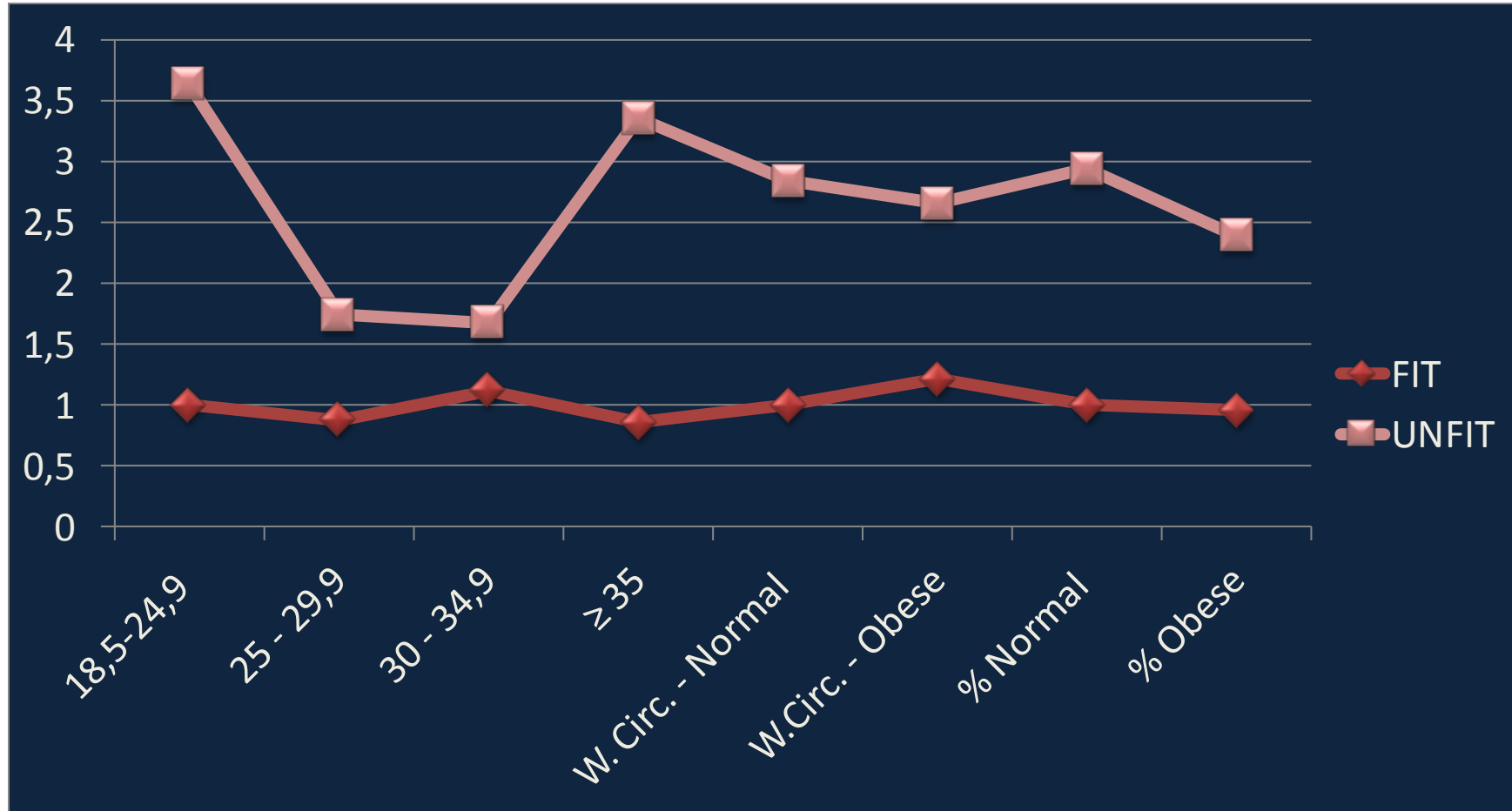


Dr Emmanouil Georgiadis

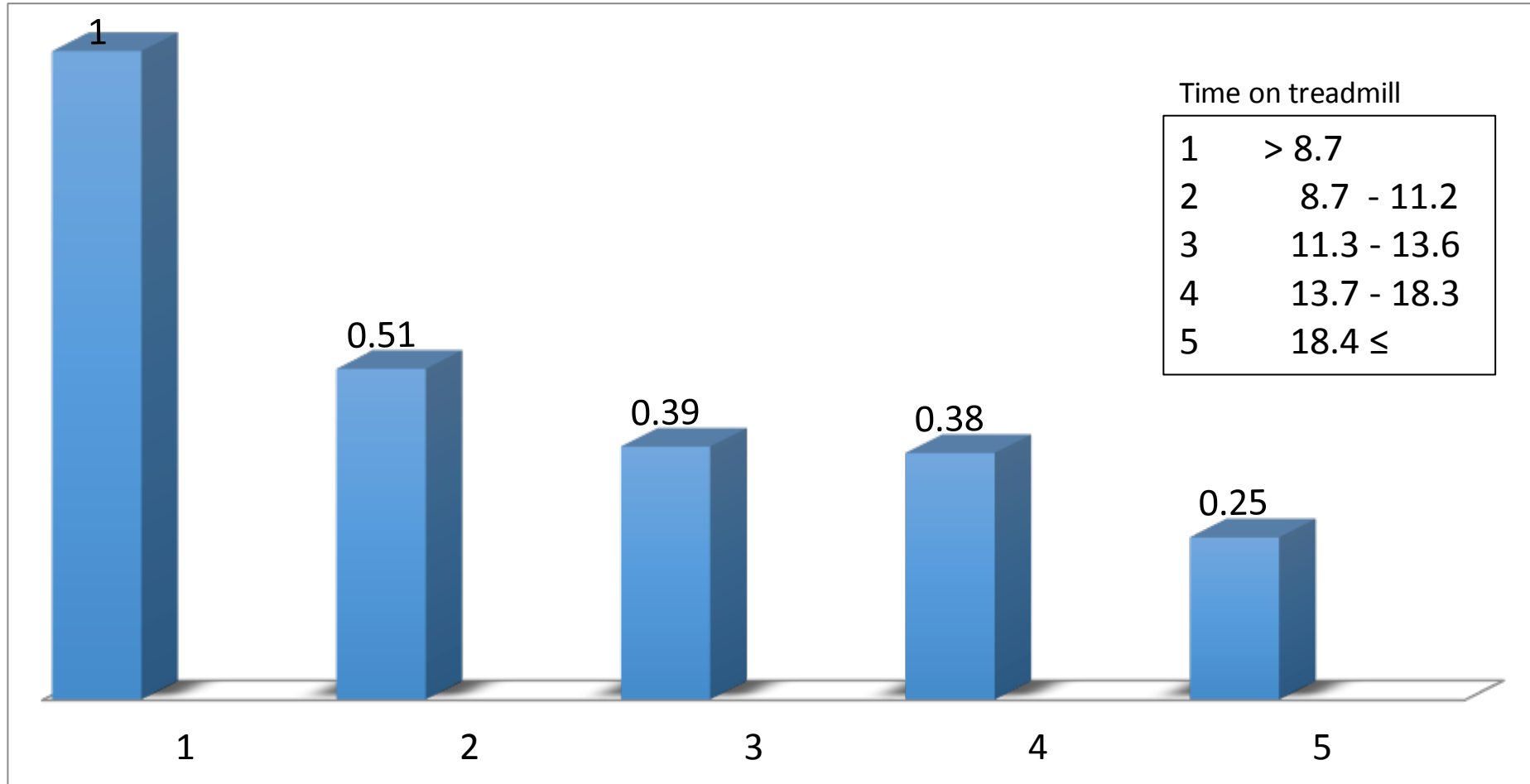
FITNESS OVER FATNESS – SEDENTARY BEHAVIOURS

IMPORTANT PARAMETER: PHYSICAL FITNESS

Fitness and mortality levels



Fitness and mortality levels



Physical inactivity and health...

