

Physical Activity Immunity and COVID-19

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Our factory setting is to be in a sociable group, supportive environment and have a purpose

People



Sociable

Connect

Place



Nature

Take Notice

Purpose



Autonomy

Be Active, Give
Keep Learning



People

Place

Purpose



Loneliness



Indoors



Lack of
control

LOCKDOWN

Fear and Chronic Stress





Chronic
Stress
Loneliness

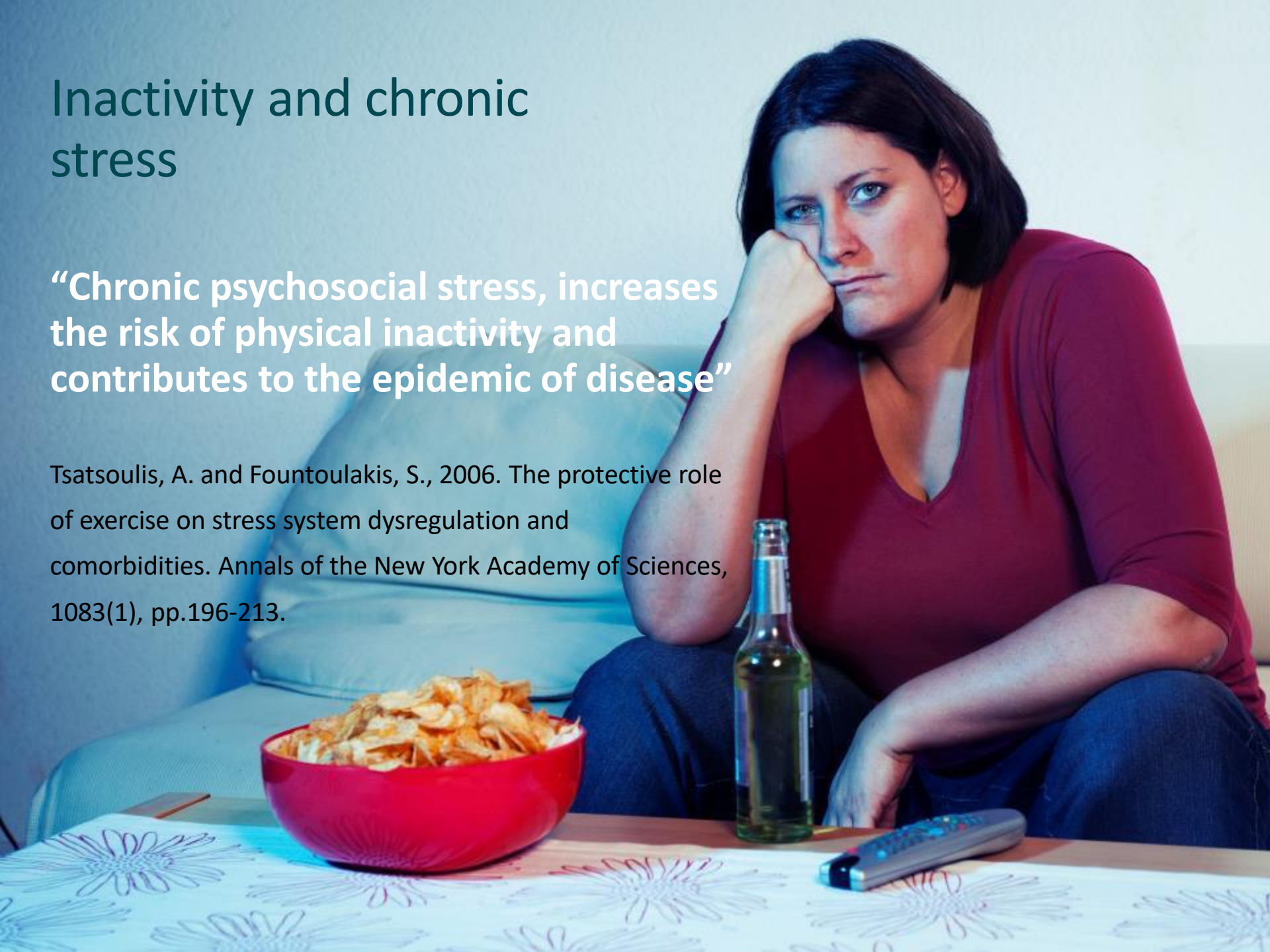
Inactivity
Poor diet
Obesity
Smoking



Inactivity and chronic stress

“Chronic psychosocial stress, increases the risk of physical inactivity and contributes to the epidemic of disease”

Tsatsoulis, A. and Fountoulakis, S., 2006. The protective role of exercise on stress system dysregulation and comorbidities. *Annals of the New York Academy of Sciences*, 1083(1), pp.196-213.



