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Healthy Ageing, but What is Health and How to Maintain it?

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What is health...?



Health is a state of complete physical, mental, and social **well-being**, and not merely the absence of disease or infirmity.

Health in terms of Activities of Daily Living (ADL)....

Idealistic definition

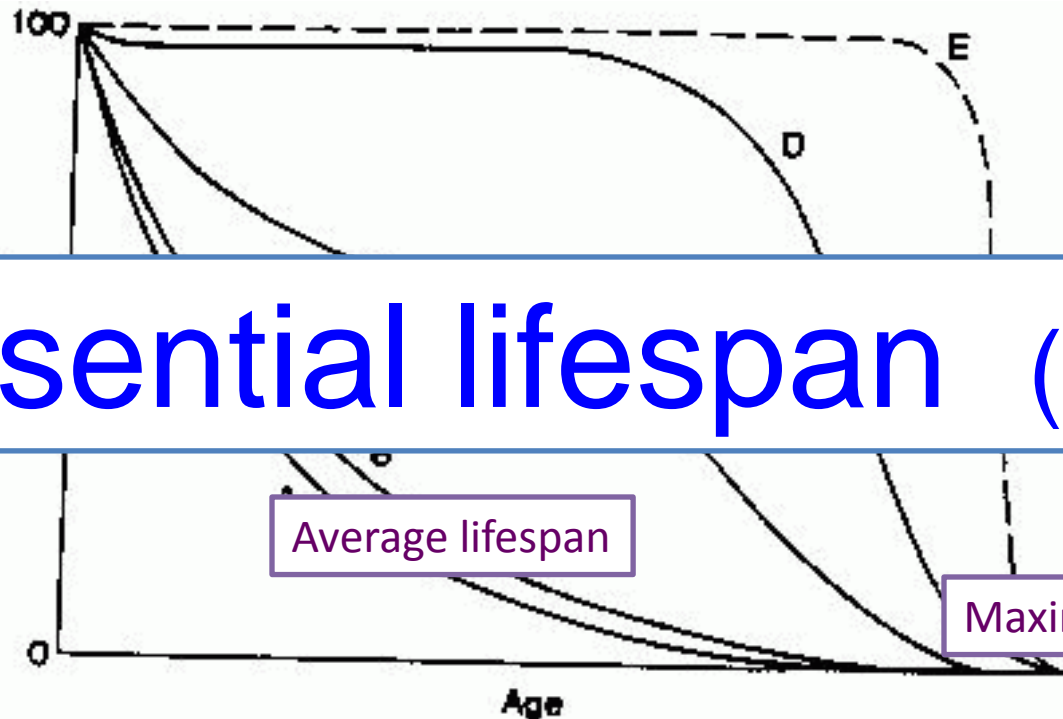
ABSOLUTE physical and mental independence in ADL.

Nobody has it....

Pragmatic and realistic definition

ADEQUATE physical and mental independence in ADL.

Biologically, at what point in lifespan ageing begins?



Essential lifespan (ELS)

Average lifespan

Maximum lifespan

Biologically,
ageing happens after
essential lifespan (ELS)
of the species

Psychologically,
human ageing “stops” after
ELS of about 40-50 years.

Ageing occurs at all levels of biological organisation, but differently...



Younger Buttock



Older Buttock



Younger Arm



Older Arm (UV damaged)

