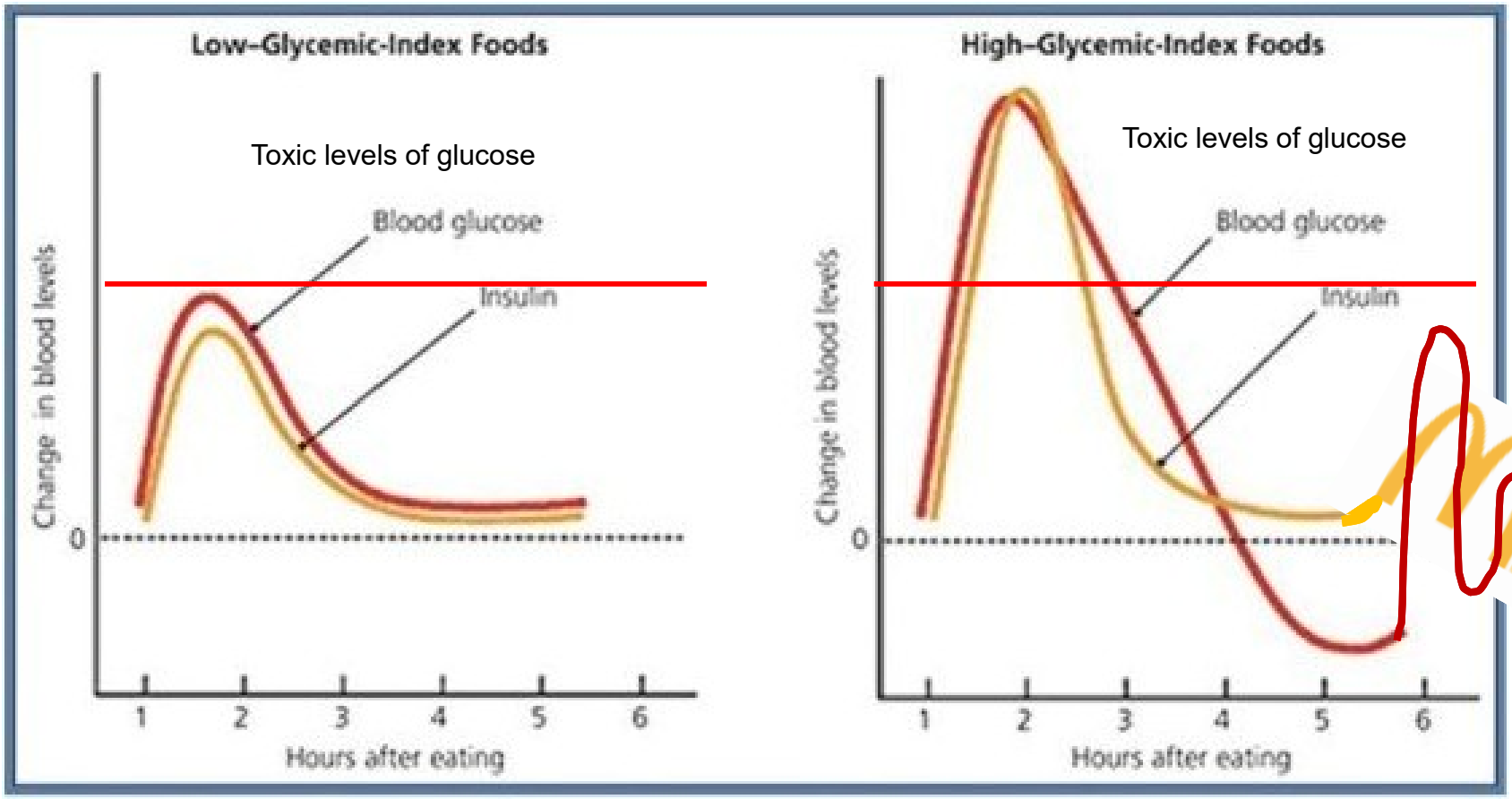
door

door langzame koolhydraten (groente en fruit) en noten, peulvruchten, gevogelte en vis