Obesity and chronic stress

Chronic
Stress



Ghrelin



Increase Calorie Intake

↑ Increase Carbohydrate Utilisation
↓ Decrease Fat Utilisation



Increase Weight
and Visceral Fat

Visceral Fat



Chronic Stress

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graph TD; A[Chronic Stress] --> B[Stress Hormones]; A --> C[Inactivity<br/>Poor diet<br/>Obesity<br/>Smoking]; B --> D[Chronic Inflammation]; C --> D;
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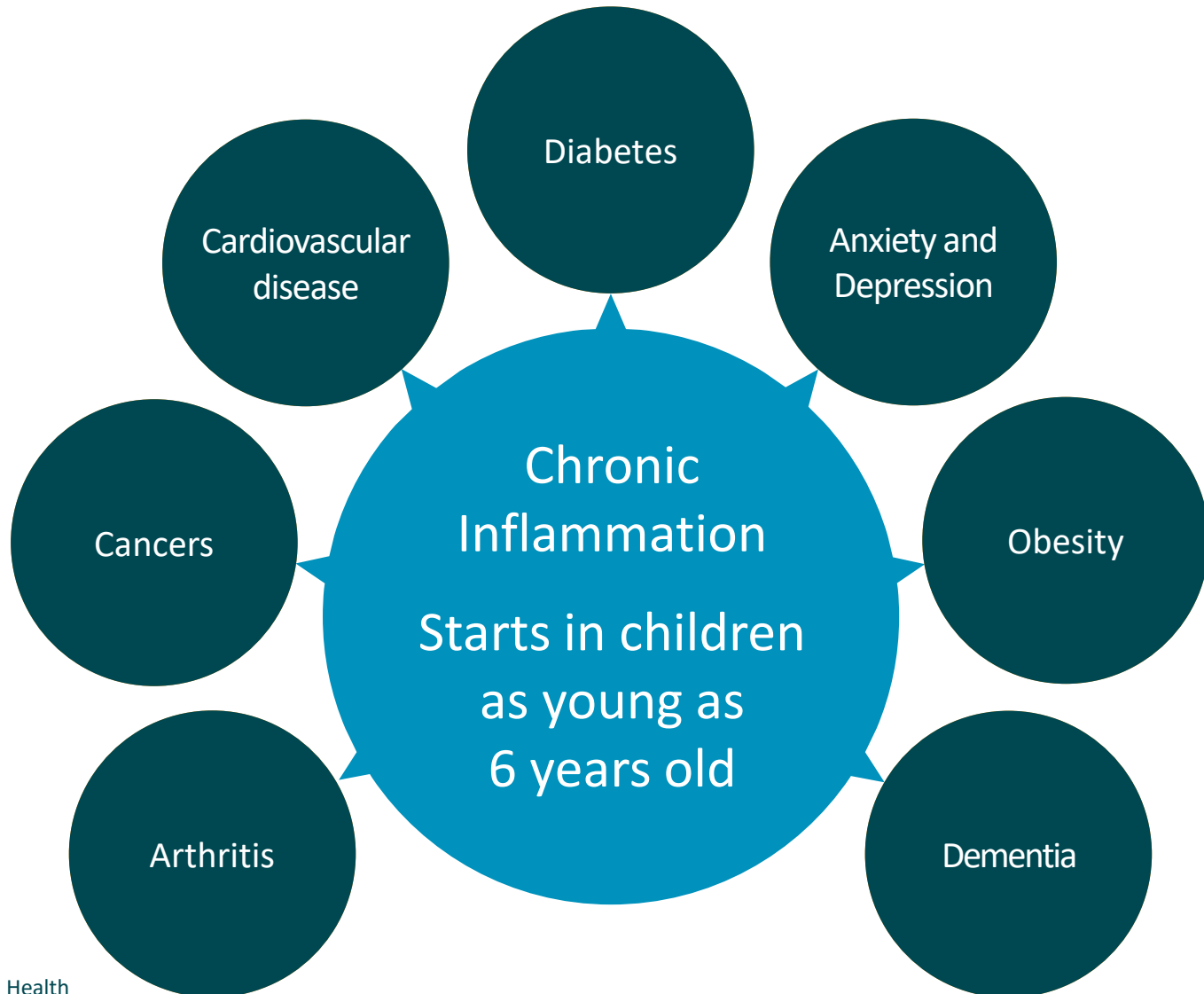
Stress
Hormones

Inactivity
Poor diet
Obesity
Smoking

Chronic Inflammation



Inflammation: The cause of Causes



Physical Activity reduces inflammation

1.
Reduces
visceral fat

2.
Reduces anti-
inflammatories

3.
Damages
healthy cells



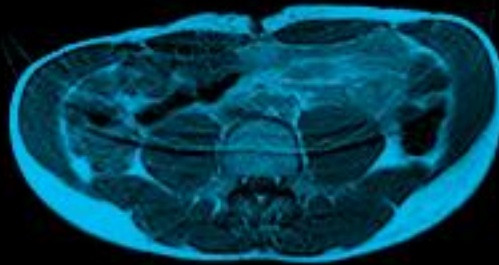
Inactivity: trilogy of inflammation

1.
Increases
visceral fat



Reducing inflammation – fat

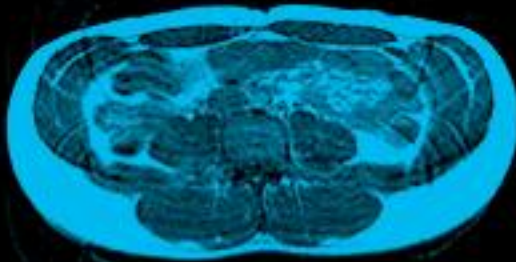
Variation in visceral fat content in men with the same waist circumference