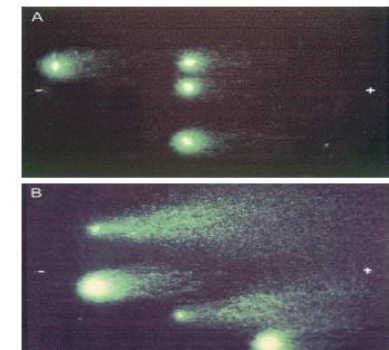
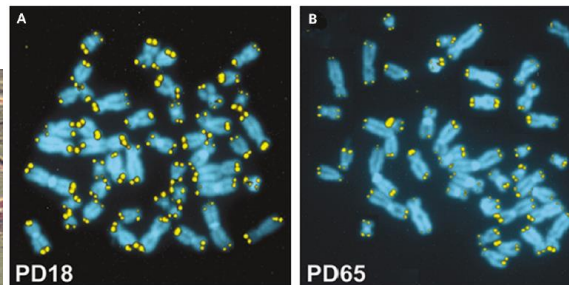
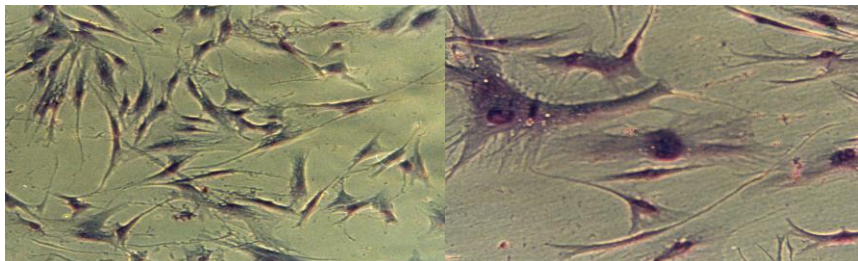
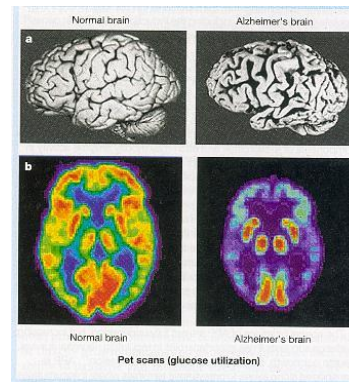
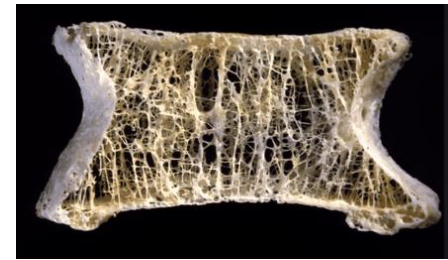


Figure 1. Quantitative-FISH analysis of individual telomeres. Representative images of HCA2 cells at PD18 (A) and PD65 (B) demonstrate variable telomere lengths and heterogeneous accumulation of short telomeres prior to replicative senescence.