“Physical inactivity and low fitness is perhaps the most important predictor of morbidity and mortality that we know of. Low fitness accounts for more sickness and deaths in the population than anything else that we have studied”

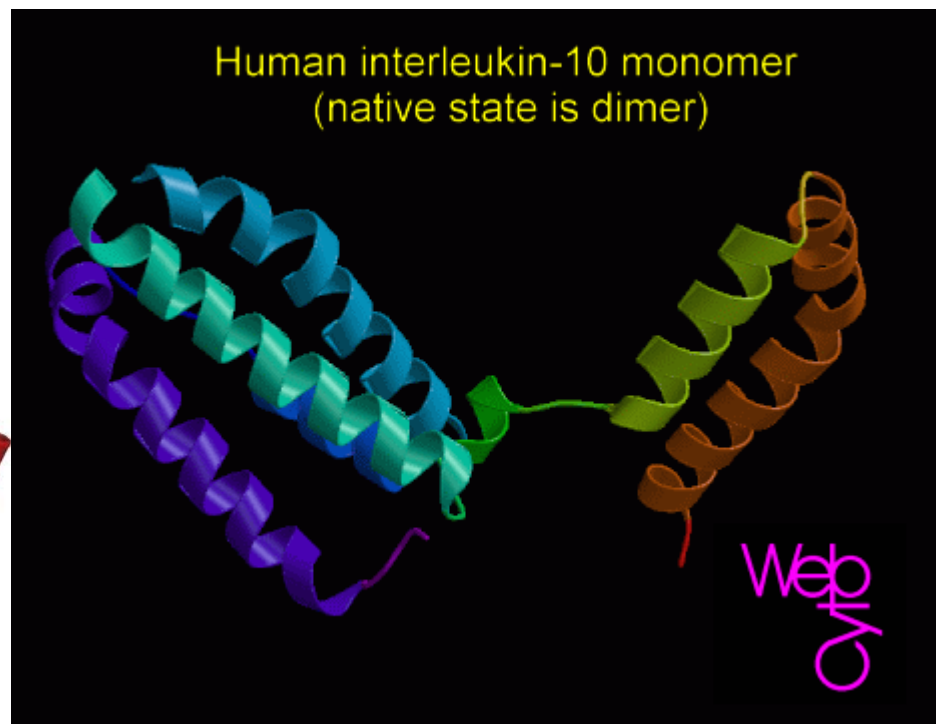
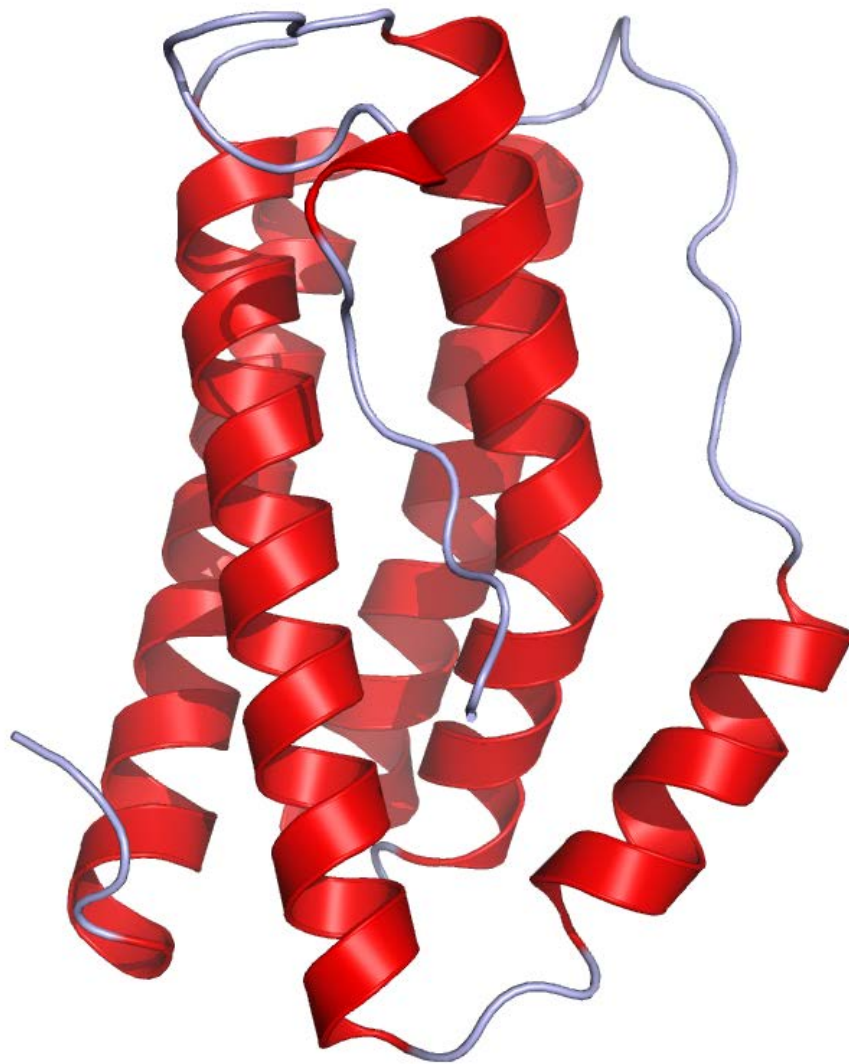
- *Dr. Steve Blair*

Conclusion

- Increased physical activity **diminishes the risk of illness** in every human being
- For a good level of health we do need to reduce body weight if any individual is sufficiently physically active
- **Why does this happen?**

