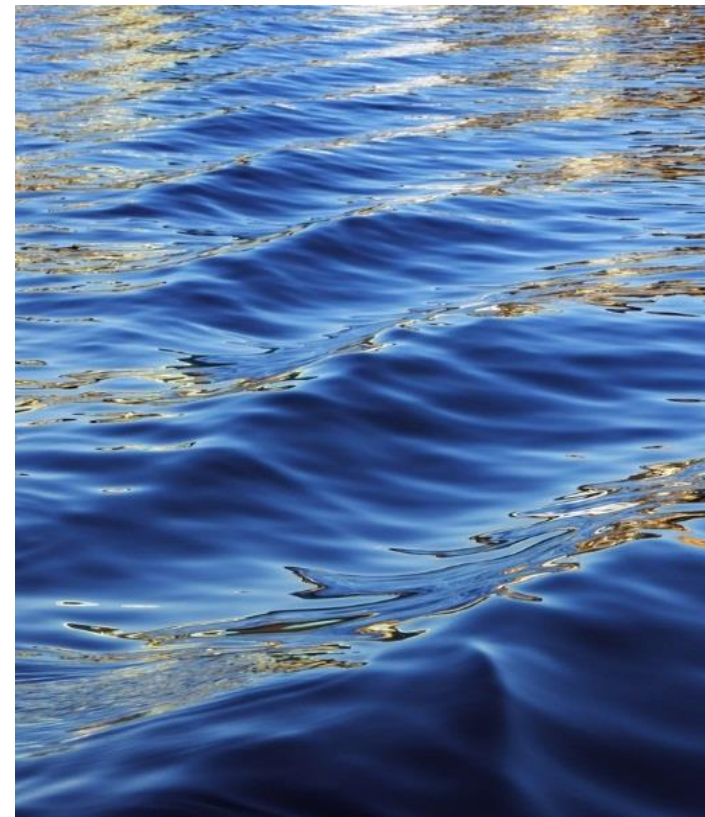




Είναι η οστεοαρθρίτιδα το  
αναπόφευκτο αποτέλεσμα της  
γήρανσης;

Θάνος Κουτρούμπας  
at\_kout@yahoo.com



# Σύγκρουση συμφερόντων

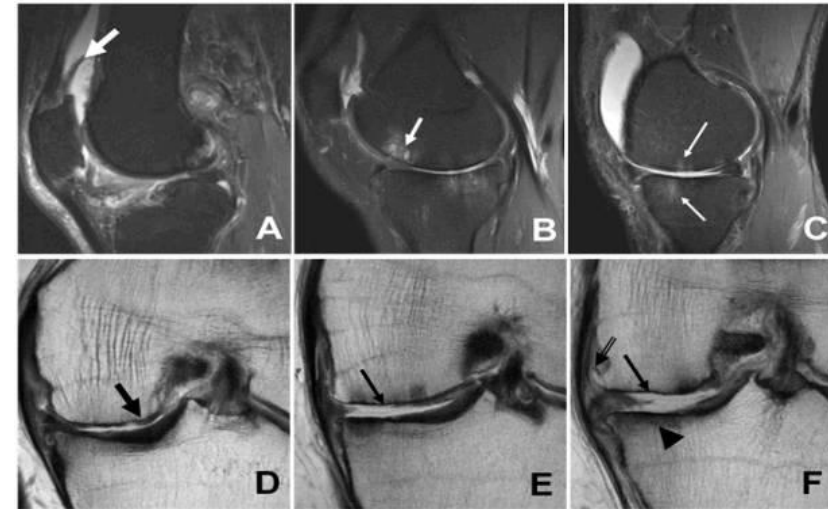
Καμία για την παρουσίαση αυτή.

Την τελευταία διετία τιμητικές αμοιβές από τις εταιρείες:

AbbVie, Genesis Pharma, Pfizer, UCB

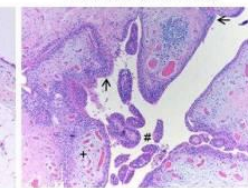
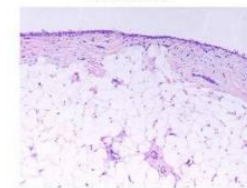
# Οστεοαρθρίτιδα: από τους παράγοντες κινδύνου στη νόσο

Ηλικία  
Παχυσαρκία  
Τραύμα  
Κληρονομικότητα  
Φλεγμονή



Normal

Osteoarthritis



Synovium



Articular cartilage

Calcified cartilage

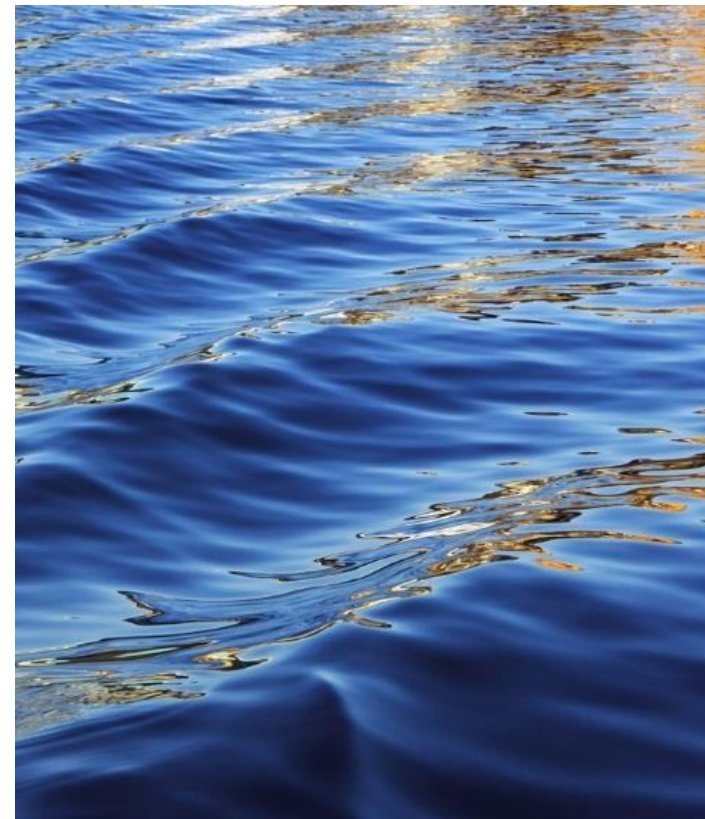
Vascular invasion

Tidemark duplication

Subchondral bone



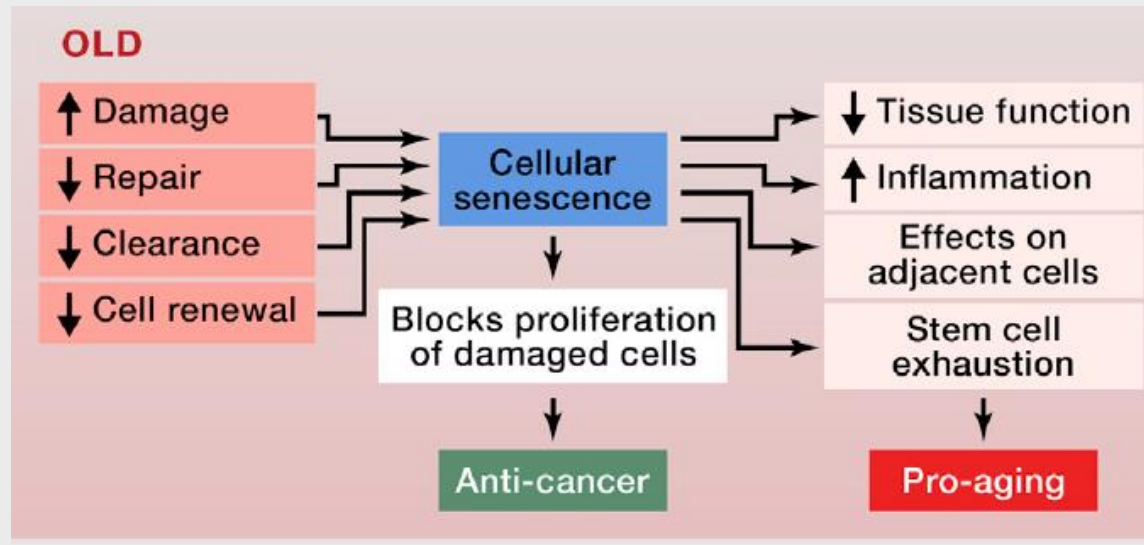
Γιατί μεγαλώνουμε;