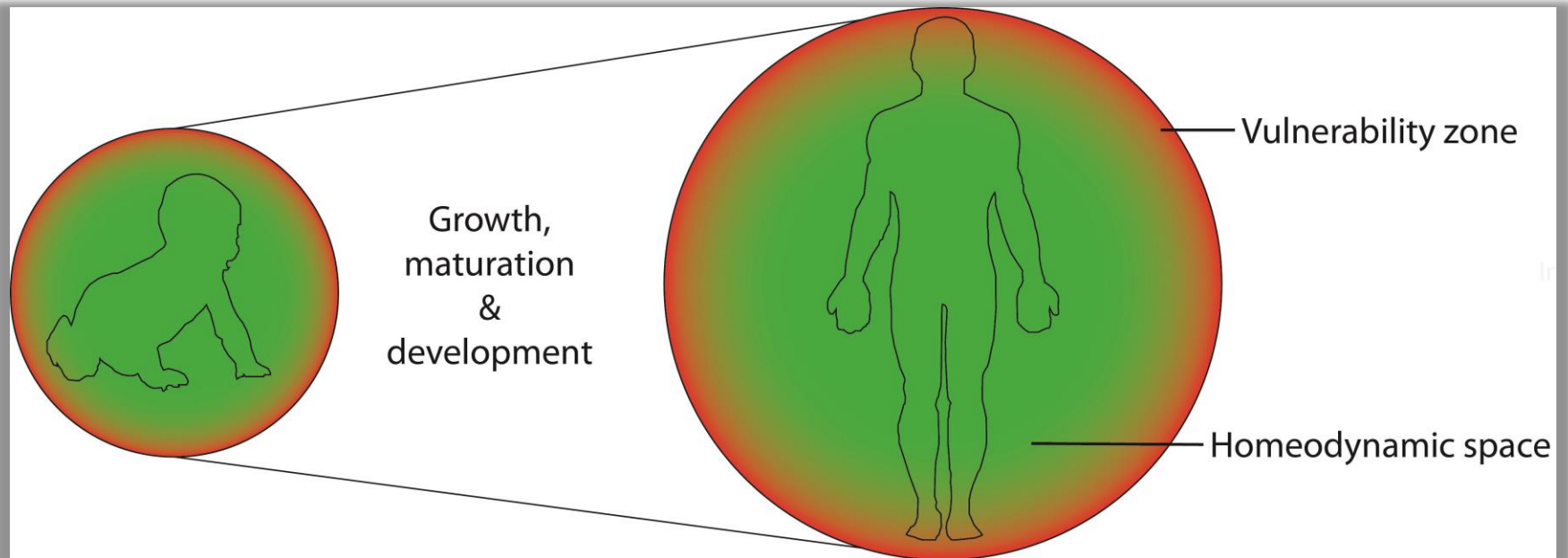
we are not programmed to age and die

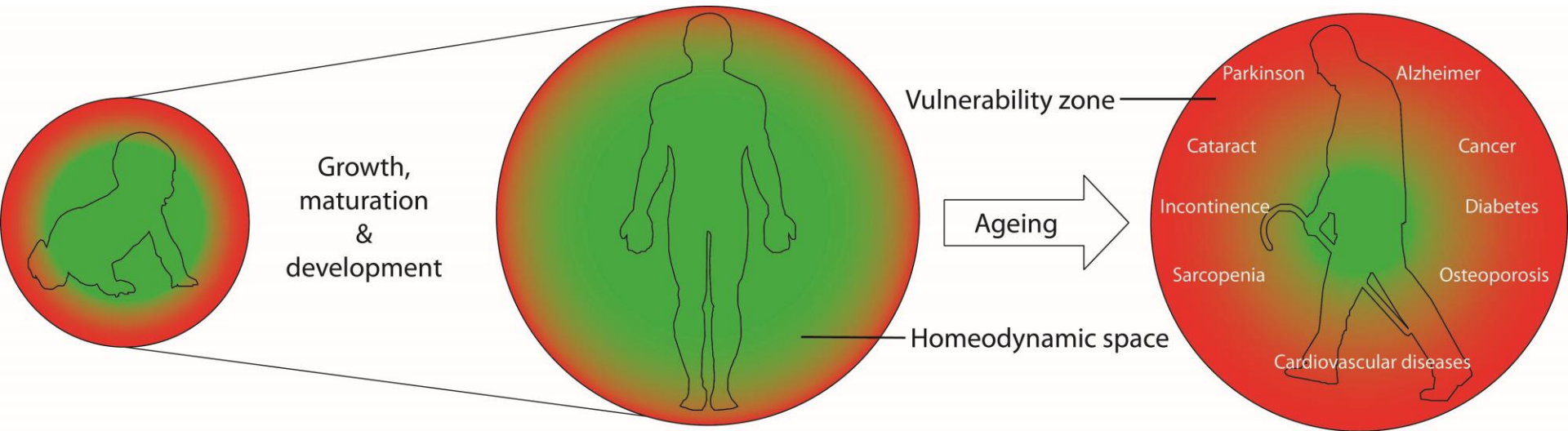
There are no gerontogenes
whose sole function is to
cause ageing and eventual
death

Genes determine essential
lifespan of a species

(longevity-assurance genes; vitagenes)