Macronutriënt-verhoudingen
Anti-nutrienten
Glykemische lading
Onderdelen van onze voeding waar veranderingen in zijn aangebracht sinds het begin van de landbouwrevolutie
Vezels
Vetzuur-verhoudingen
Natrium-kalium-balans
Micronutriënt-gehalte

Insuline/glucose respons



Food Values: Glycemic Index/Glycemic Load

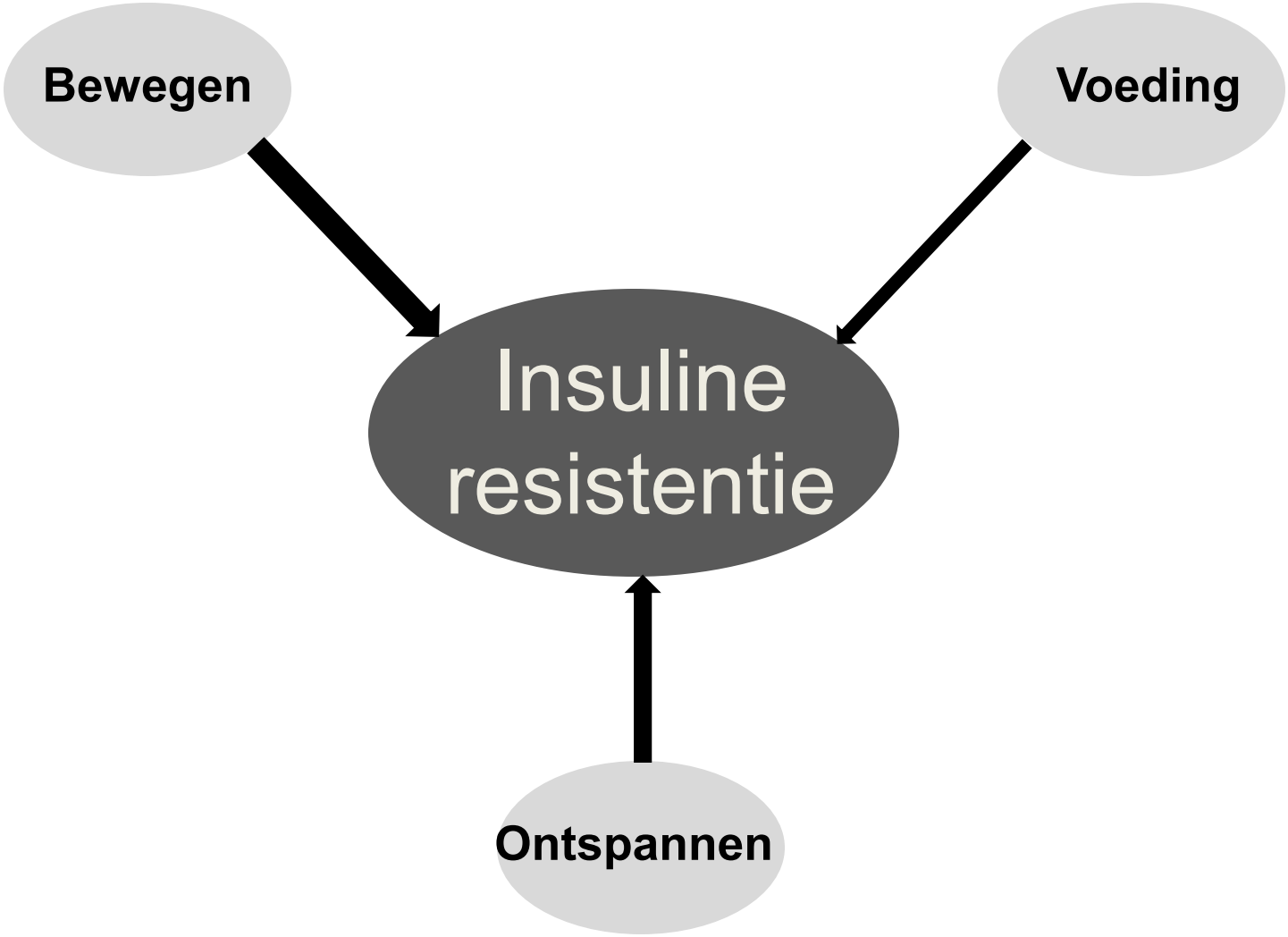
	Low GI	Med GI	High GI
Low GL	All-bran cereal (8,42) Apples (6,38) Carrots (3,47) Peanuts (1,14) Strawberries (1,40) Sweet Co… (3,54)	Beets (5,64) Cantaloupe (4,65) Pineapple (7,59) Sucrose, i.e. table sugar (7,68)	Popcorn (8,72) Watermelon (4,72) Whole wheat flour bread (…)
Med GL	Apple juice (11,40) Bananas (12,52) Fettucine (18,40) Orange juice (12,50) Sourdough wheat bread (15,54)	Life Cereal (16,66) New potatoes (12,…) Wild rice (18,5…)	Cheerios (15,74) Shredded wheat (15,75)
High GL	Linguine (23,52) Macaroni (23,47) Spaghetti (…,42)	Couscous (23,65) White rice (23,64)	Baked Russet potatoes (26,85) Cornflakes (21,81)