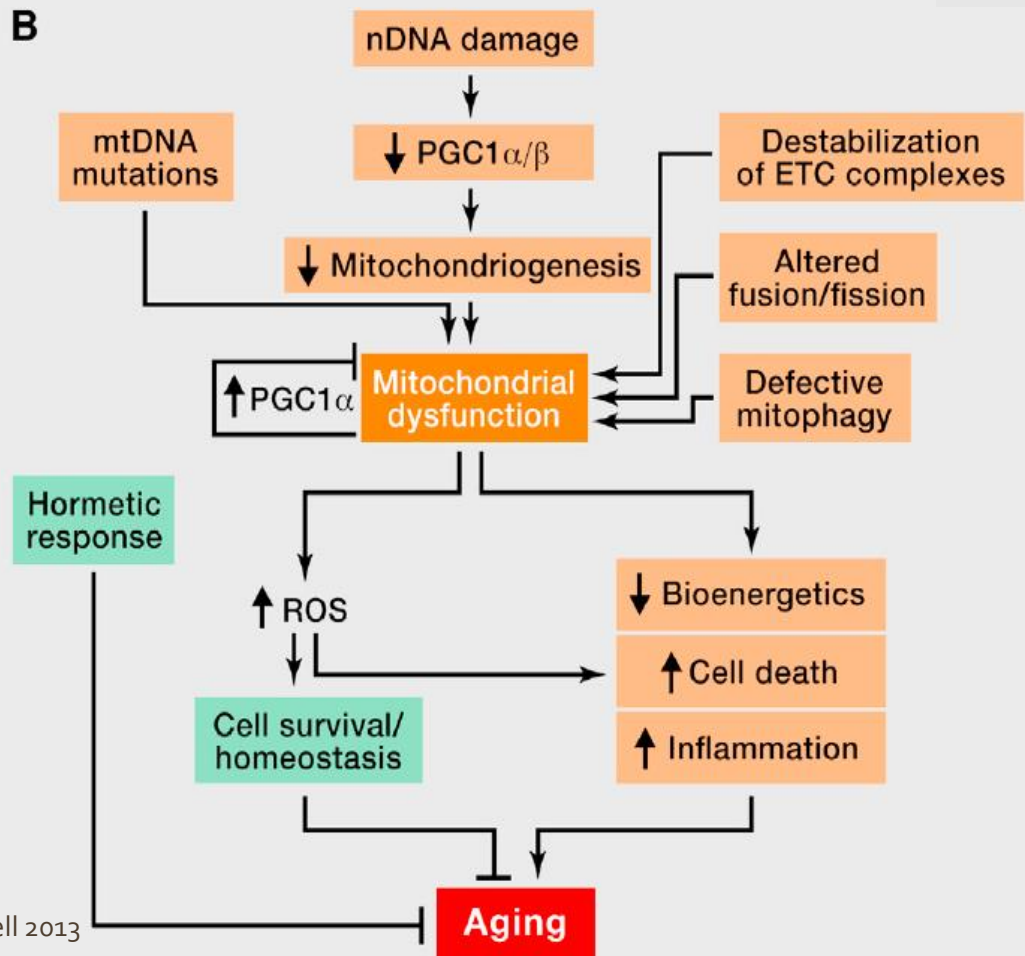
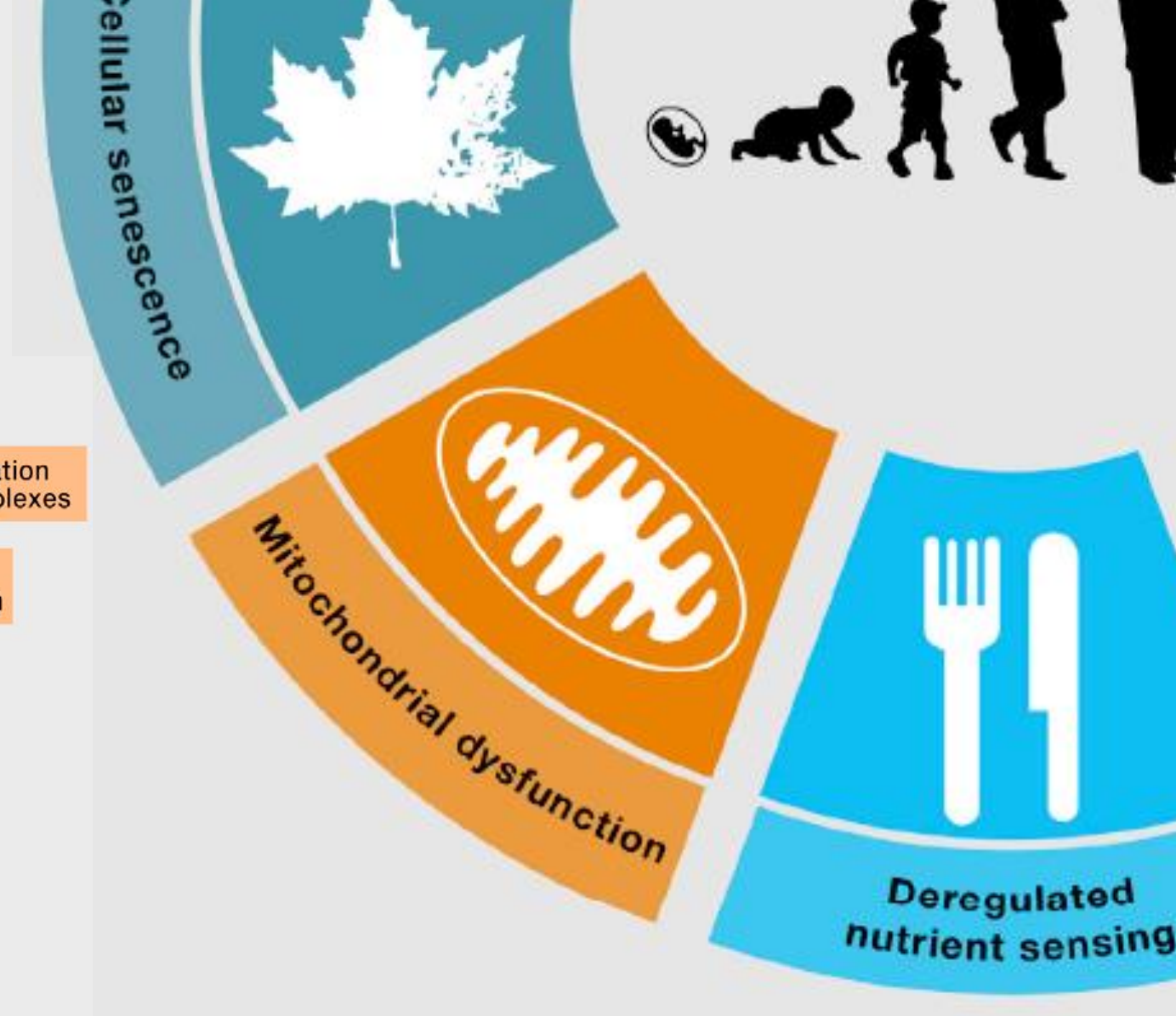
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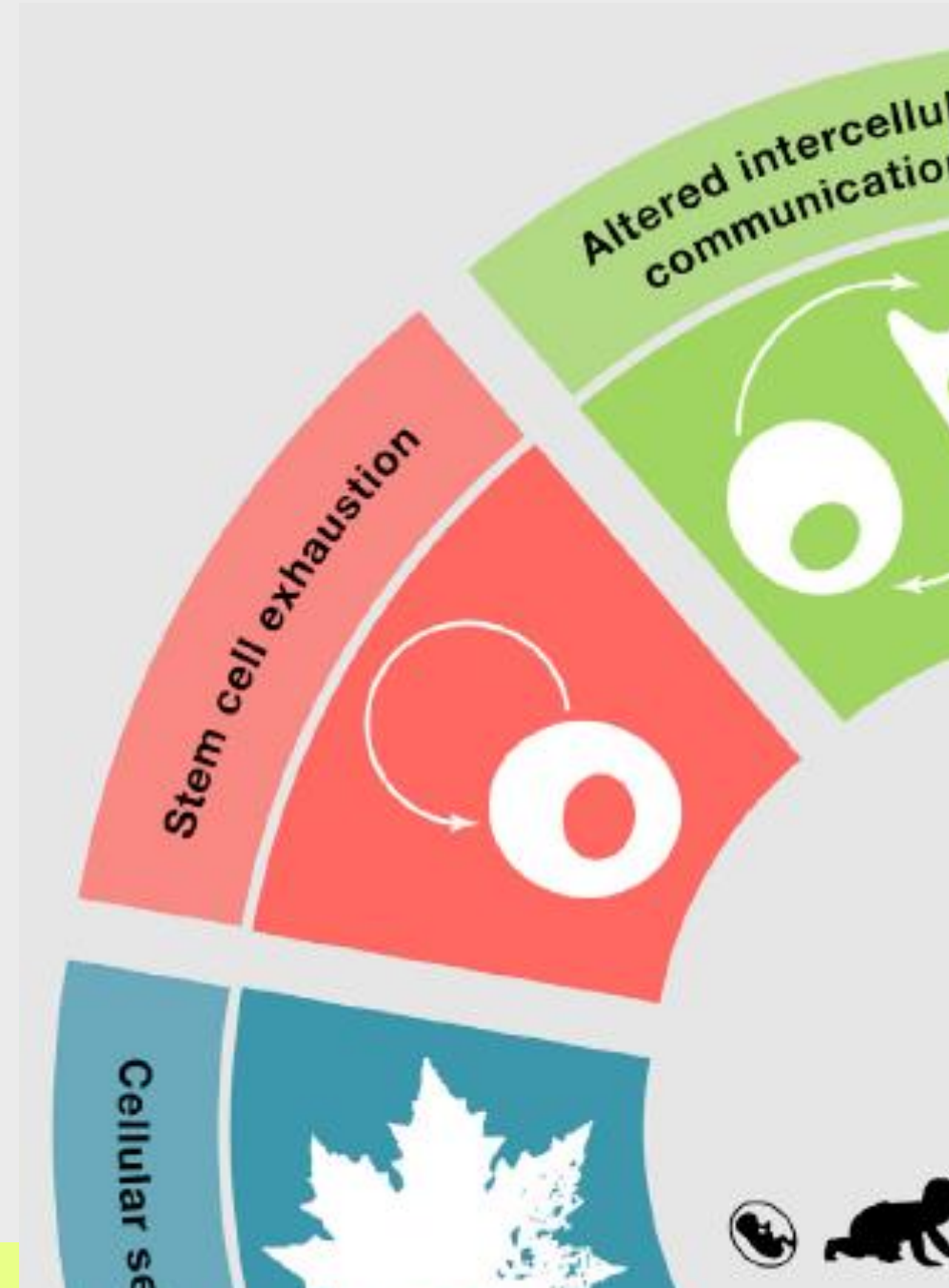
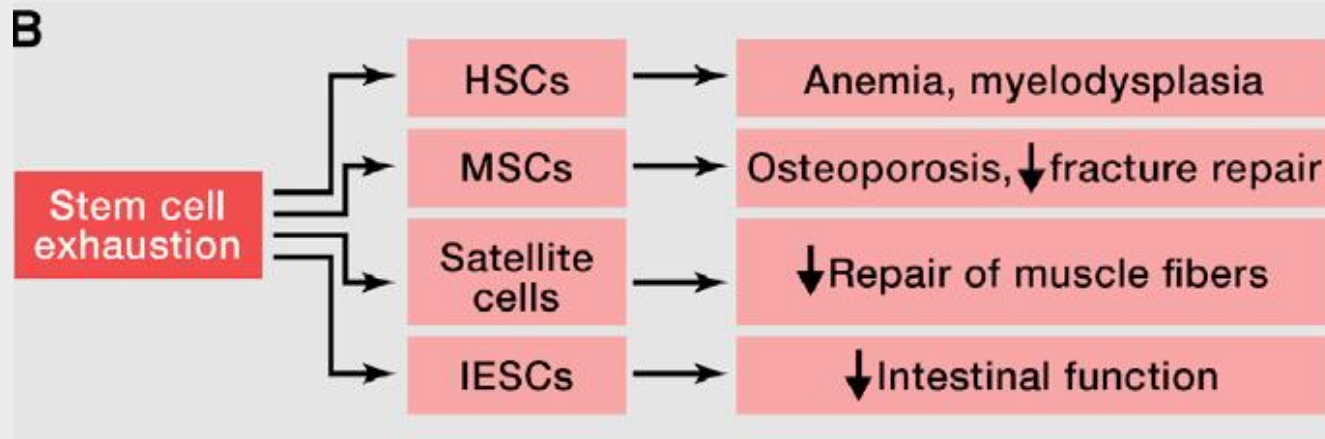