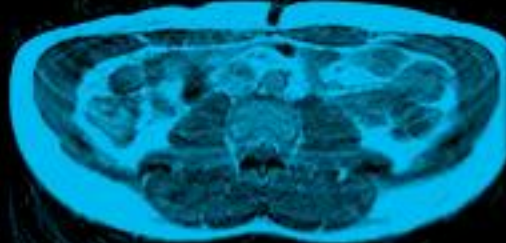
Visceral fat = 0.5 L



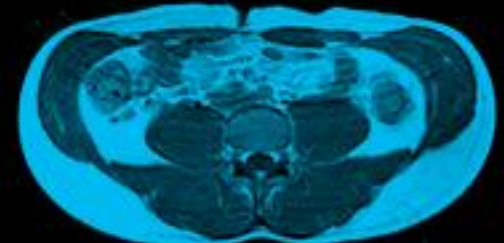
Visceral fat = 1.1 L



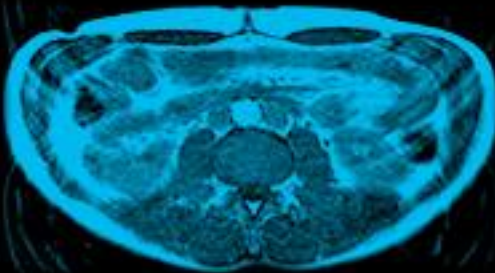
Visceral fat = 1.2 L



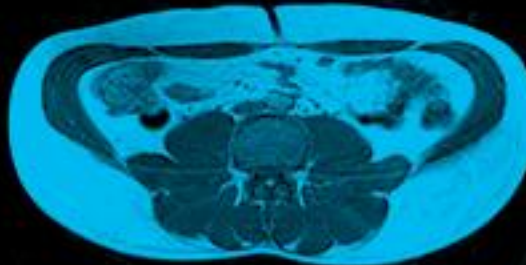
Visceral fat = 1.3 L



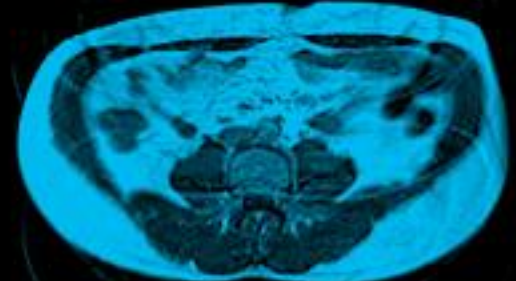
Visceral fat = 1.7 L



Visceral fat = 1.8 L



Visceral fat = 4.2 L



Visceral fat = 4.3 L



Visceral fat reduction with exercise

Fat loss after 13 weeks of walking 60 mins a day and no weight loss



Lee S et al. J Appl Physiol 2005;99:1220-1225

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Inactivity: trilogy of inflammation