Veggies & fruits

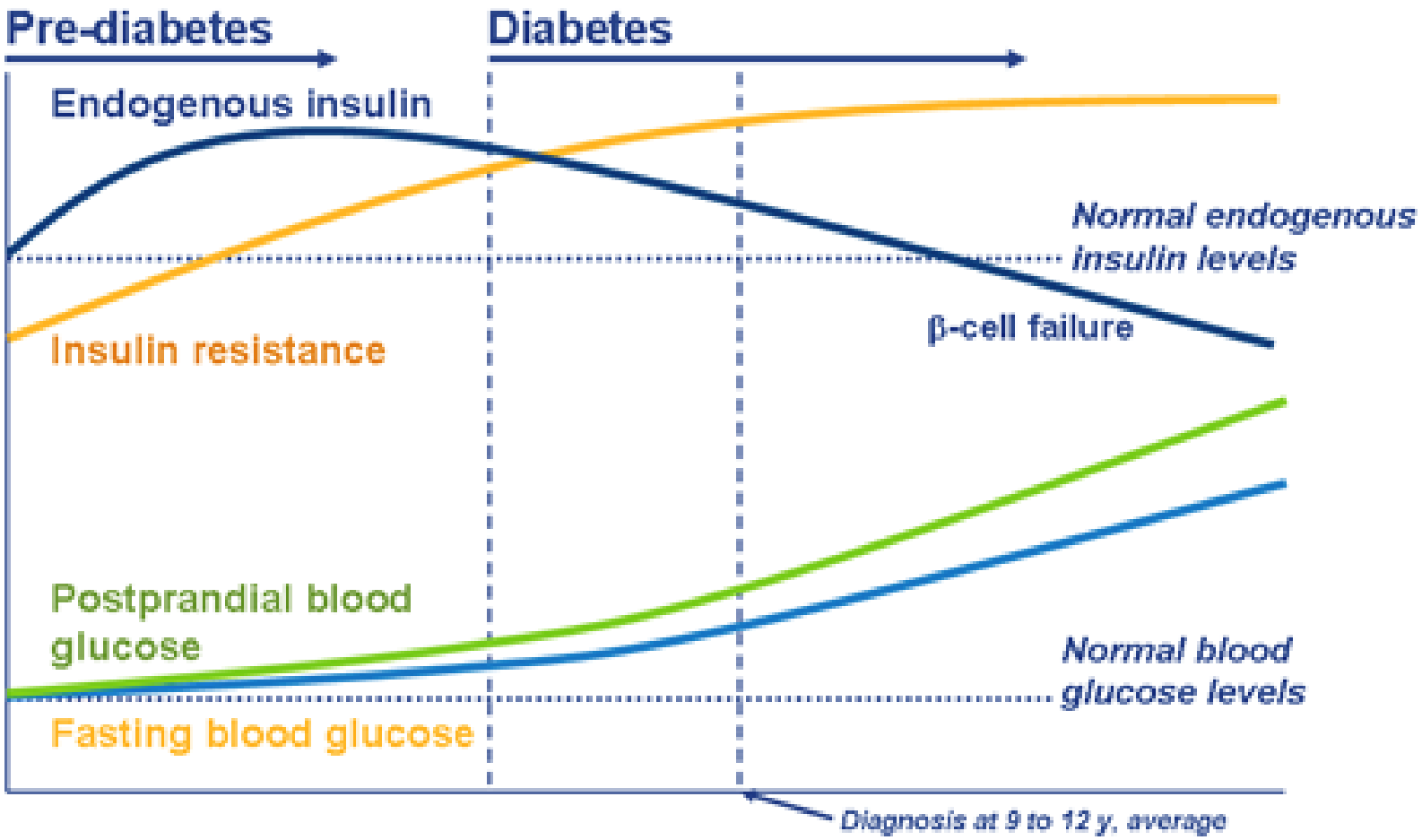
Starch / zetmeel

Source: Revised International Table of Glycemic Index (GI) and Glycemic Load (GL), *The American Journal of Clinical Nutrition*, July 2002