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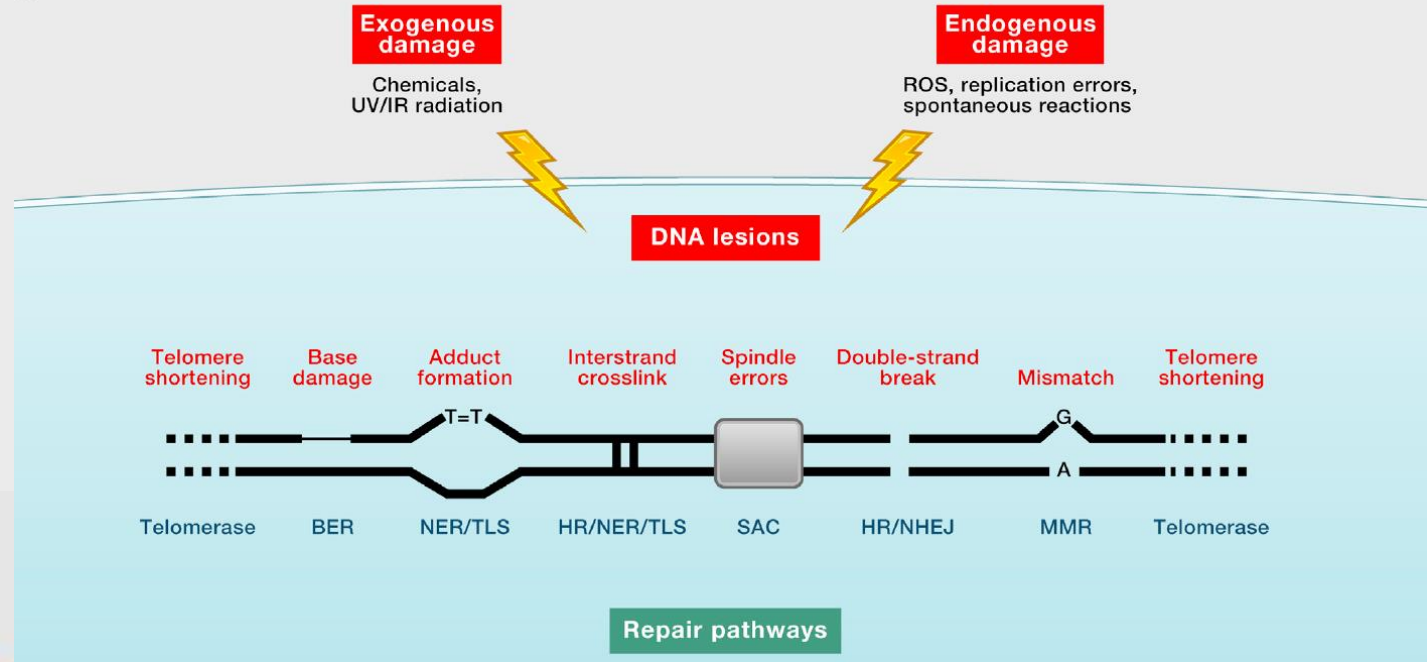
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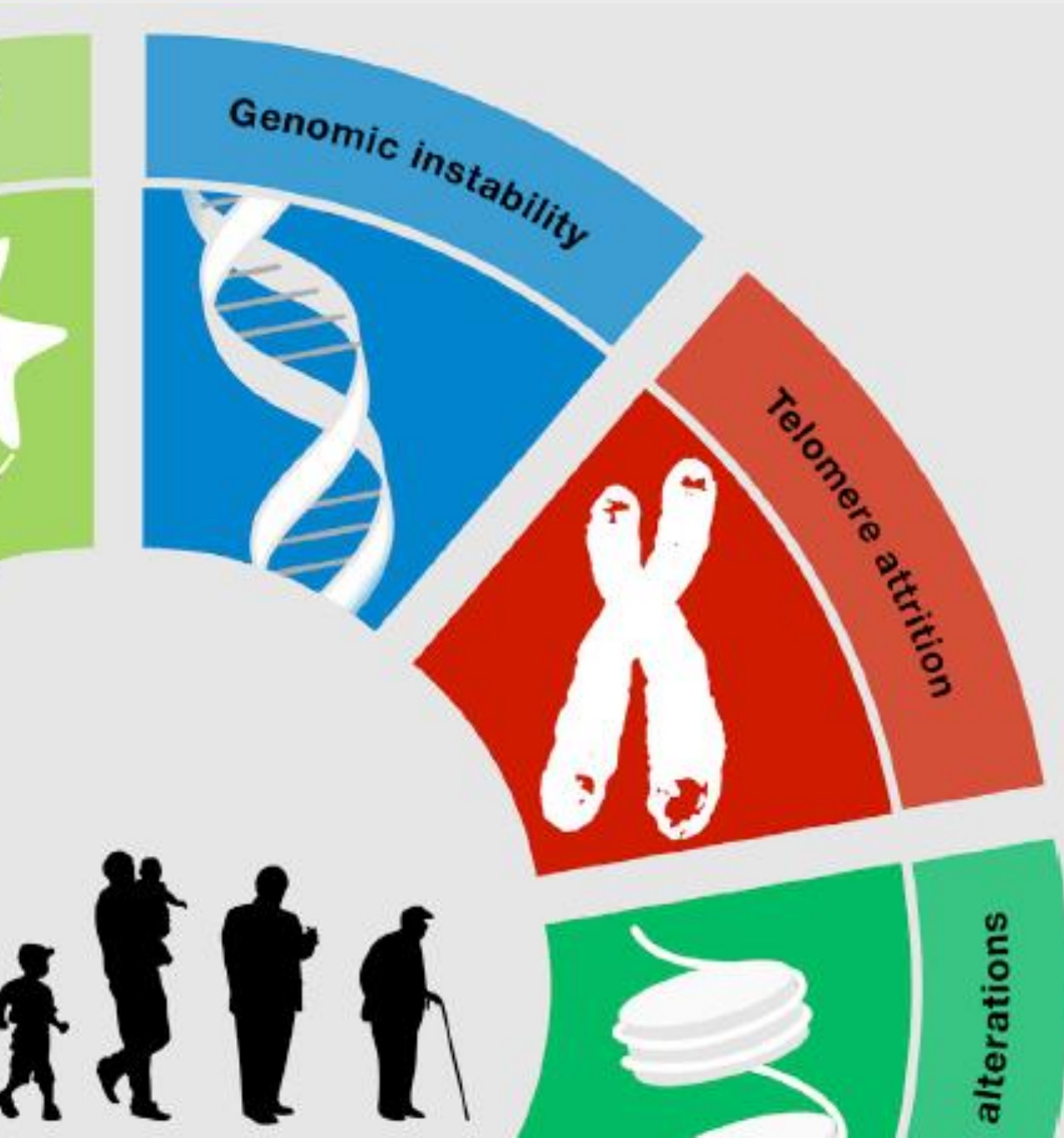