Not homeostasis, but HOMEODYNAMICS





Ageing is the shrinkage of the homeodynamic space

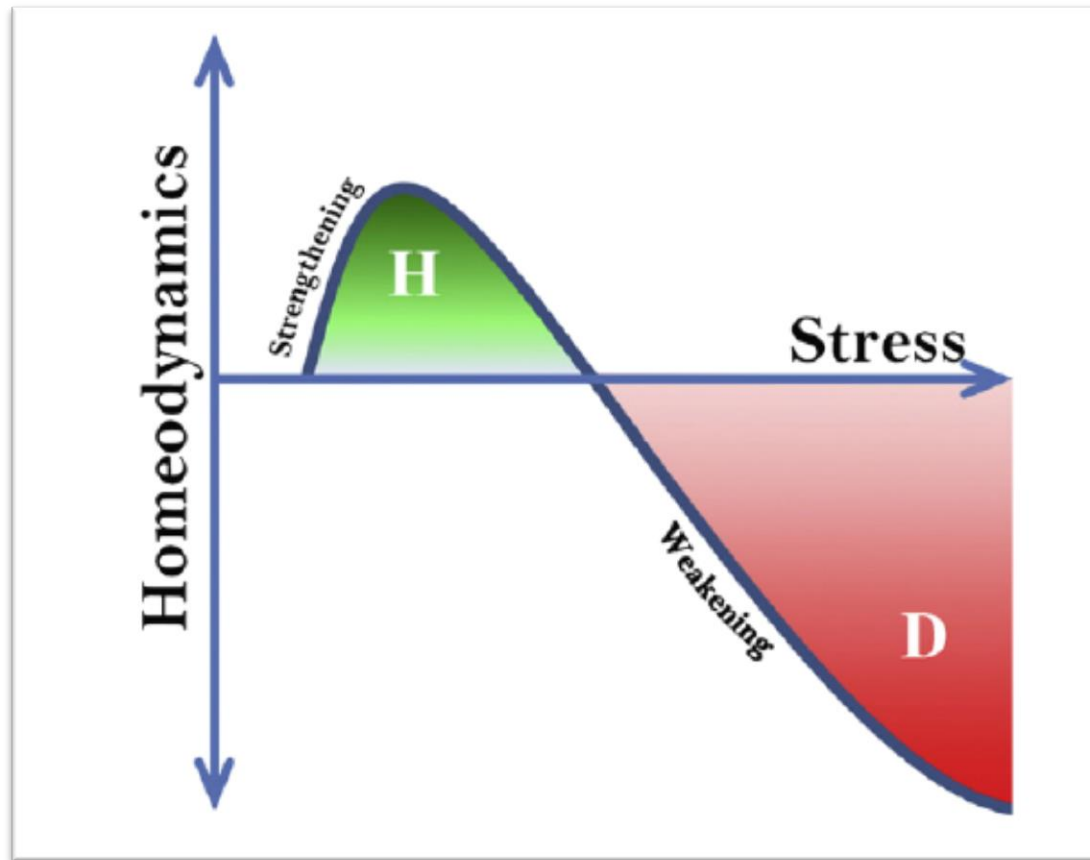
Anti-ageing or healthy ageing?

Ageing interventions:

1. Wishful thinking and miracles
2. Piecemeal remedies / replacements
3. Replenishments – hormones, anti-oxidants
4. Wholistic interventions.

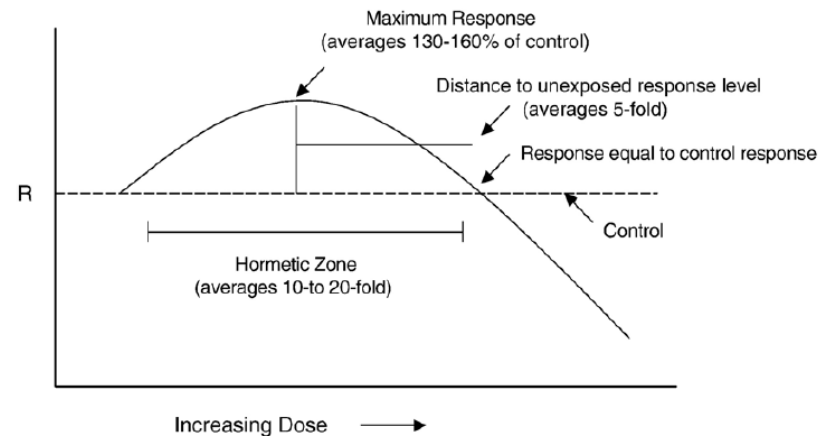
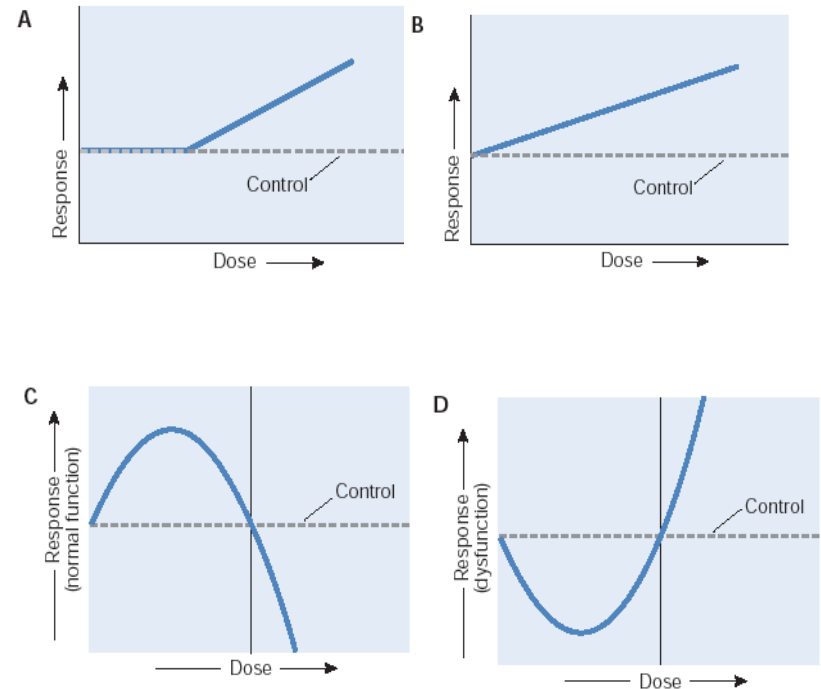