Risico-factoren



Progression to Type 2 Diabetes

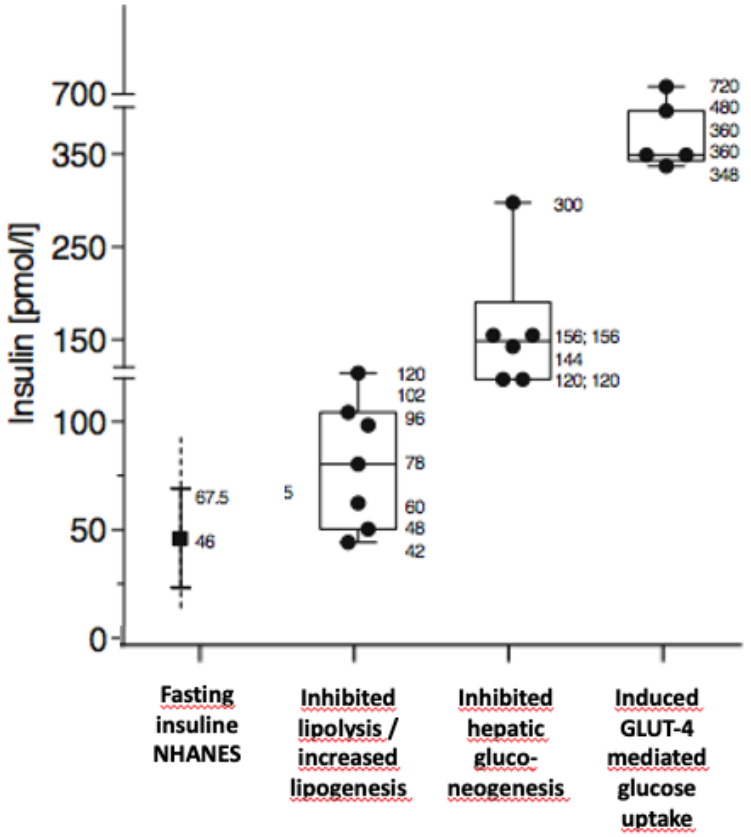


The carbohydrate-insulin model: a physiological perspective on the obesity pandemic