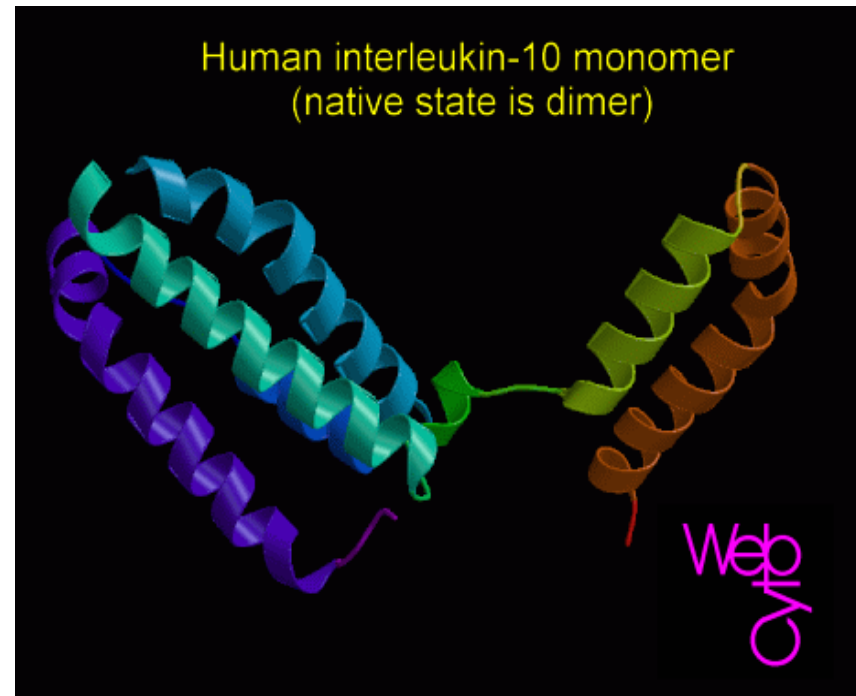
Interleukins

IL – 4,6,7,10 & 15



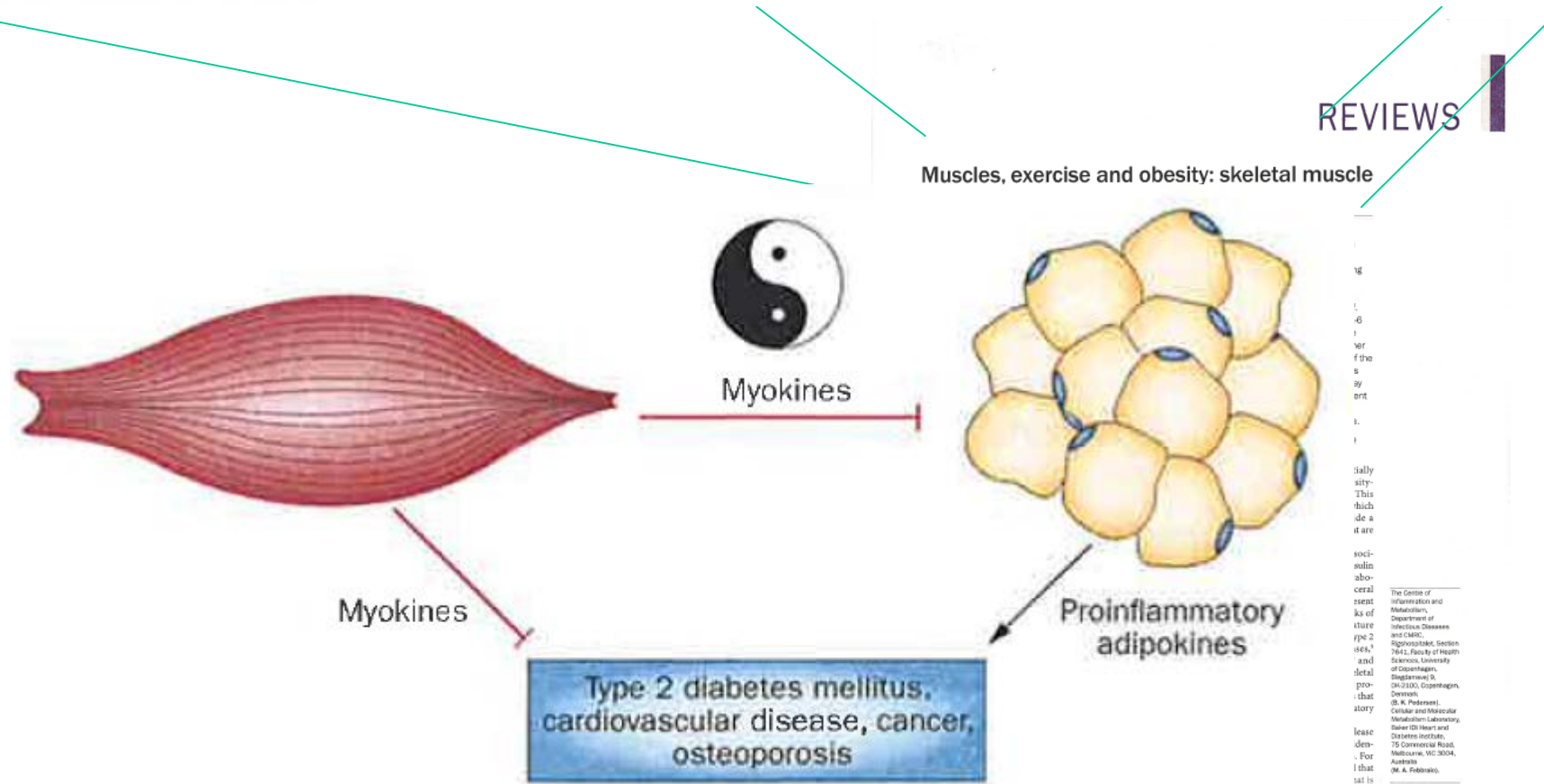
Interleukin – 4,6,7,10 &15

- Proteins secreted during physical activity
- Powerful anti-inflammation action
- Reducing metabolic risk factors
- Better health



Muscles, exercise and obesity: skeletal muscle as a secretory organ

Bente K. Pedersen and Mark A. Febbraio



Muscles, exercise and obesity: skeletal muscle

REVIEWS

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Correspondence to:
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Competing interests
The authors declare no competing interests.

released in response to increased glucose demand during contraction.¹⁰ To date, owing to lack of more precise

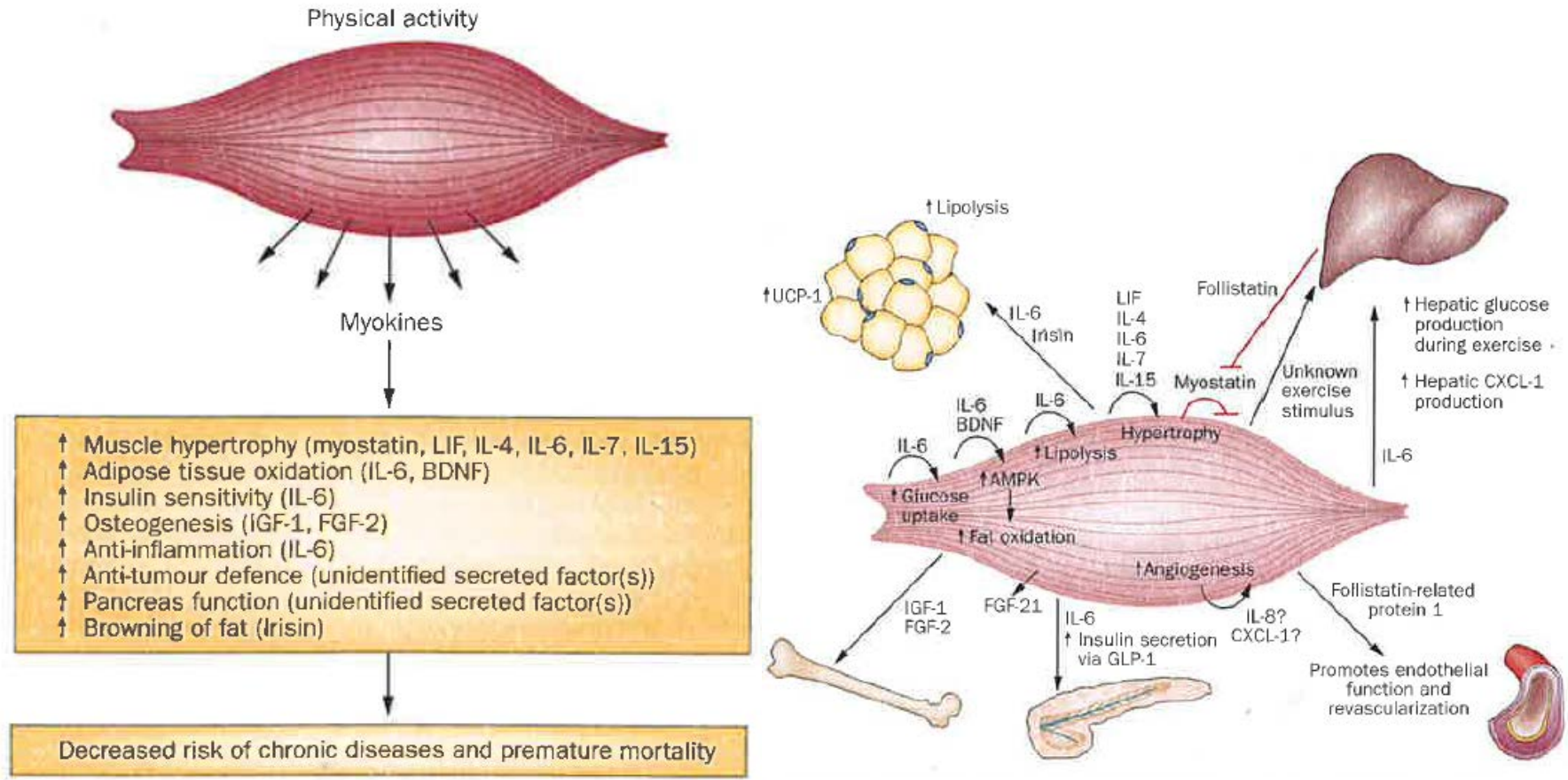
NATURE REVIEWS | ENDOCRINOLOGY

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VOLUME 8 | AUGUST 2012 | 457

Muscles, exercise and obesity: skeletal muscle as a secretory organ

Bente K. Pedersen and Mark A. Febbraio



The role of IL-6

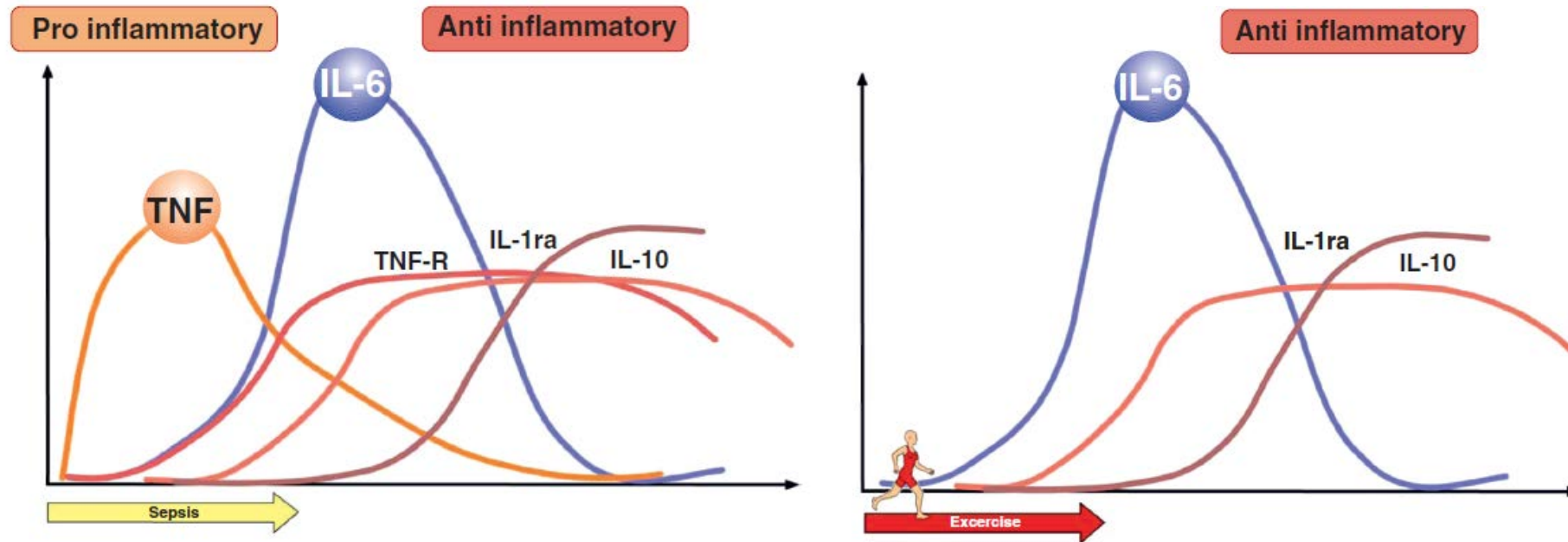


Figure 3 Comparison of sepsis-induced versus exercise-induced increases in circulating cytokines. During sepsis, there is a marked and rapid increase in circulating tumor necrosis factor- α (TNF- α), which is followed by an increase in interleukin-6 (IL-6). In contrast, during exercise, the marked increase in IL-6 is not preceded by elevated TNF- α . Adapted, with permission, from (175).