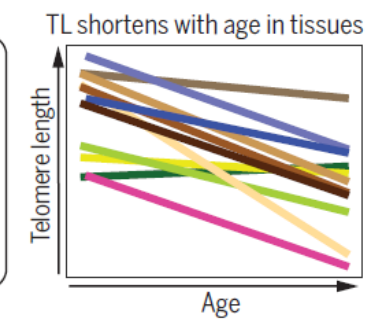
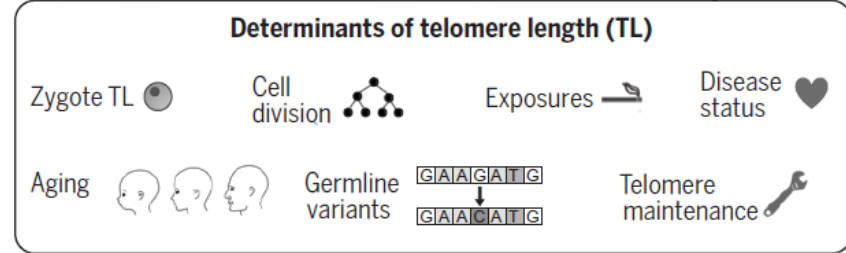
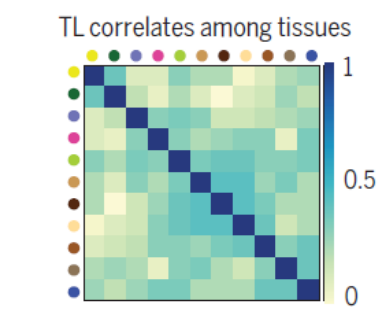
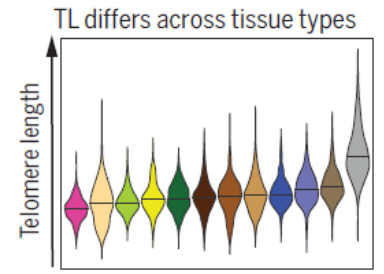
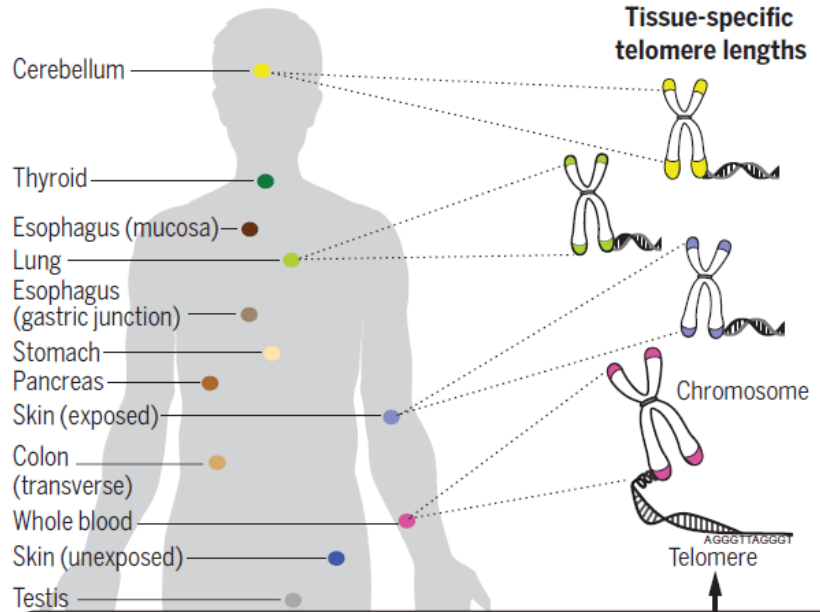
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A