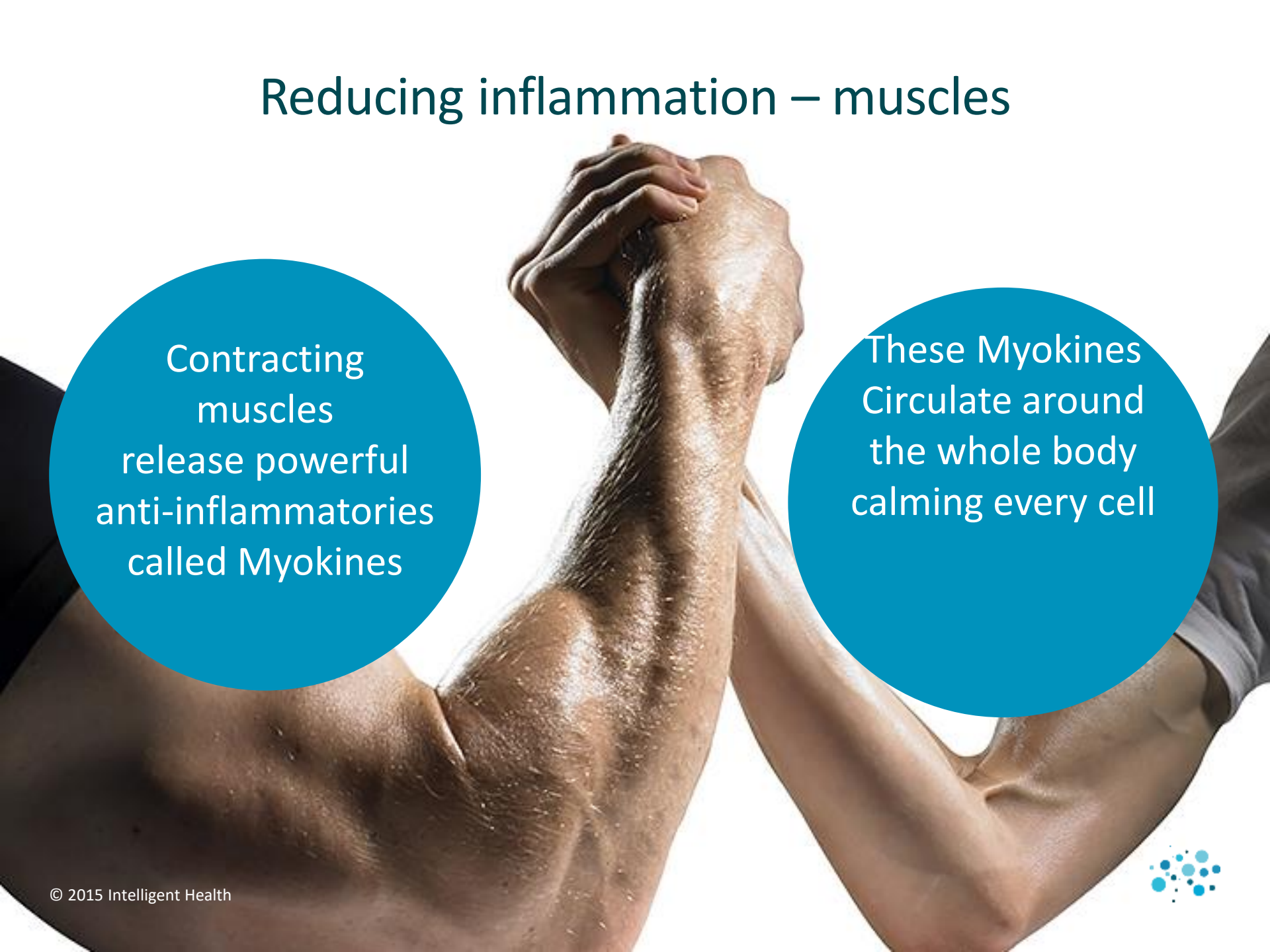
1.
Increases
visceral fat

2.
Reduces anti-
inflammatories

3.
Damages
healthy cells



Reducing inflammation – muscles



Contracting
muscles
release powerful
anti-inflammatories
called Myokines

These Myokines
Circulate around
the whole body
calming every cell



Inactivity: trilogy of inflammation

1.
Increases
visceral fat

2.
Reduces anti-
inflammatories

3.
Damages
healthy cells



Inside a healthy cell

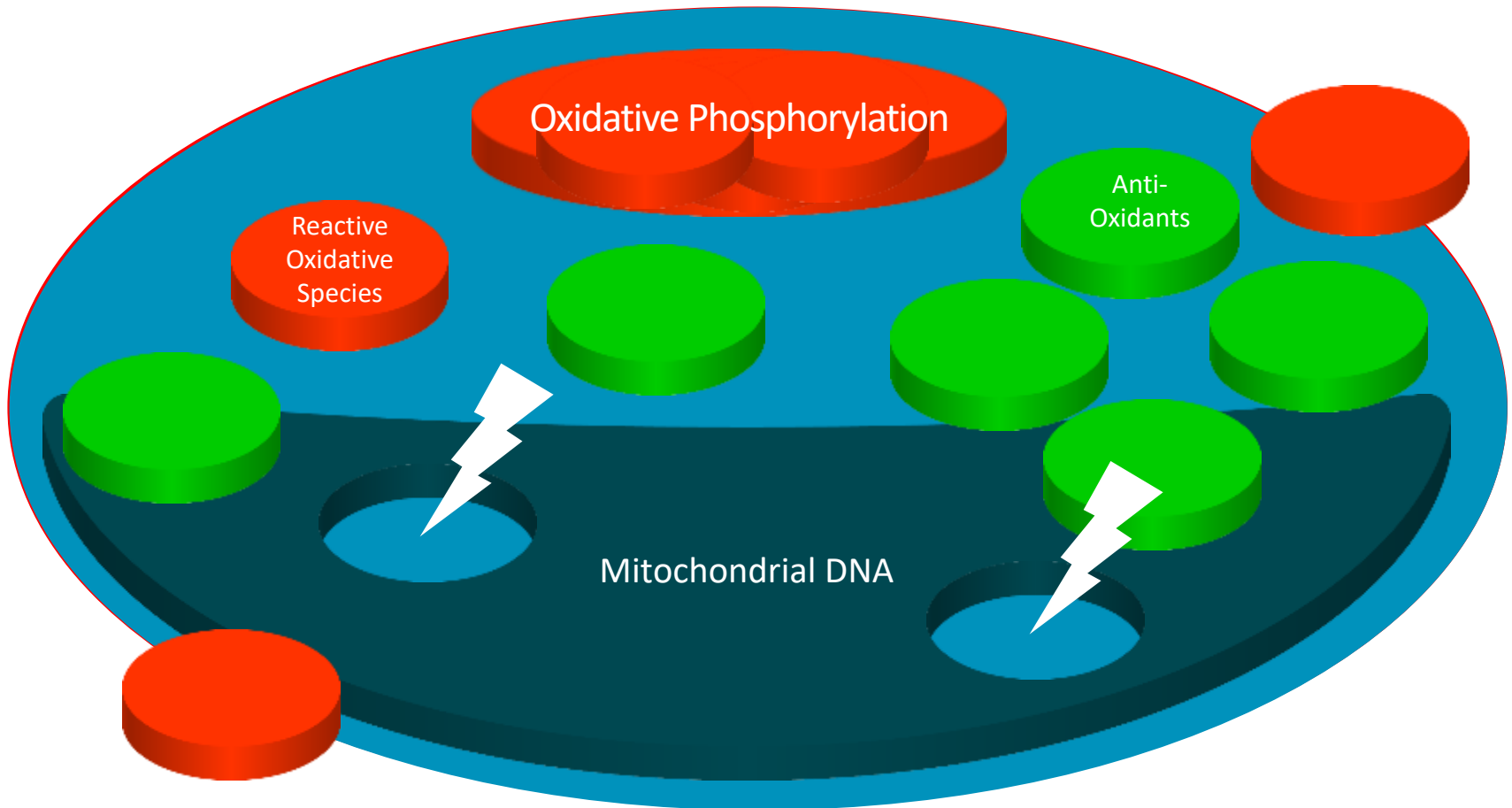
Chromosomes
keep dividing

Mitochondria,
healthy
and active.
Providing lots
of energy

Immune
system is
switched off
until needed



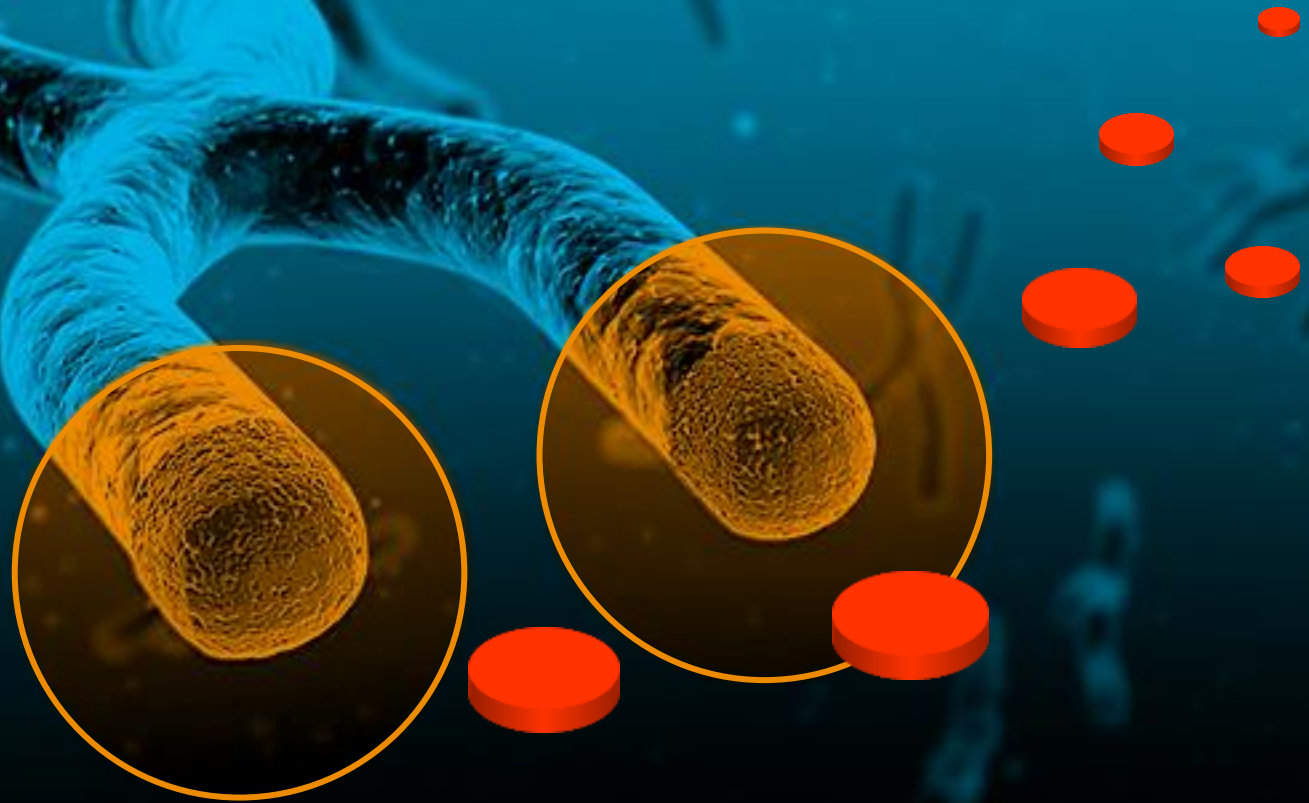
Sedentary, high calorie diet and stress