Biological role of Muscle

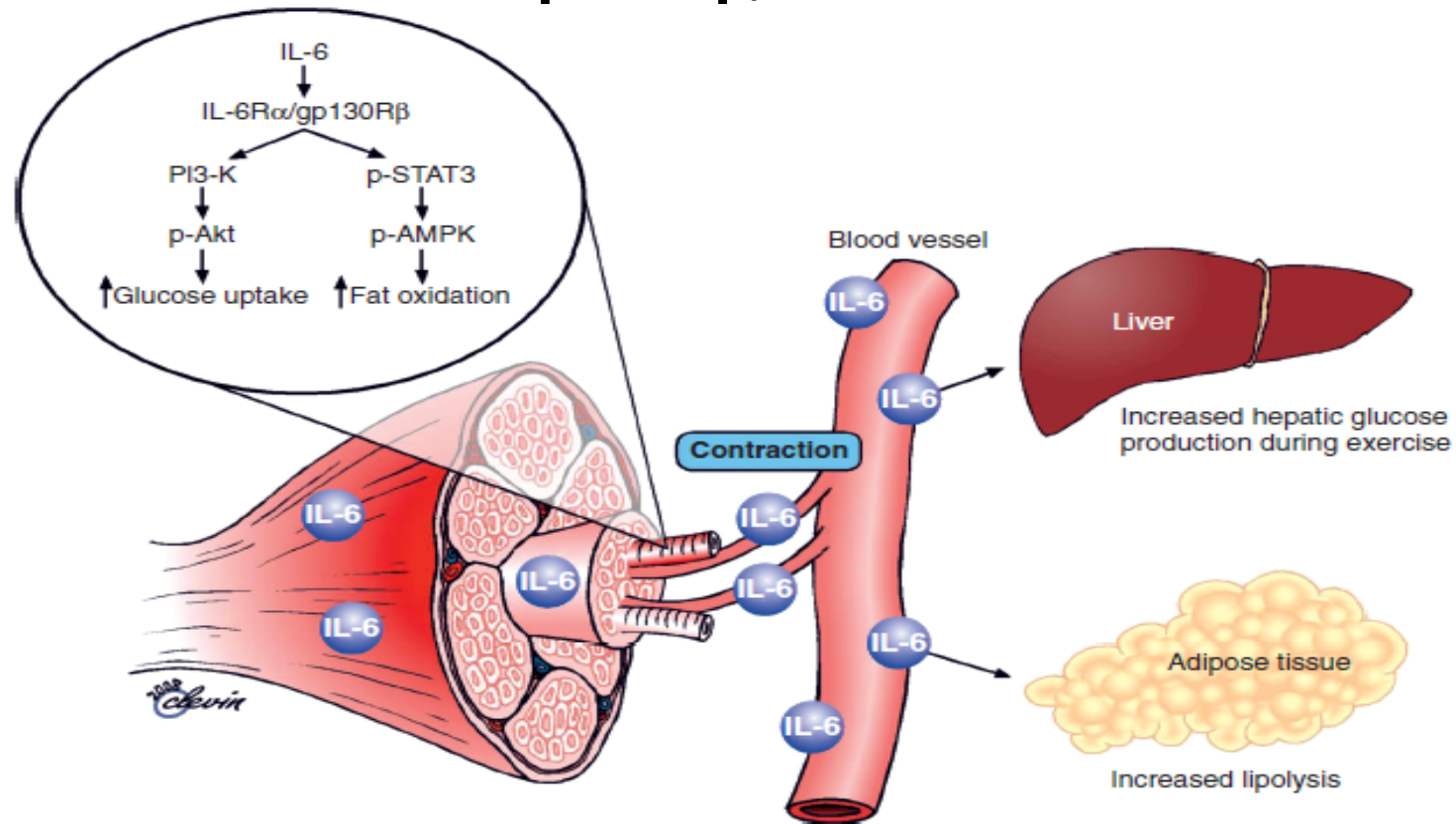


Figure 7 Biological role of contraction-induced interleukin-6 (IL-6). Skeletal muscle expresses and releases myokines into the circulation. In response to muscle contractions, both type I and type II muscle fibers express the myokine IL-6, which subsequently exerts its effects both locally within the muscle (e.g., through activation of AMPK) and—when released into the circulation—peripherally in several organs in a hormone-like fashion. Specifically in skeletal muscle, IL-6 acts in an autocrine or paracrine manner to signal through a gp130Rβ/IL-6Rα homodimer resulting in activation of AMP-kinase and/or PI3-kinase to increase glucose uptake and fat oxidation. IL-6 is also known to increase hepatic glucose production during exercise or lipolysis in adipose tissue. Modified, with permission, from (173).

White fat cells to Brite fat cells

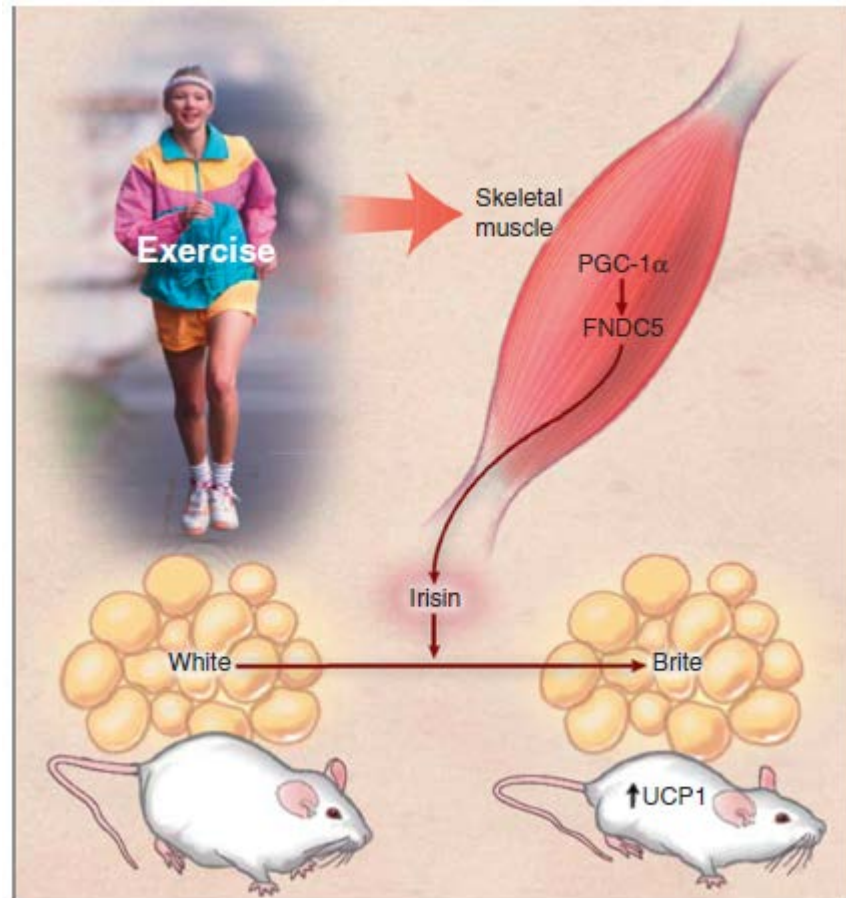


Figure 8 Exercise increases the intramuscular expression of peroxisome proliferator activated receptor γ coactivator 1 α (PGC-1 α). Boström and colleagues recently reported that PGC-1 α , a transcriptional coactivator, stimulates the expression of the membrane protein fibronectin type III domain containing 5 (FNDC5), which is proteolytically cleaved to form irisin, a myokine. Irisin drives the transformation of white fat cells into brite cells—white fat cells with a phenotype similar to that of brown fat cells, as indicated by a marked increase in the expression of uncoupling protein 1 (UCP1) in white adipose tissue. The investigators also showed that an elevated level of plasma irisin, achieved through gene replacement, is followed by a reduction in body weight and an improvement in metabolic homeostasis in obese mice. Adapted, with permission, from (168).