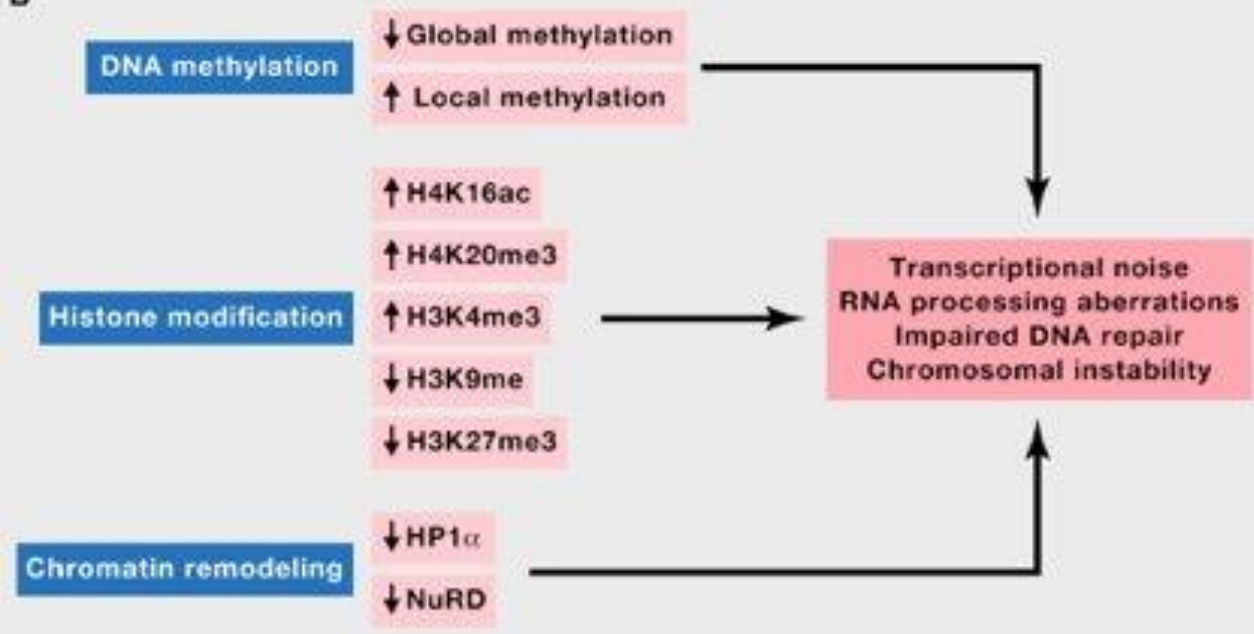
952 GTEx donors → 6391 tissue samples



**TL in human tissues.** Using a Luminex-based assay, TL was measured in DNA samples from >25 different human tissue types from 952 deceased donors in the GTEx project. TL within tissue types is determined by numerous factors, including zygotic TL, age, and exposures. TL differs across tissues and correlates among tissue types. TL in most tissues declines with age.

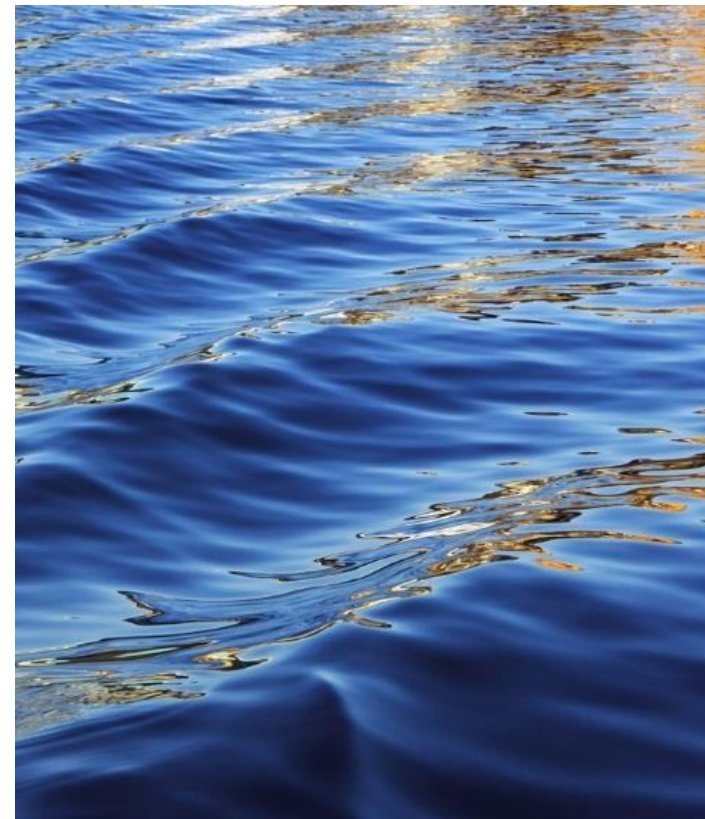


B

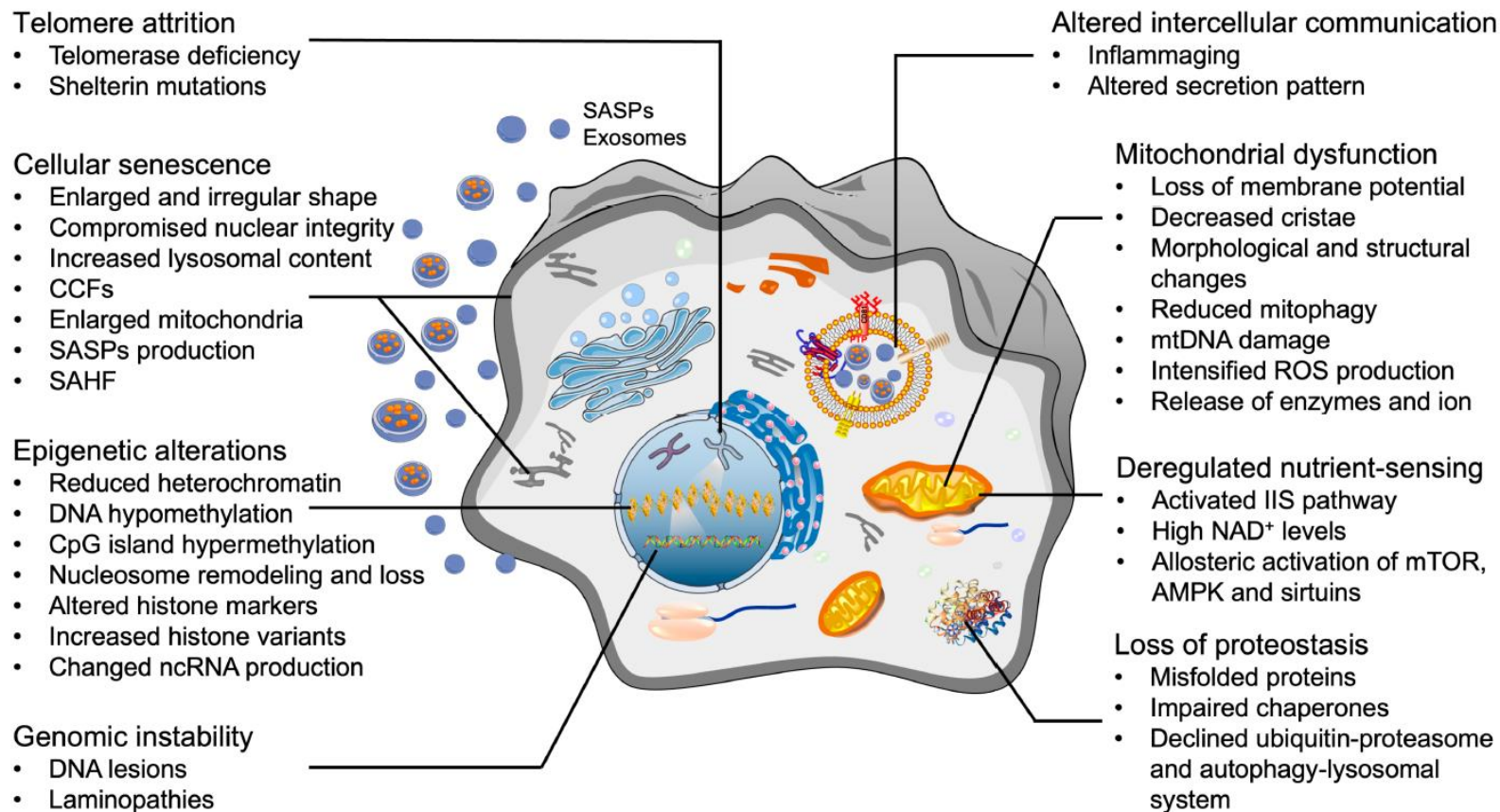




Πώς γερνάει η άρθρωση;