Mitochondria



Telomeres get shorter



Epel, Elissa, et al. Can meditation slow rate of cellular aging? Cognitive stress, mindfulness, and telomeres. *Annals of the New York Academy of Sciences* 1172.1 (2009): 34-53



“Green exercise is associated with better cell-ageing profiles with increased telomerase compared to indoor gym-based activity”



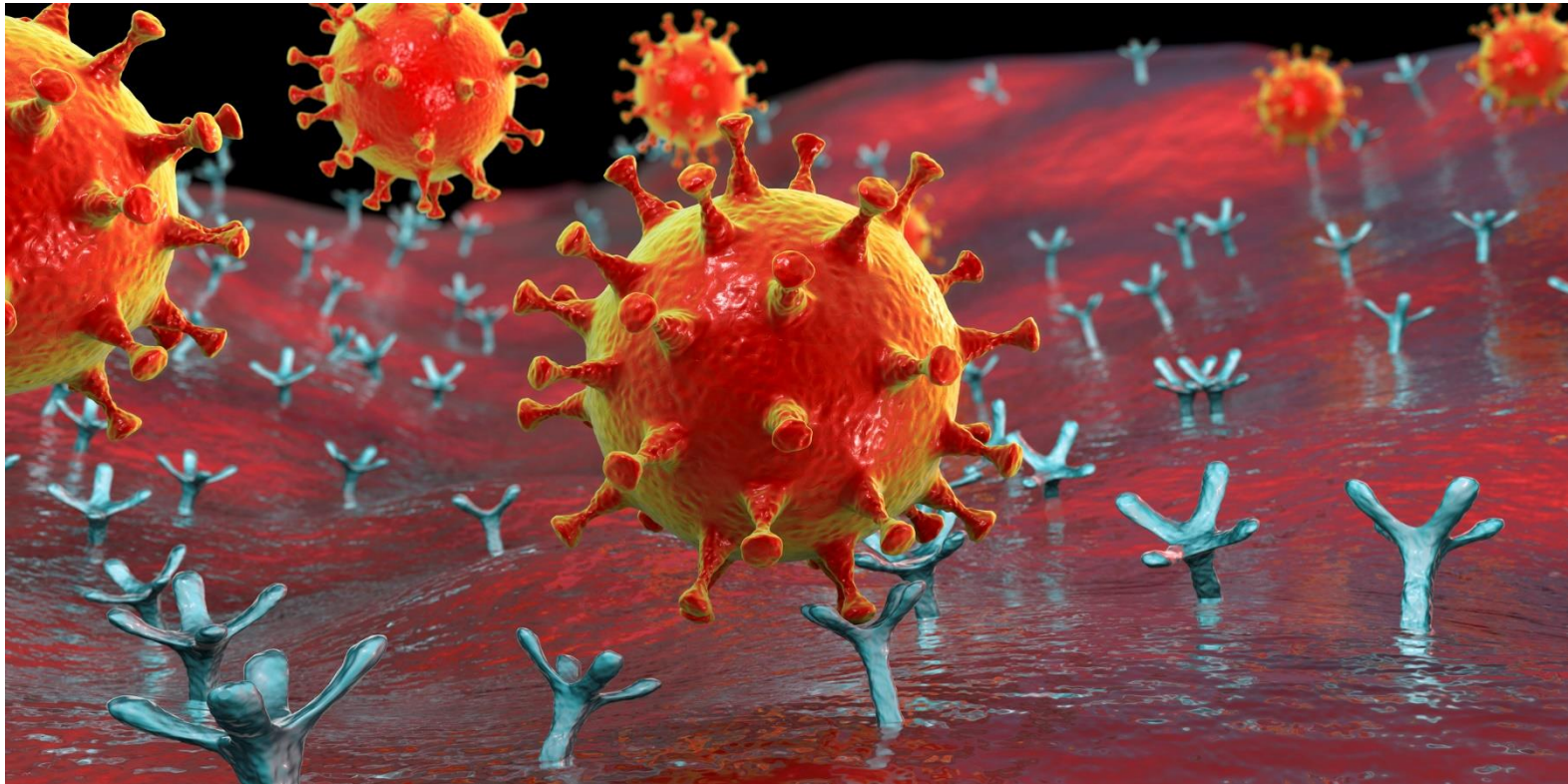
G Olafsdottir, P Cloke, E Epel, J Lin, Z van Dyck, B Thorleifsdottir, T Eysteinnsson, M Gudjonsdottir, C Vögele; Green exercise is associated with better cell ageing profiles: Gunnthora Olafsdottir, *European Journal of Public Health*, Volume 26, Issue suppl_1, 1 November 2016