Hypothesis of Inactivity-Disease links

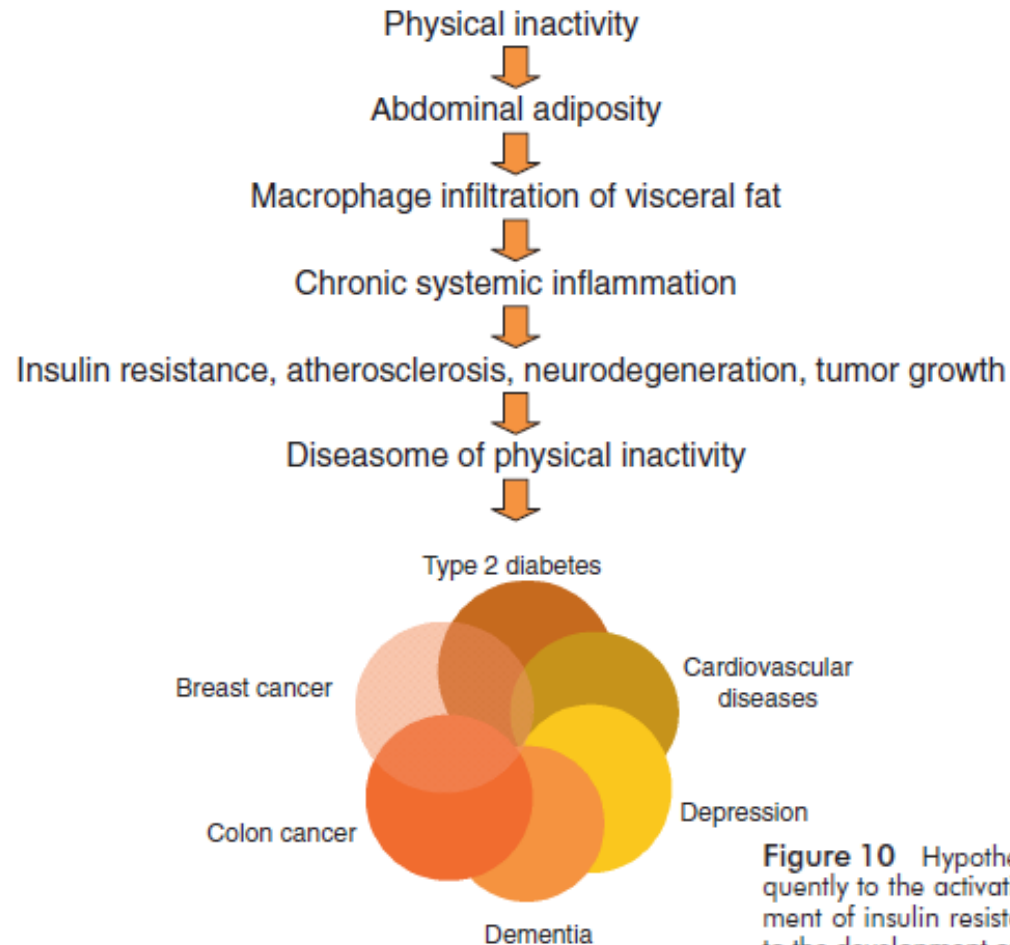


Figure 10 Hypothesis: physical inactivity leads to accumulation of visceral fat and consequently to the activation of a network of inflammatory pathways, which promotes development of insulin resistance, atherosclerosis, neurodegeneration, and tumor growth, leading to the development of “the diseasome of physical inactivity.” Adapted, with permission, from (165).

What do we need to know as practitioners?

- A need for a new public message: from losing weight to move more and get fitter!
- When it comes to physical activity: anything is better than nothing!
- Human system knows its best and just needs the opportunity to achieve it!
- Creating an excuse to walk further can have a long list of positive impacts

SEDENTARY BEHAVIOUR AND HEALTH

'Sitting is the new smoking': Sedentary behavior linked to increased all-cause mortality

September 13, 2017 | [Anicka Slachta](#)

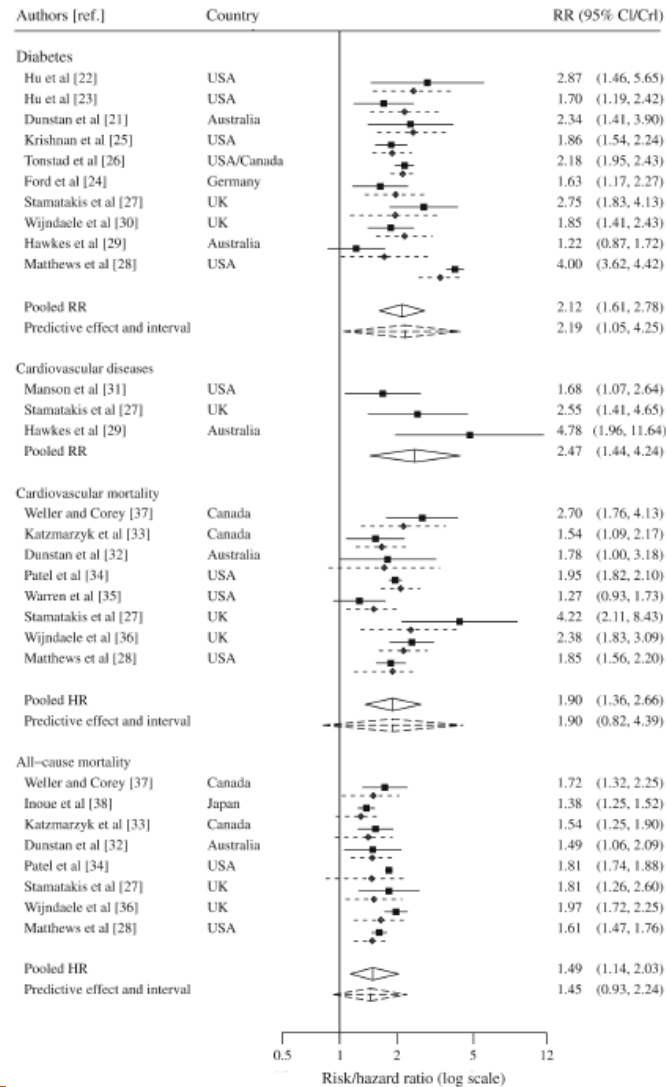
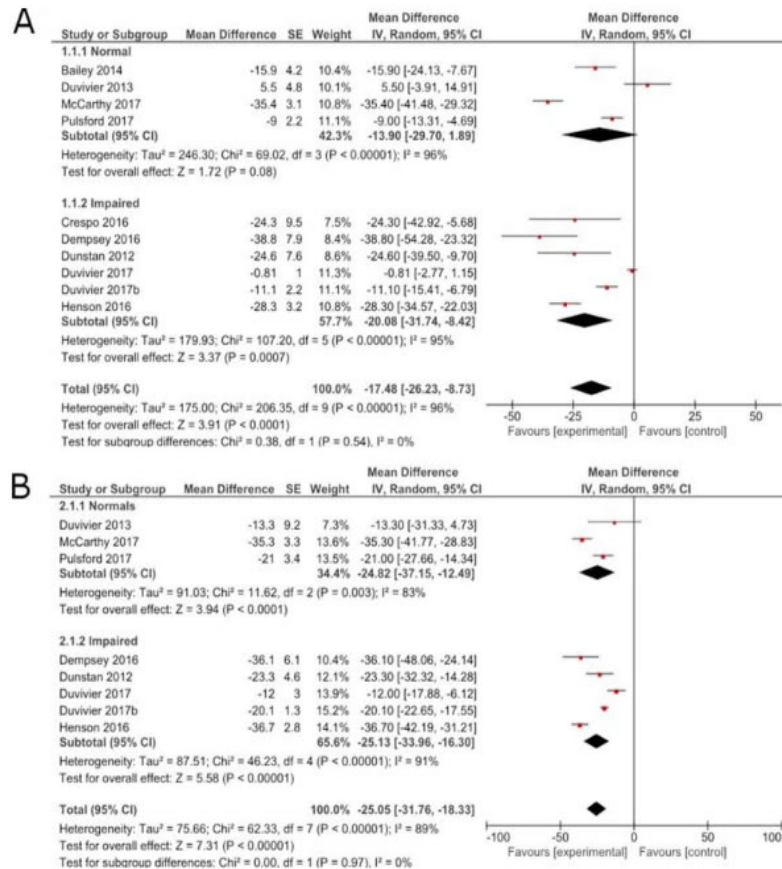


For years, medical professionals and media personalities alike have warned against sitting for prolonged periods, coining the phrase “sitting is the new smoking” to describe the health risks of a sedentary lifestyle. But how much is too much? Keith M. Diaz, MD, and a team of researchers spent more than four years trying to objectively answer that question.

Based on various epidemiological data

Meta-analysis

(Chastin et al. BJSM 2018)



Sedentary time in adults and the association with diabetes, cardiovascular disease and meta-analysis
 E. G. Wilmore · C. L. Edwardson · F. A. Achana · M. J. Davies · T. Goady · L. J. Gray · K. Khunti · T. Yates · S. J. H. Biddle
 Diabetologia (2018) 55:5268–5277
 DOI 10.1007/s00125-018-0272-7
 META-ANALYSIS

Breaks in Sedentary Time

Beneficial associations with metabolic risk

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DAVID W. DUNSTAN, PHD²
JO SALMON, PHD³
ESTER CERIN, PHD⁴

JONATHAN E. SHAW, MD²
PAUL Z. ZIMMET, MD²
NEVILLE OWEN, PHD¹

Significant associations with metabolic markers (11–13).