# Πως γερνάει η άρθρωση;



**Cellular hallmarks of aging are present in OA chondrocytes**

From He, Biology 2022

Η γήρανση του σκελετού προκαλεί οστεοαρθρίτιδα. Πάντα;

Γήρανση=ΟΑ;

ΟΑ σε μικρή ηλικία

Δεν παθαίνουν όλοι οι ηλικιωμένοι ΟΑ

Δεν επηρεάζονται από ΟΑ όλες οι αρθρώσεις

Δεν επηρεάζονται όλα τα διαμερίσματα μίας άρθρωσης







Ηλικία



Ηλικία

Γονίδια  
Φύλο



Ηλικία

Γονίδια  
Φύλο

Τραυμα  
Επαναλαμβανόμενη  
φορτιση  
Φλεγμονή  
Παχυσαρκία  
Ανατομικές δυσπλασίες

Ηλικία



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Επαναλαμβανόμενη  
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Παχυσαρκία  
Ανατομικές δυσπλασίες



ΟΑ

# Site-specific heritability of OA.

TABLE 2. Intraclass correlation and heritability of OA at the five skeletal sites

	$R_{MZ}$ (95% CI)	$R_{DZ}$ (95% CI)	Heritability, % (95% CI)
DIP	0.65 (0.59, 0.72)	0.32 (0.25, 0.39)	65 (57, 73)
PIP	0.58 (0.51, 0.66)	0.25 (0.17, 0.32)	53 (44, 62)
CMC	0.74 (0.70, 0.80)	0.21 (0.14, 0.29)	68 (60, 75)
Hip	0.39 (0.25, 0.51)	0.09 (0.00, 0.18)	28 (15, 40)
Knee	0.39 (0.27, 0.51)	0.20 (0.11, 0.30)	37 (28, 48)

Intraclass correlation ( $R$ ) for MZ and DZ twins, the heritability estimates and 95% CIs are given for each joint site; calculated from the univariate AE model.

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twins

Dizygotic  
twins

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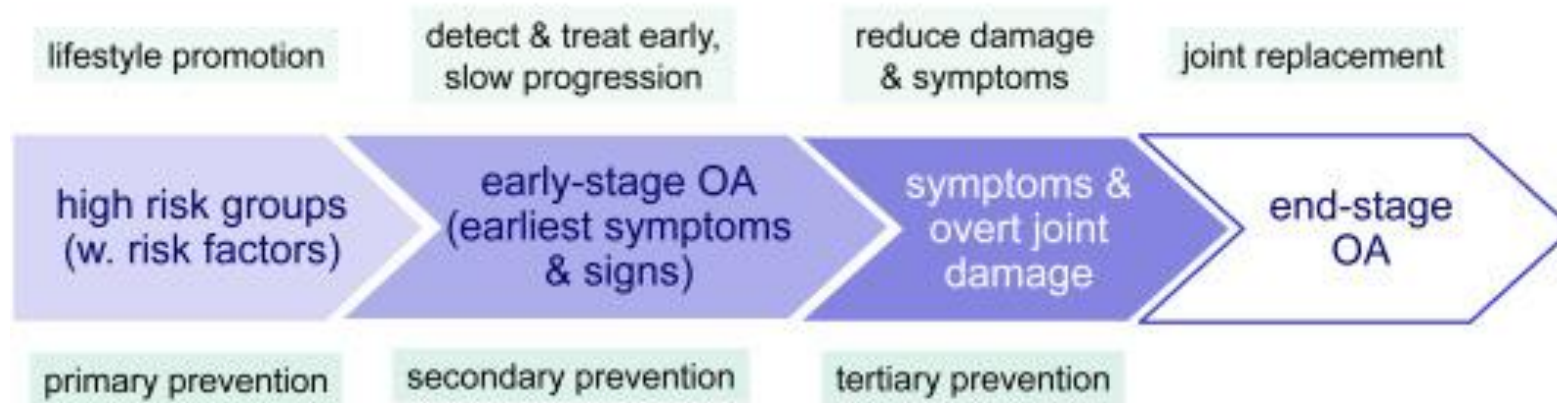
Dizygotic  
twins

## Knee and hip OA

Minor genetic influence  
Strong influence of weight  
Strong influence of trauma

# ΟΑ: πρόληψη

## the OA continuum



# ΟΑ: πρωτογενής πρόληψη

Απώλεια βάρους

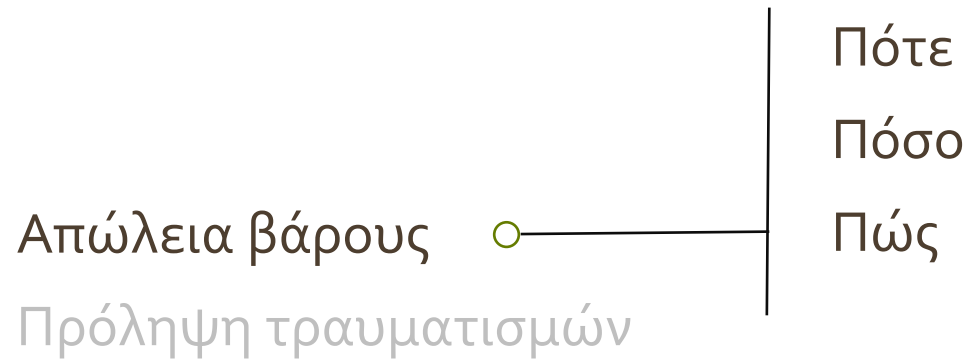
Πρόληψη τραυματισμών

# ΟΑ: πρωτογενής πρόληψη

Απώλεια βάρους

Πρόληψη τραυματισμών

# ΟΑ: πρωτογενής πρόληψη



# Weight and weight loss and risk of incident knee OA requiring arthroplasty

Relative weight changes between ages 20-50 years	OR	95% CI
Normal all the time	1	
Normal at 20, overweight at one of the ages 30, 40, 50	<b>1.86</b>	1.11-3.12
Normal at 20, overweight at two of the ages 30, 40, 50	<b>3.07</b>	1.87-5.05
Normal at 20, overweight thereafter	<b>3.15</b>	1.85-5.36
Overweight at age 20, normal at least in one of the ages 30, 40, 50	0.6	0.16-2.21
Overweight all the time	<b>2.37</b>	1.21-4.62

# Weight Loss Reduces the Risk for Symptomatic Knee Osteoarthritis in Women

## The Framingham Study

Decrease in BMI of 2 units in the last 10 years  
(weight loss of approx. 5.1 kg)

Decreased odds for developing OA by 50%  
(OR 0.46, 95%CI 0.24-0.86, p=0.02)



Απώλεια βάρους- στρατηγικές.



# Weight loss strategies

## ***Weight loss***

Diet

Exercise

Bariatric surgery

Cognitive behavioral therapy

## ***Maintaining the loss***

Diet and exercise

# ΟΑ: πρωτογενής πρόληψη

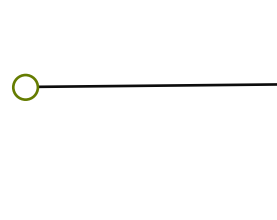
Απώλεια βάρους

Πρόληψη τραυματισμών

# ΟΑ: πρωτογενής πρόληψη

Απώλεια βάρους

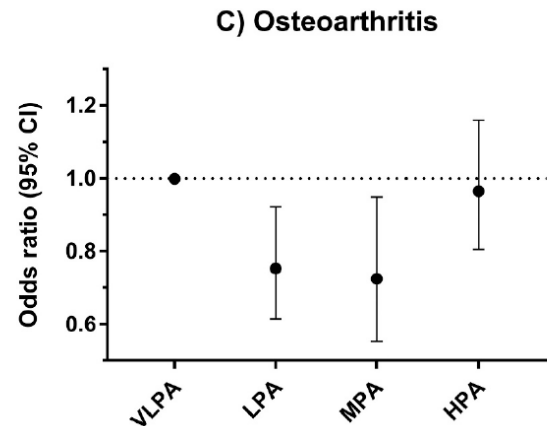
Πρόληψη τραυματισμών



Σωματική  
δραστηριότητα  
και άσκηση

# Physical activity is associated with reduced odds for OA

## NHANES survey 1999-2018



<150    150-960    961-1800    >1800

MET-min per week

**Table 2**

Odds ratio (95%CI) for degenerative diseases according to physical activity levels. Data are representative of non-institutionalized American population.