David S Ludwig,[1,2,3] Louis J Aronne,[4] Arne Astrup,[5] Rafael de Cabo,[6] Lewis C Cantley,[7] Mark I Friedman,[8,9] Steven B Heymsfield,[10] James D Johnson,[11,12] Janet C King,[13] Ronald M Krauss,[14,15] Daniel E Lieberman,[16] Gary Taubes,[9] Jeff S Volek,[17] Eric C Westman,[18] Walter C Willett,[3,19] William S Yancy, Jr,[18] and Cara B Ebbeling[1,2]

ABSTRACT

According to a commonly held view, the obesity pandemic is caused by overconsumption of modern, highly palatable, energy-dense processed foods, exacerbated by a sedentary lifestyle. However, obesity rates remain at historic highs, despite a persistent focus on eating less and moving more, as guided by the energy balance model (EBM). This public health failure may arise from a fundamental limitation of the EBM itself. Conceptualizing obesity as a disorder of energy balance restates a principle of physics without considering the biological mechanisms that promote weight gain. An alternative paradigm, the carbohydrate-insulin model (CIM), proposes a reversal of causal direction. According to the CIM, increasing fat deposition in the body—resulting from the hormonal responses to a high-glycemic-load diet—drives positive energy balance. The CIM provides a conceptual framework with testable hypotheses for how various modifiable factors influence energy balance and fat storage. Rigorous research is needed to compare the validity of these 2 models, which have substantially different implications for obesity management, and to generate new models that best encompass the evidence. *Am J Clin Nutr* 2021;00:1–13.



Ludwig et al, AJCN, 2021

Kolb et al. BMC Medicine (2018) 16:232

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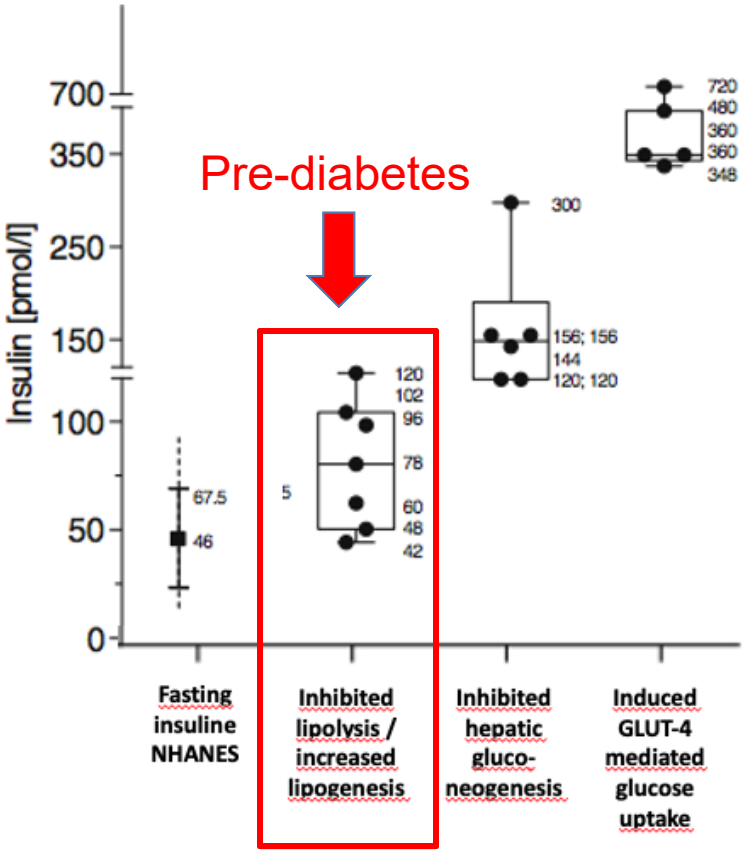

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Dank voor uw aandacht

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