In addition to the effects of total sed-

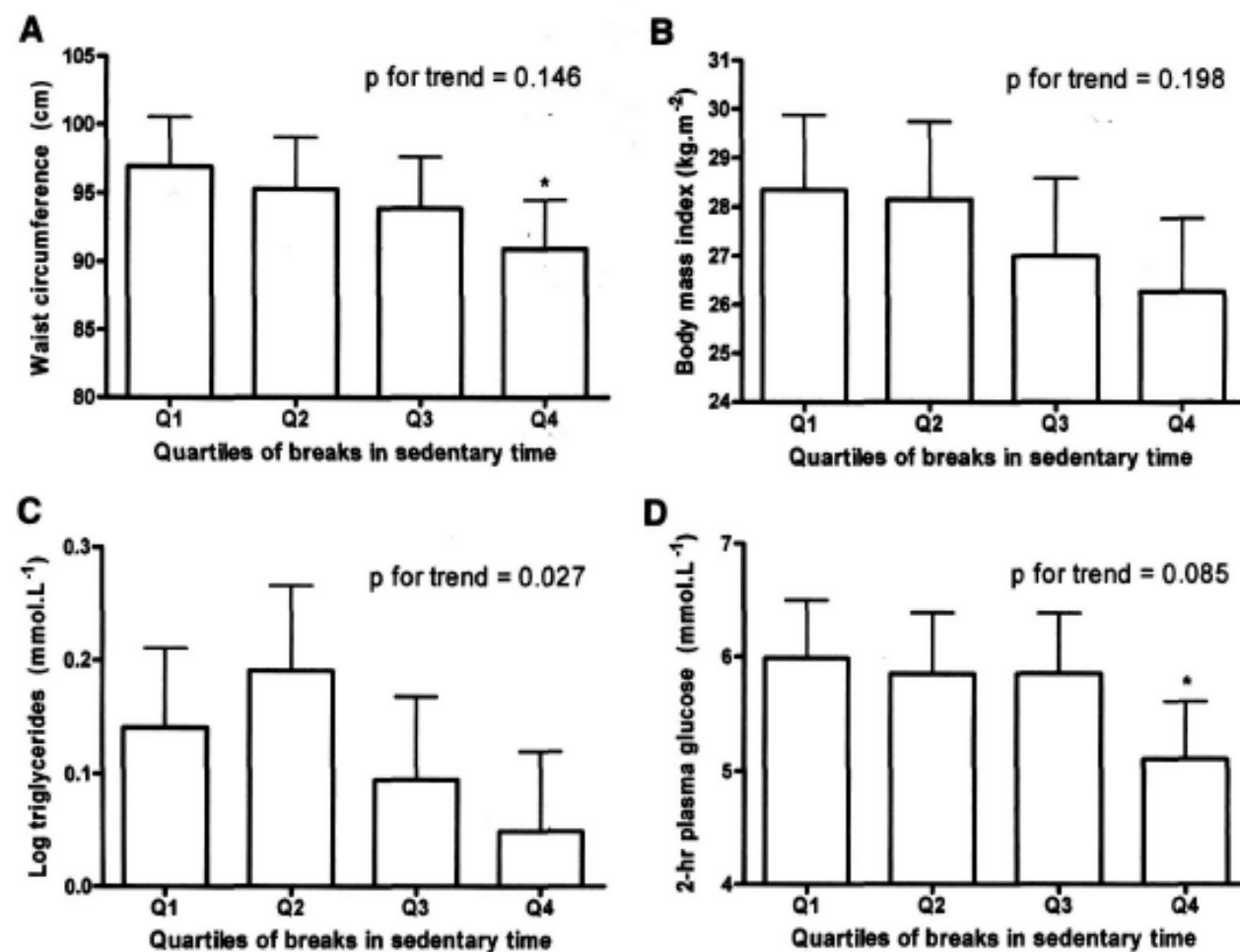
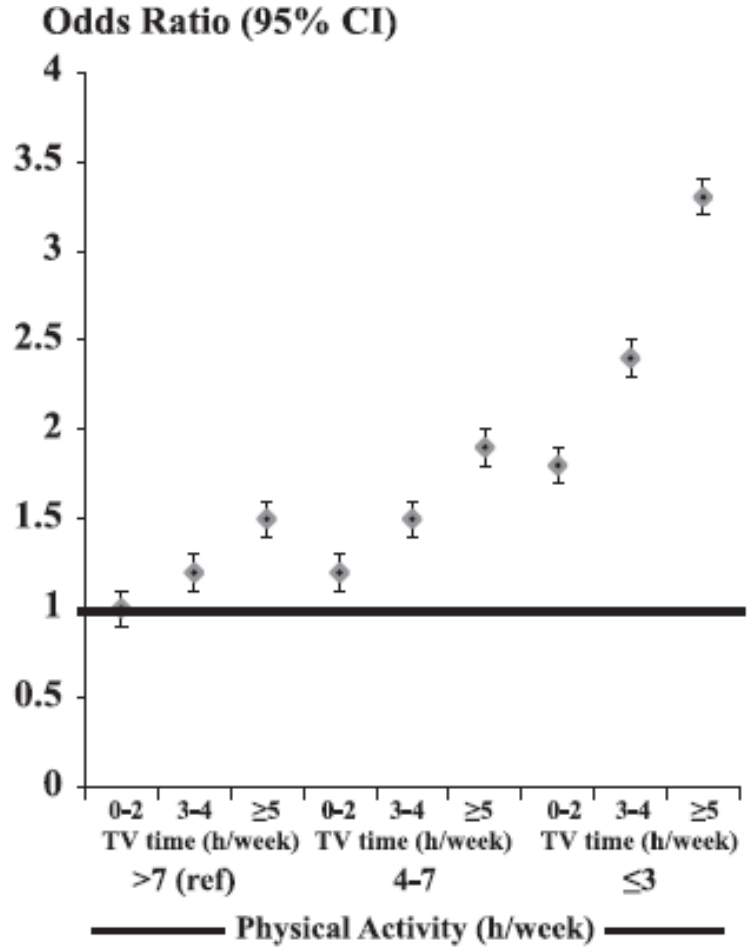
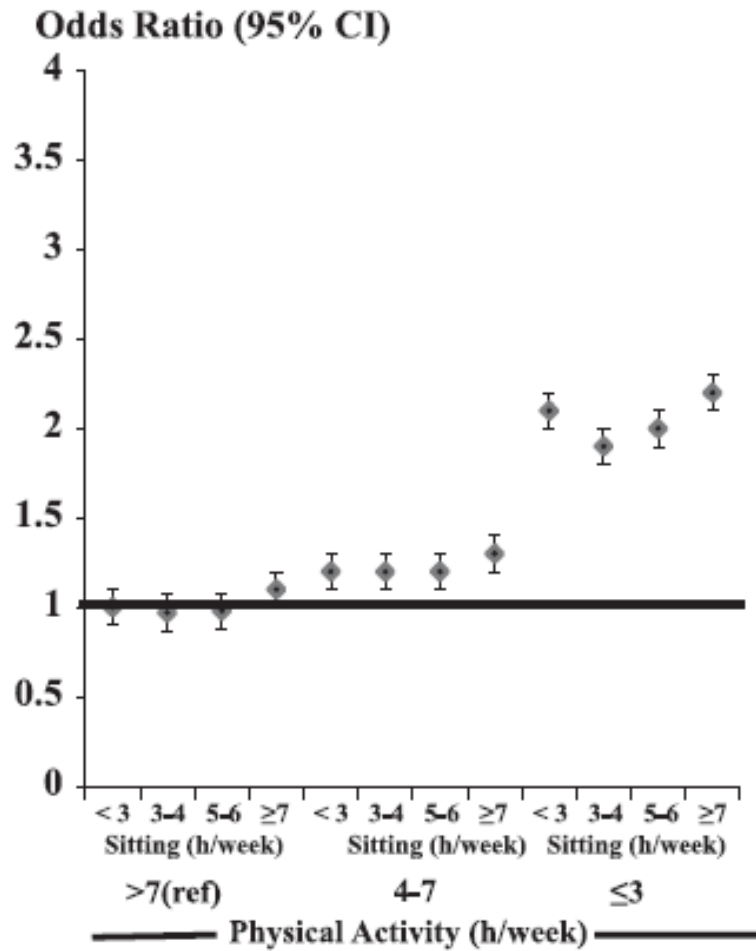


Figure 1. Quartiles of breaks in sedentary time with metabolic risk and abdominal waist circumference (A), BMI (B), and plasma glucose (C), 2-hr plasma glucose (D).

How much is too much?