	Physical activity levels (MET-min/week)			
	VLPA (<150)	LPA (150-960)	MPA (961-1800)	HPA (>1800)
<b>Sarcopenia</b>				
Age-adjusted	1.00 (ref) <sup>abc</sup>	0.57 (0.45, 0.71)	0.43 (0.31, 0.60)	0.33 (0.25, 0.45)
Multivariable-adjusted 1	1.00 (ref) <sup>abc</sup>	0.58 (0.46, 0.73)	0.46 (0.34, 0.63)	0.34 (0.25, 0.46)
Multivariable-adjusted 2	1.00 (ref) <sup>abc</sup>	0.60 (0.47, 0.76)	0.49 (0.35, 0.69)	0.39 (0.29, 0.52)
<b>Osteoporosis</b>				
Age-adjusted	1.00 (ref) <sup>abc</sup>	0.68 (0.48, 0.96)	0.62 (0.39, 0.99)	0.46 (0.34, 0.62)
Multivariable-adjusted 1	1.00 (ref) <sup>c</sup>	0.70 (0.48, 1.01)	0.71 (0.43, 1.17)	0.60 (0.44, 0.81)
Multivariable-adjusted 2	1.00 (ref) <sup>c</sup>	0.68 (0.46, 1.01)	0.71 (0.43, 1.18)	0.57 (0.42, 0.76)
<b>Osteoarthritis</b>				
Age-adjusted	1.00 (ref) <sup>abc</sup>	0.72 (0.60, 0.87)	0.68 (0.52, 0.88)	0.79 (0.67, 0.94)
Multivariable-adjusted 1	1.00 (ref) <sup>ab</sup>	0.69 (0.57, 0.84)	0.66 (0.50, 0.86)	0.86 (0.72, 1.03)
Multivariable-adjusted 2	1.00 (ref) <sup>ab</sup>	0.75 (0.62, 0.92)	0.73 (0.55, 0.95)	0.97 (0.81, 1.16)

VLPA: Very Low Physical Activity; LPA: Low Physical Activity; MPA: Medium Physical Activity; HPA: High Physical Activity.

Model 1 Adjusted by age, sex, race/ethnicity, annual household income and educational level.

Model 2 Additionally adjusted by smoking status, alcohol consumption and obesity.

<sup>a</sup> Significant differences between Very Low and Low physical activity levels.

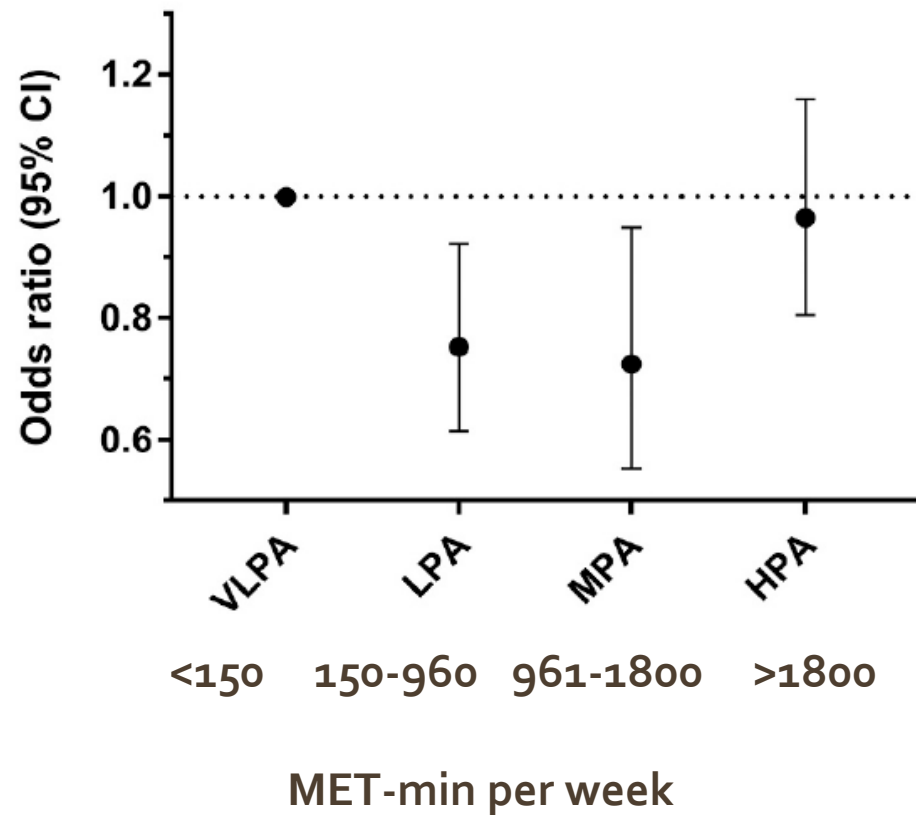
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NHANES survey 1999-2018

## C) Osteoarthritis



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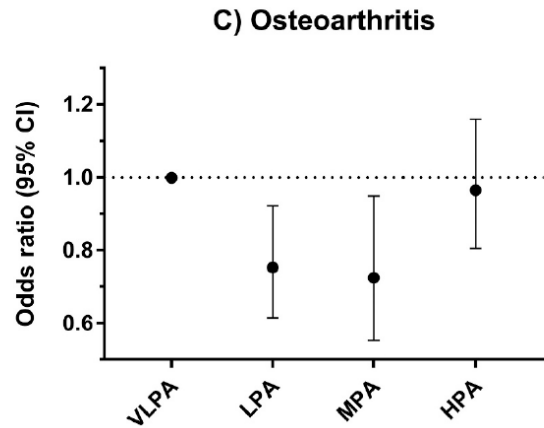
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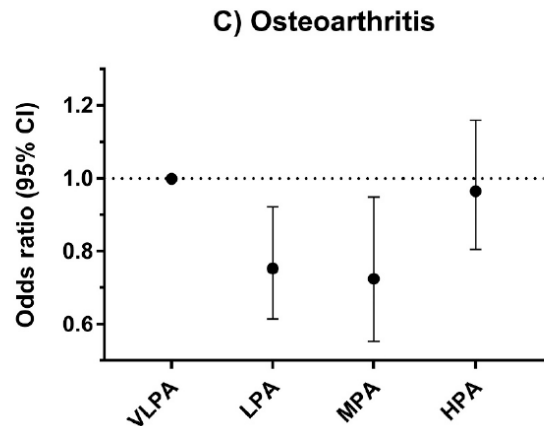
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Age-adjusted	1.00 (ref) <sup>abc</sup>	0.68 (0.48, 0.96)	0.62 (0.39, 0.99)	0.46 (0.34, 0.62)
Multivariable-adjusted 1	1.00 (ref) <sup>c</sup>	0.70 (0.48, 1.01)	0.71 (0.43, 1.17)	0.60 (0.44, 0.81)
Multivariable-adjusted 2	1.00 (ref) <sup>c</sup>	0.68 (0.46, 1.01)	0.71 (0.43, 1.18)	0.57 (0.42, 0.76)
<b>Osteoarthritis</b>				
Age-adjusted	1.00 (ref) <sup>abc</sup>	0.72 (0.60, 0.87)	0.68 (0.52, 0.88)	0.79 (0.67, 0.94)
Multivariable-adjusted 1	1.00 (ref) <sup>ab</sup>	0.69 (0.57, 0.84)	0.66 (0.50, 0.86)	0.86 (0.72, 1.03)
Multivariable-adjusted 2	1.00 (ref) <sup>ab</sup>	0.75 (0.62, 0.92)	0.73 (0.55, 0.95)	0.97 (0.81, 1.16)

VLPA: Very Low Physical Activity; LPA: Low Physical Activity; MPA: Medium Physical Activity; HPA: High Physical Activity.