We have a new disease that conventional medicine cannot treat

Chronic Inflammation

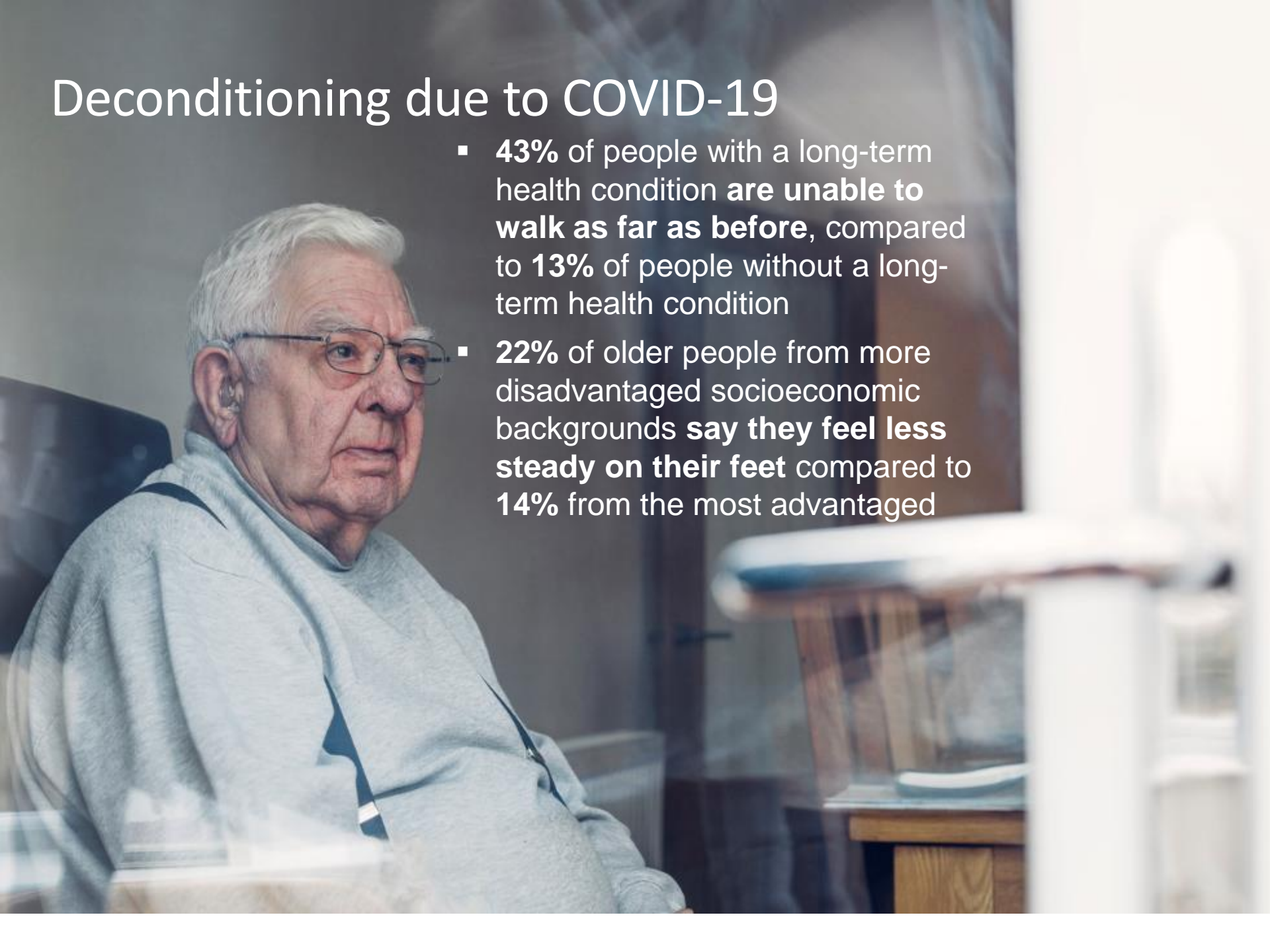


COVID -19



Deconditioning due to COVID-19

- **43%** of people with a long-term health condition **are unable to walk as far as before**, compared to **13%** of people without a long-term health condition
- **22%** of older people from more disadvantaged socioeconomic backgrounds **say they feel less steady on their feet** compared to **14%** from the most advantaged



COVID -19

What has been the impact of the Covid-19 Pandemic?