The Joint Associations of Sedentary Time and Physical Activity With Mobility Disability in Older People: The NIH-AARP Diet and Health Study

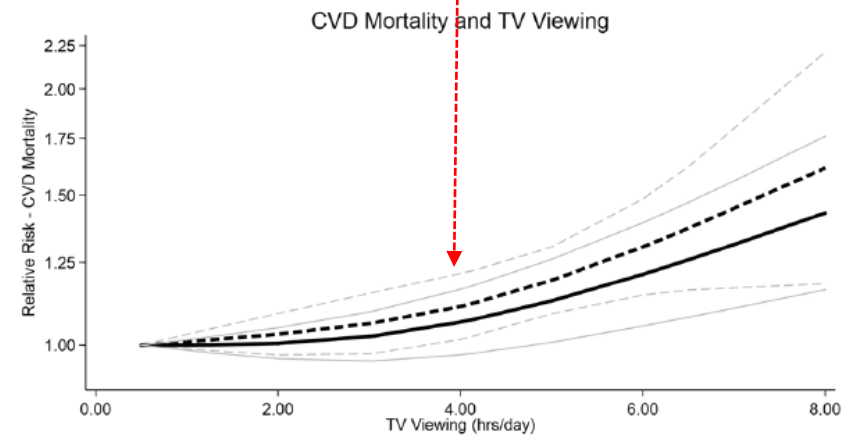
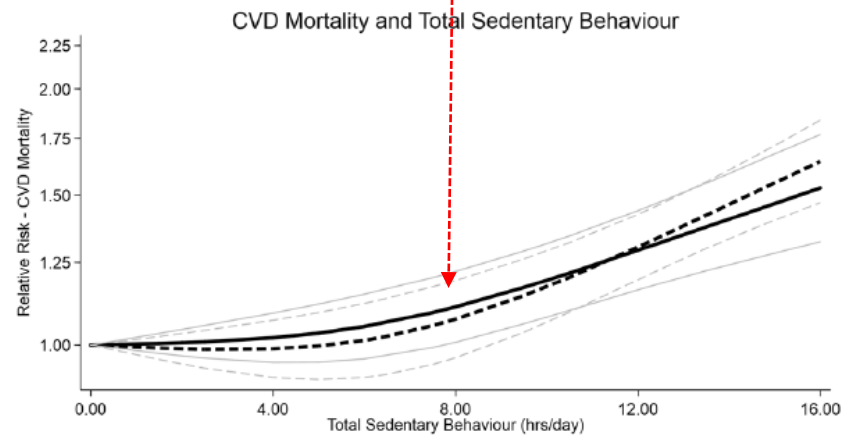
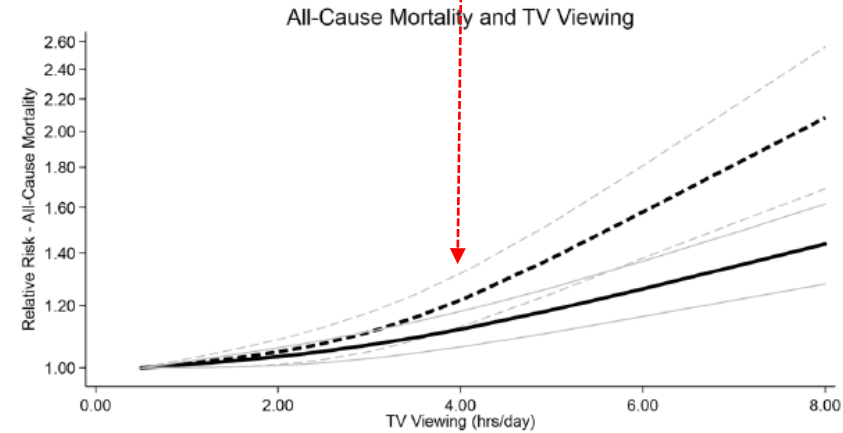
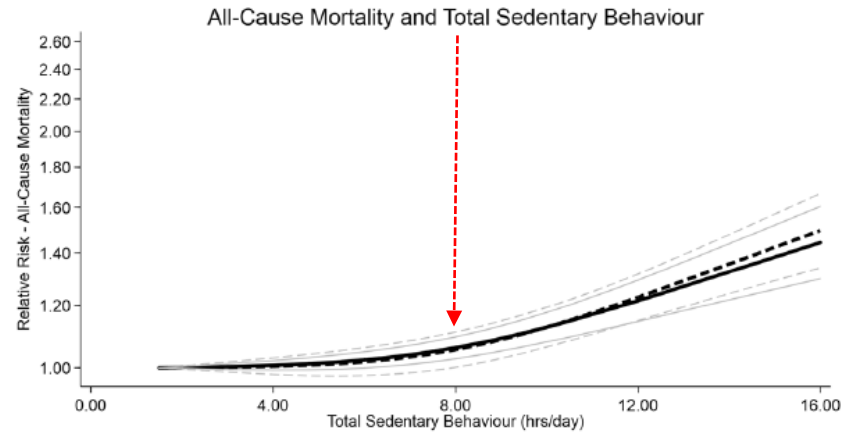
Loretta DiPietro, PhD, MPH,¹ Yichen Jin, MSPH,¹ Sameera Talegawkar, PhD,¹ and Charles E. Matthews, PhD²



How much is too much?

Sedentary behaviour and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: a systematic review and dose response meta-analysis

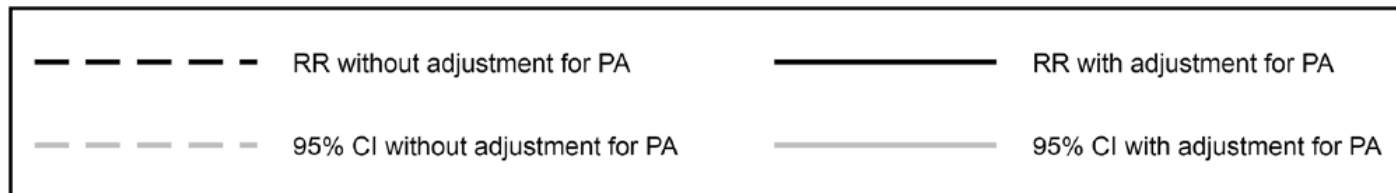
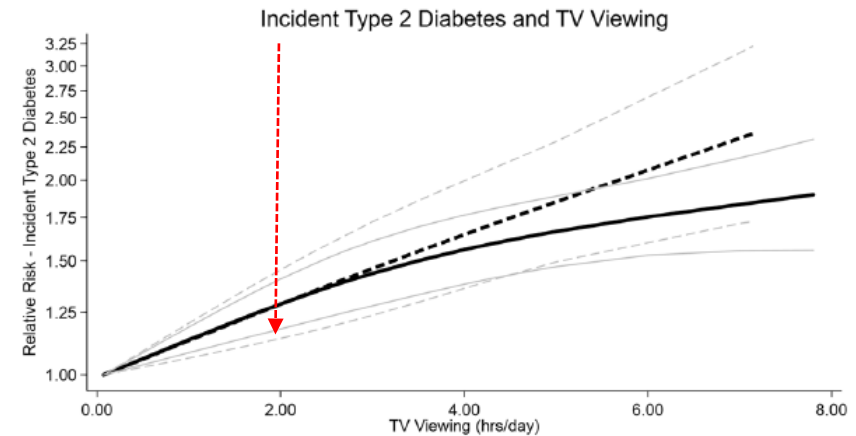
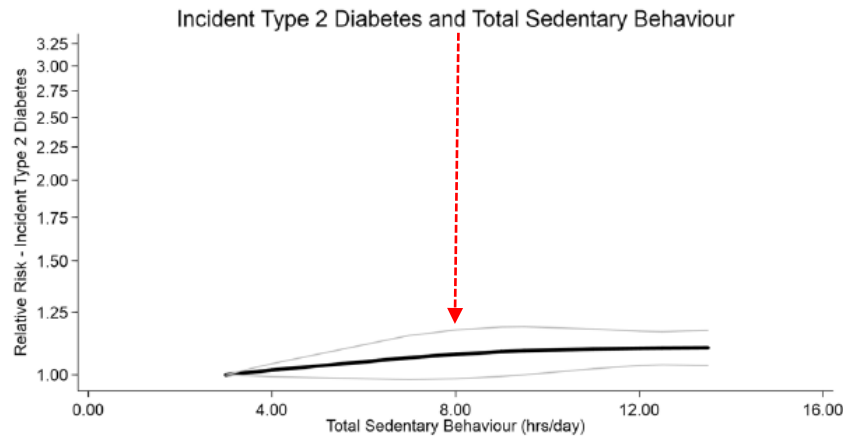
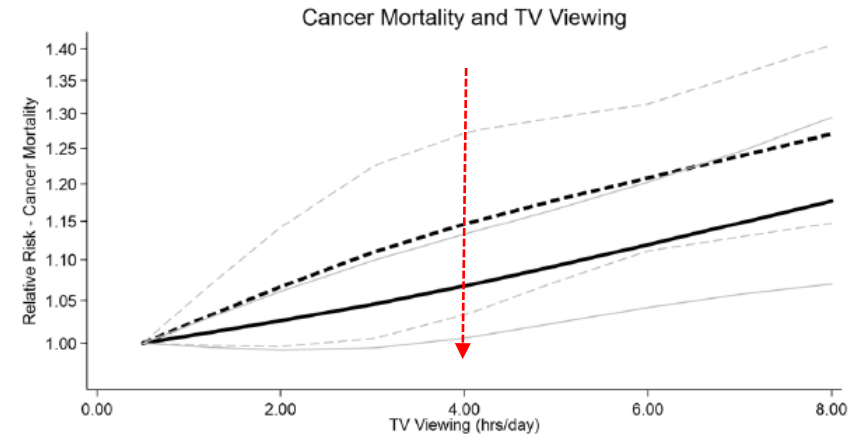
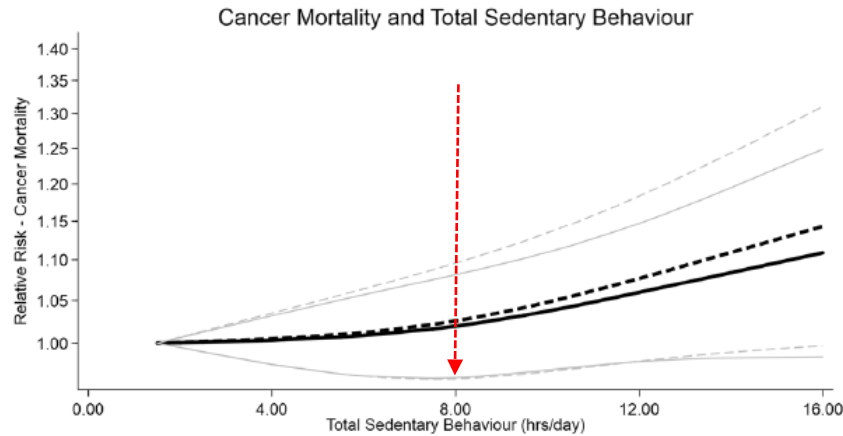
Richard Patterson¹ · Eoin McNamara² · Marko Tainio² · Thiago Hérick de Sá³ · Andrea D. Smith⁴ · Stephen J. Sharp² · Phil Edwards⁵ · James Woodcock² · Søren Brage² · Katrien Wijndaele²