Wholistic interventions for maintaining health



HORMESIS

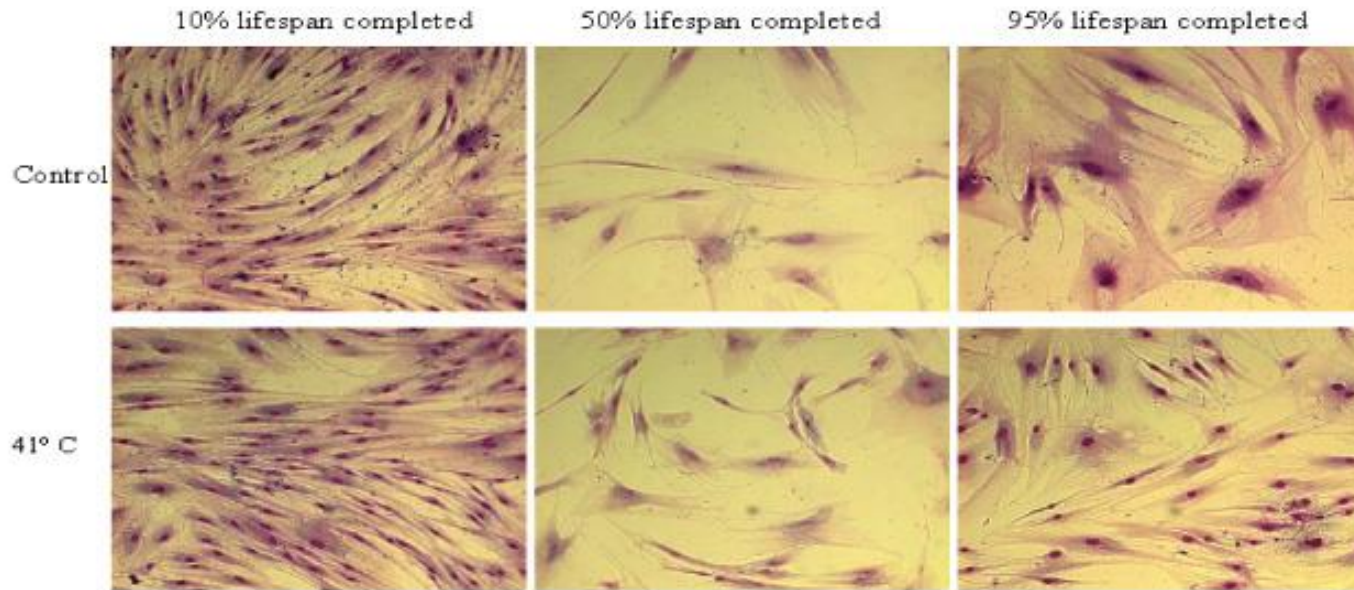
- Biphasic dose response
 - U-shaped response
 - Inverted-U shape response
- Adaptive response
- Compensatory response



Three types of dose response curves...

Strengthening the homeodynamics by mild stress-induced HORMESIS

Challenging of homeodynamics
stimulates compensatory,
adaptive, and reparative
processes.



*Some examples
from our labs*

Repeated mild heat shock slows down ageing, improves angiogenesis, wound healing and healthspan

A condition that causes hormesis is: **HORMETIN**
The science of hormesis is **HORMETICS**

Physical hormetins

exercise, heat, cold, radiation...