Model 1 Adjusted by age, sex, race/ethnicity, annual household income and educational level.

Model 2 Additionally adjusted by smoking status, alcohol consumption and obesity.

<sup>a</sup> Significant differences between Very Low and Low physical activity levels.

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<150    150-960    961-1800    >1800

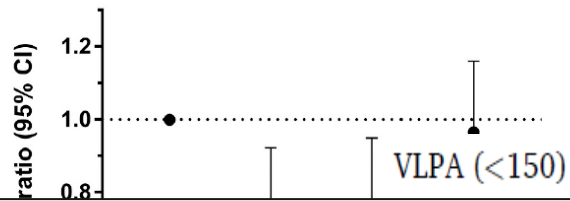
MET-min per week



# Physical activity is associated with reduced odds for OA

NHANES survey 1999-2018

**C) Osteoarthritis**



**Table 2**

Odds ratio (95%CI) for degenerative diseases according to physical activity levels. Data are representative of non-institutionalized American population.

	Physical activity levels (MET-min/week)			
	VLPA (<150)	LPA (150-960)	MPA (961-1800)	HPA (>1800)
<b>Sarcopenia</b>				
Age-adjusted	1.00 (ref) <sup>abc</sup>	0.57 (0.45, 0.71)	0.43 (0.31, 0.60)	0.33 (0.25, 0.45)
Multivariable-adjusted 1	1.00 (ref) <sup>abc</sup>	0.58 (0.46, 0.73)	0.46 (0.34, 0.63)	0.34 (0.25, 0.46)
Multivariable-adjusted 2	1.00 (ref) <sup>abc</sup>	0.60 (0.47, 0.76)	0.49 (0.35, 0.69)	0.39 (0.29, 0.52)
<b>Osteoporosis</b>				
Age-adjusted	1.00 (ref) <sup>abc</sup>	0.68 (0.48, 0.96)	0.62 (0.30, 0.99)	0.46 (0.34, 0.62)
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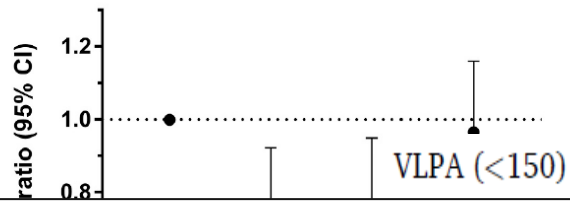
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MET-min per week

# Physical activity is associated with reduced odds for OA

NHANES survey 1999-2018

C) Osteoarthritis



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<150 150-960 961-1800 >1800

MET-min per week

# Physical activity is associated with reduced odds for OA

## NHANES survey 1999-2018

C) Osteoarthritis

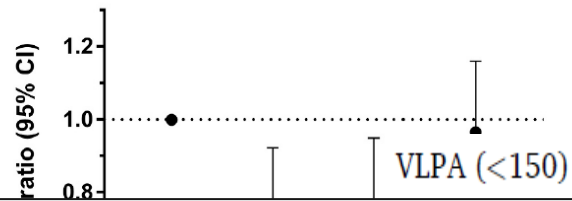


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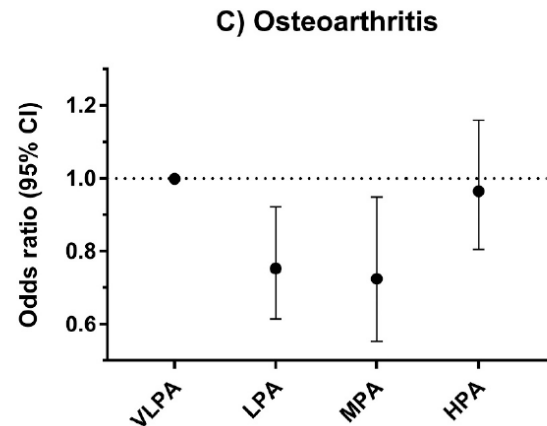
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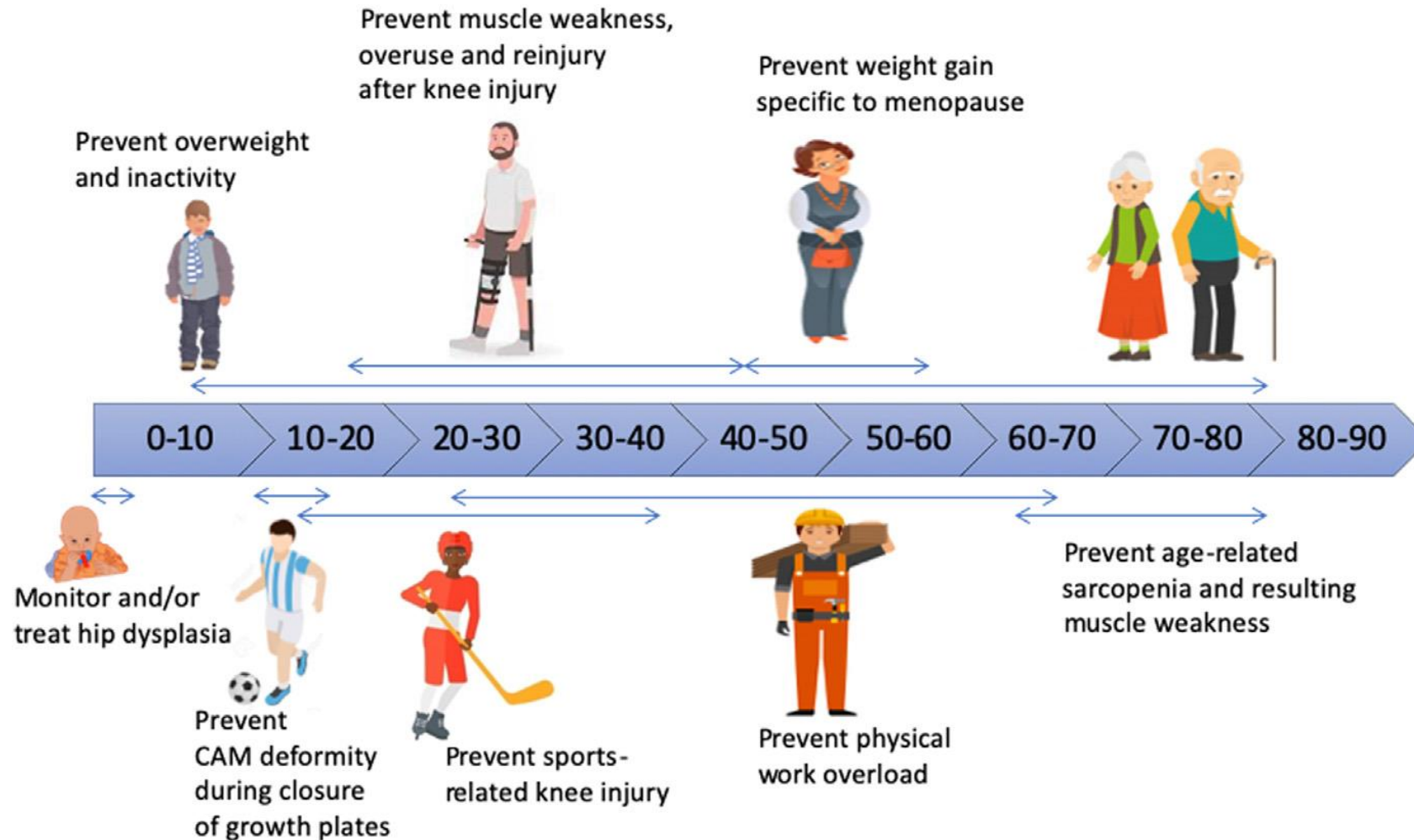
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# Opportunities for the prevention of OA across the lifespan



# Ways to see osteoarthritis...

As a health problem (in an individual)

As a social problem (in terms of disability, costs etc)

As an aspect of ageing

As a common, largely preventable, degenerative disease, demanding organized action