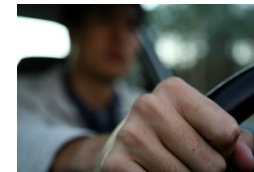
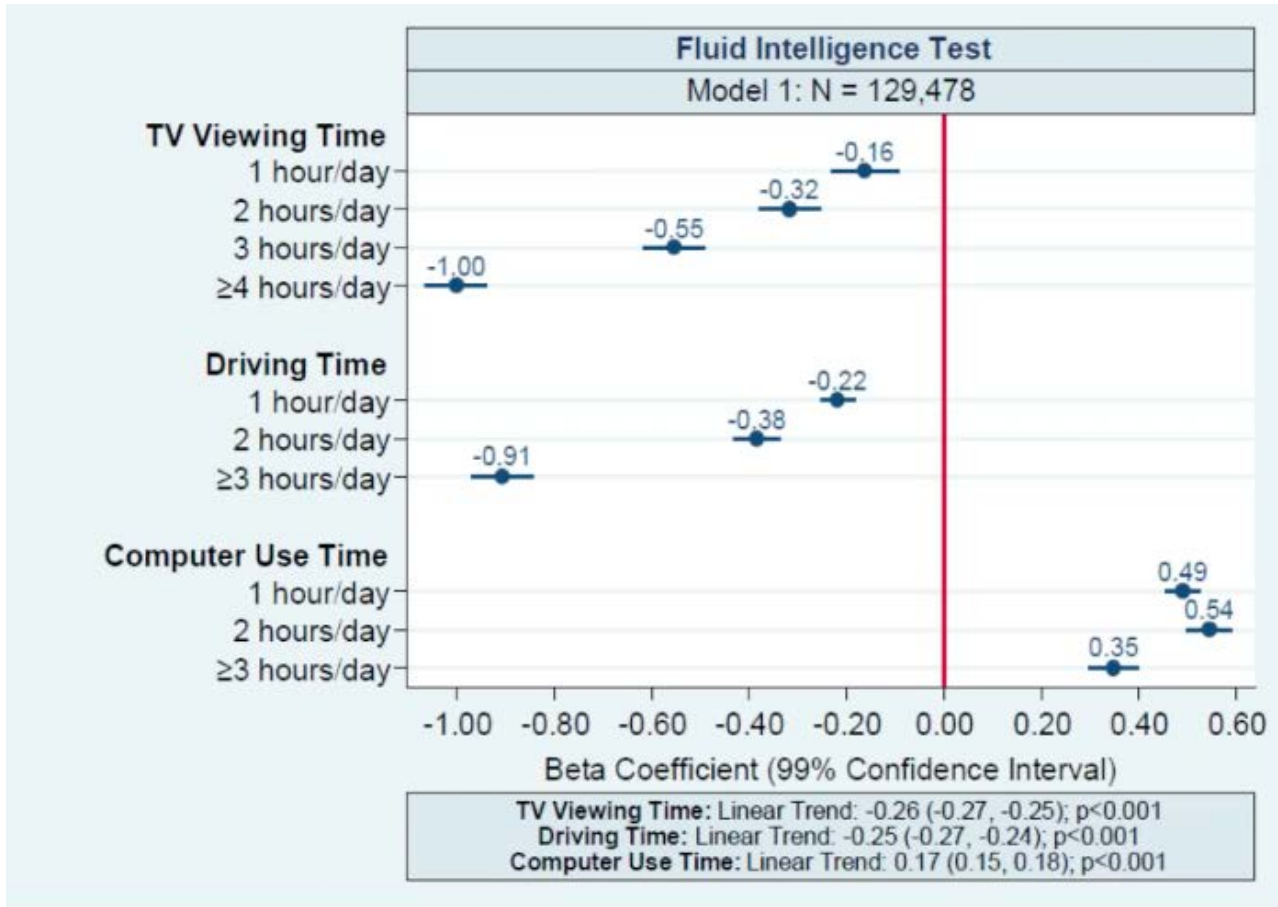
How much is too much?

Sedentary behaviour and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: a systematic review and dose response meta-analysis

Andrea D. Smith⁴ ·
Vandana D. Balleine²

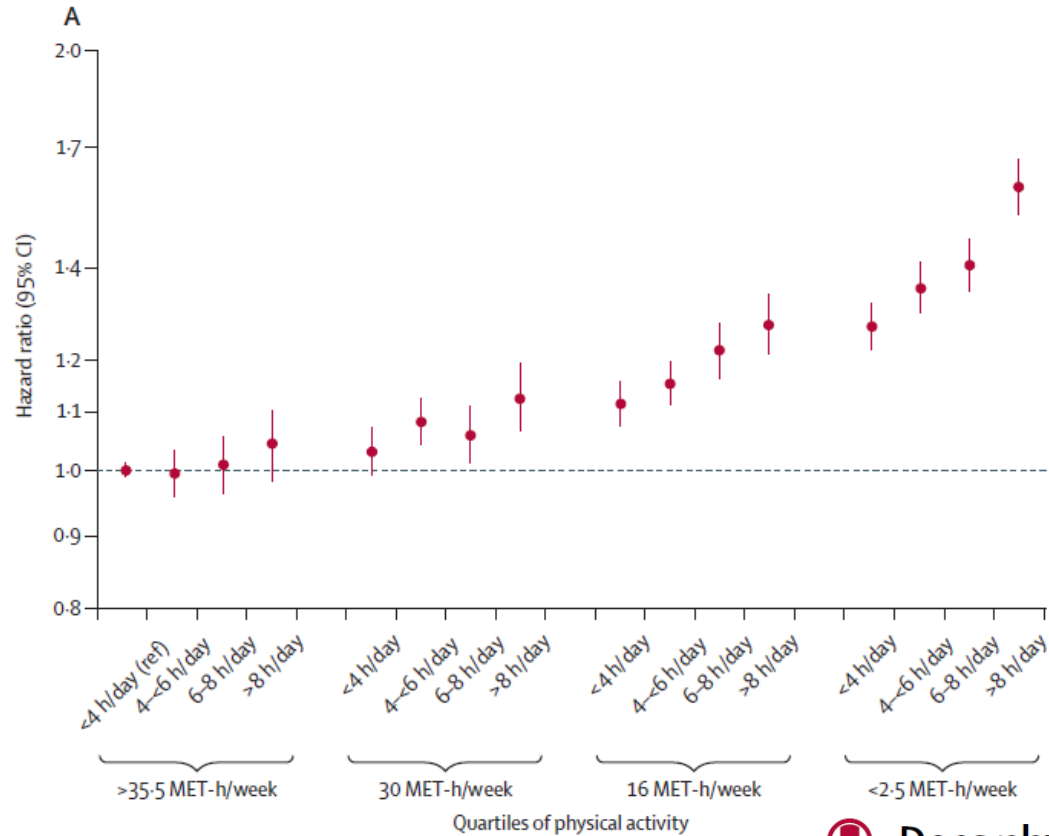


Bacrania et al.2017



Associations between sedentary behaviours and cognitive function: cross-sectional and prospective findings from the UK Biobank

Does exercise make a difference?



Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women

Ulf Ekelund, Jostein Steene-Johannessen, Wendy J Brown, Morten Wang Fagerland, Neville Owen, Kenneth E Powell, Adrian Bauman, I-Min Lee, for the Lancet Physical Activity Series 2 Executive Committee* and the Lancet Sedentary Behaviour Working Group*

What do we need to know as practitioners?

- We need to inform the public about the toxic effects of sedentary behaviours especially when they are combined with lack of exercise and inactivity;
- At least: 5' break every 60' of sedentary behaviour;
- Creating opportunities for more active endeavours and reducing TV viewing can be an important step forward;
- Frequent breaks and increased fitness levels can have an important impact for improving health at all ages!