Nutritional hormetins

spices, micronutrients, fasting

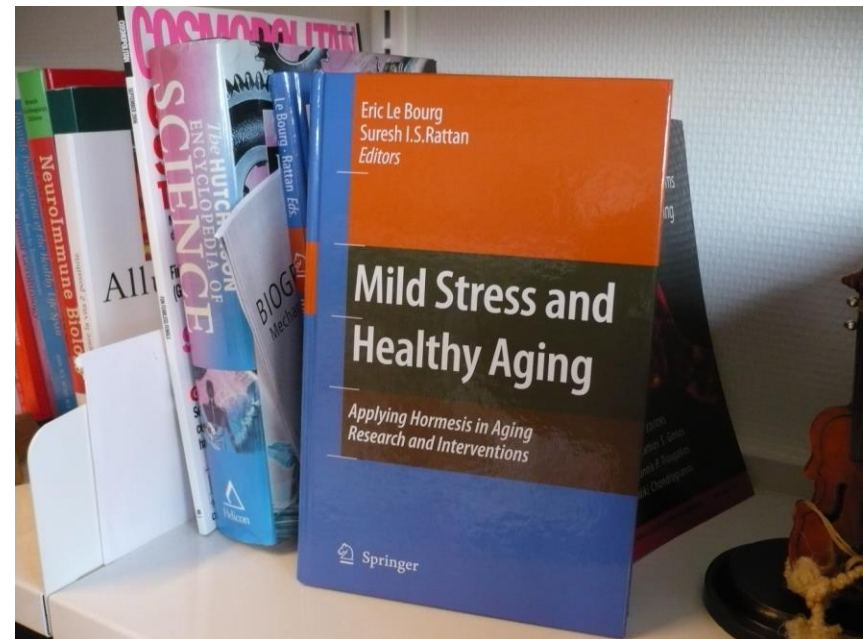
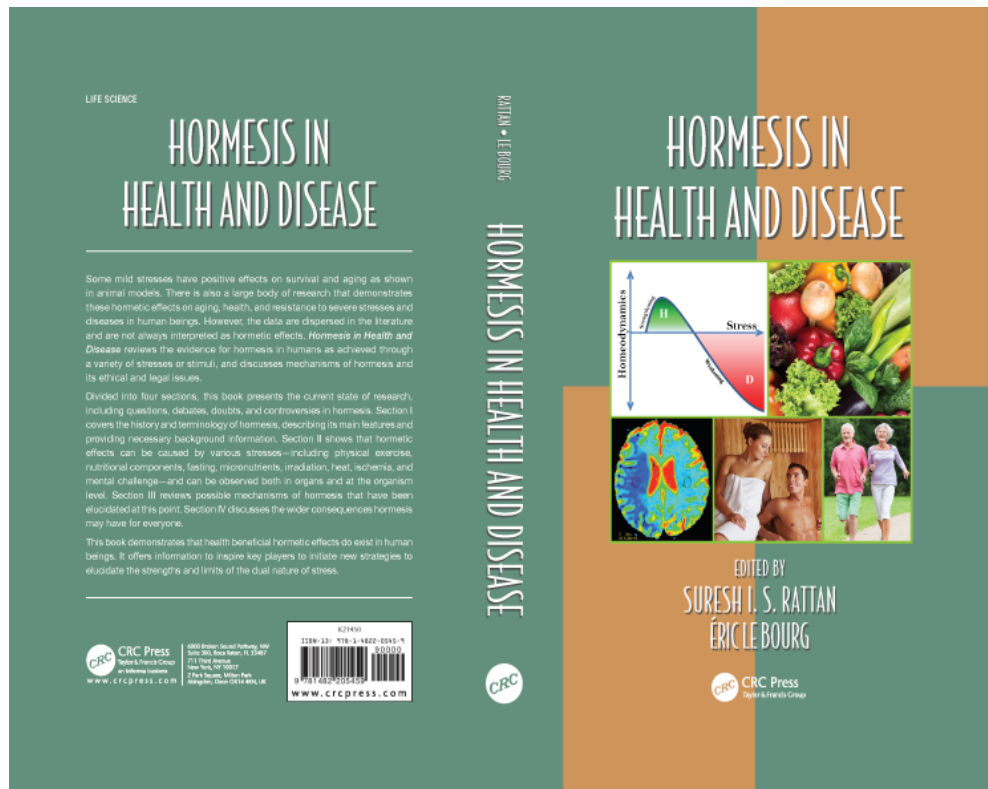


Psychological hormetins

Social and mental engagement, focussed attention
(meditation)



Hormesis for humans – Health beneficial effects of stress of choice....



What we need for maintaining health....

Biological level – food, shelter, biomedical technology

Sociological level – identity, contact, communication

Psychological level – attitude, ethics, connection

Aging Science Related Journals

- *Anaplastology*
- *Journal of clinical & experimental Dermatology Reasearch*



Aging Science Related Conferences

- *5th International Conference on Clinical & Experimental Dermatology*



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