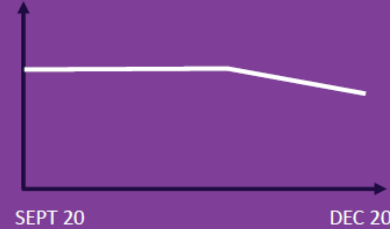
Lockdown One

Activity Levels in Essex



Lockdown Two

Activity Levels in Essex



State of Life Survey
Apr-Aug

38%

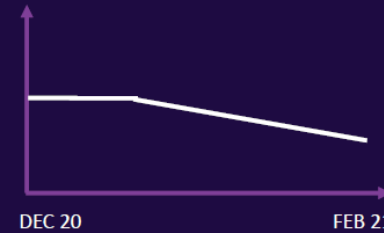
of people in high deprivation
areas were inactive

22%

of people in low deprivation
areas were inactive

Lockdown Three

Activity Levels in Essex



968,591

active adults 2021

19,000

fewer active adults than at
the start of Covid-19

Findings show inequalities deepen within particular groups



LTHC/
Disability



Lower
socio-economic



Women



16-34
year olds



Ethnic diverse
groups

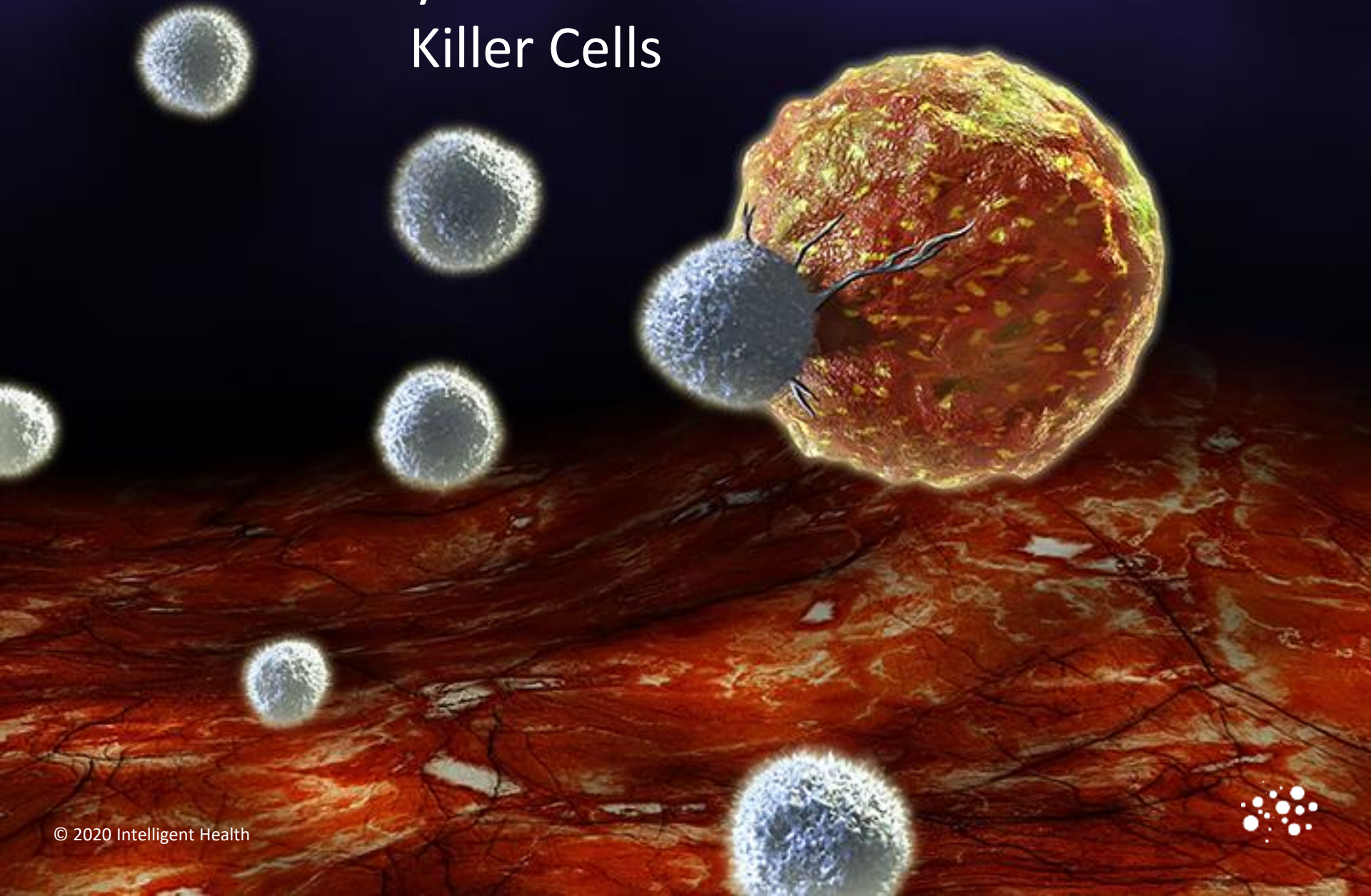


2.3%

decrease in children meeting
recommended level of activity
compared to 2019



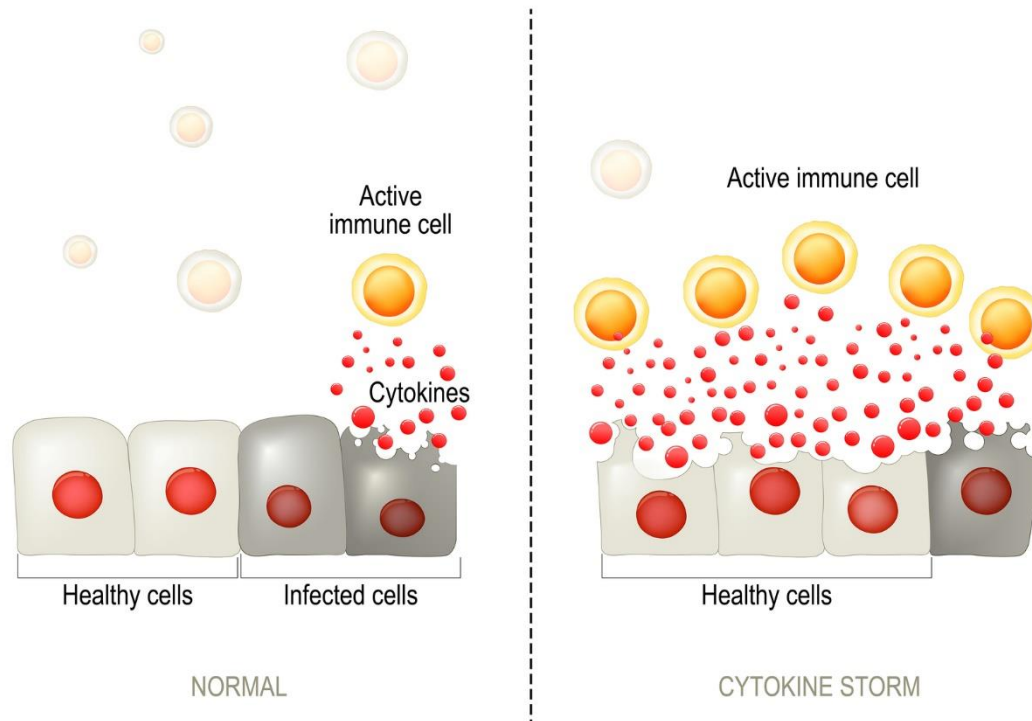
Inactivity Reduces Natural Killer Cells

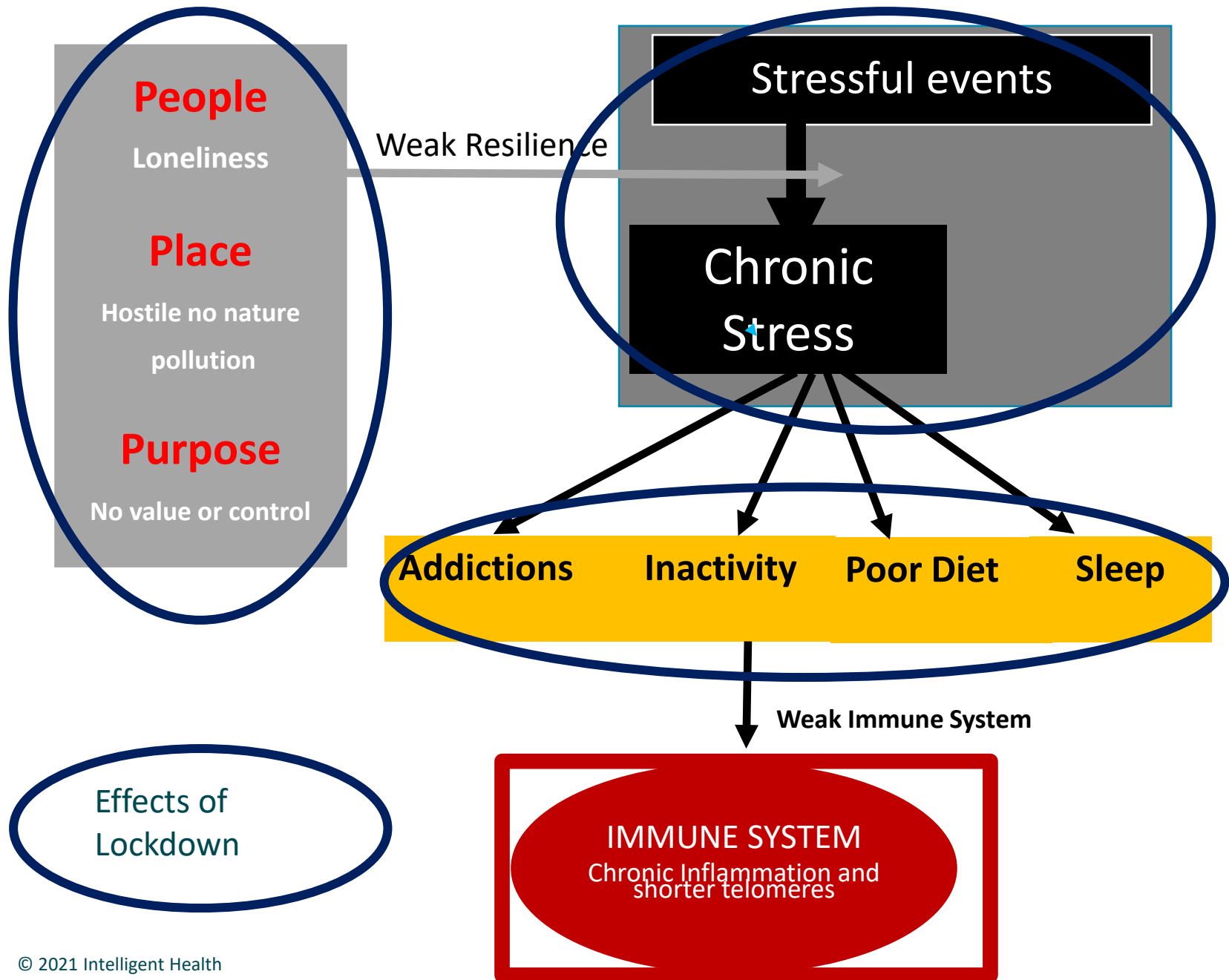


Cytokine Storm

Cytokine Storm is more likely if there is pre-existing Chronic Inflammation

Miossec, P., 2020. Understanding the cytokine storm during COVID-19: contribution of preexisting chronic inflammation. *European journal of rheumatology*, 7(Suppl 2), p.S97.





Building Active Communities

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