DuSRA Dutch Society for Research on Ageing

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Leiden University Medical Centre (LUMC)
Dutch Society for Research on Ageing
DUSRA; Dutch Society of Research on Ageing
Stimulate translational research

200 members representing 8 universities + DuSRA Board (LUMC, EUMC, WUR, UMCG)

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DuSRA Mission

To integrate basic, biomedical, clinical and socio-biological research on Ageing in The Netherlands. Dutch platform of expertise for Ageing Research. Links ageing studies in humans, animal models, model systems and cellular models. Formulates a national research agenda to promote translational science in ageing.

Annual meeting: October 4 2018
Life Expectancy over the past 4 centuries

Oeppen & Vaupel, Science 2002

50,000 yr: ~2000 generations

5-6 generations
Age is the strongest risk factor for common diseases

16-20% of life EU citizens spend in disability
- 65+ doubles before 2050
- 85+ triples before 2050
- Co-morbidity, polypharmacy, heterogeneity/biological age

Rae et al., 2010
**Hallmarks of extended health and lifespan**

Energy Metabolism
Nutrient sensing
Signaling of
Insulin/mTOR/lipids
Thyroid hormone

Cellular processes
(stemcells, senescence, autophagy, apoptosis)

Defence mechanisms
Stress
Immunity
Repair of DNA and proteins

**Shared cellular and systemic longevity mechanisms across species**

Lifespan
Physiology of healthy ageing
López-Otín et al., 2013

Hallmarks of Ageing
Biological domains of the ageing process

REVERSIBLE (SWITCHES)
modify and monitor Geroscience
A long healthy life is physiologically possible! Longevity families.
- to measure an individual’s overall health status
- predict the risk of death
- predict the risk of age-related disease incidence
- evaluate the effect of a health care management program
- evaluate the effect of lifestyle/management interventions
Biological Age Prediction

Using physiological performance, organ function, molecular data
Opportunities to make multi-marker algorithms

Deelen et al., Bioassays 2013

Mitnitski, BMC geriatrics 2002
Rockwood, Age 2013
Hannum, Mol Cell 2013
Horvath, Genome Biol. 2013
Peters, Nat Commun. 2015
Belsky, PNAS 2015
Jylhävä, EBioMedicine 2017
Slagboom, BBA special issue 2017
Phenotype

Metabolome

Proteome

Transcriptome

Epigenome

Genome

Lifestyle

Nutrition

Environment

BBMRI – Omics: Biobanking consortium
Metabolome as biomarker in 50,000 persons
Metabolic Age scores
BBMRI: after QC: 25,453 samples from 26 biobanks

Gender
- female
- male

Erik van den Akker
Jurriaan Barkey-Wolf
Availability

Data: [www.bbmri.nl/omics-metabolomics](http://www.bbmri.nl/omics-metabolomics)

Webtool: for age-predictions expected soon
Conclusions metabolomics/age biomarkers

1. A well standardized affordable 1H NMR platform predicts common disease risk and mortality (due to cancer, CVD and infectious causes).

2. Prediction improves that of traditional risk factors especially at death >60 years within 5 years follow up.

3. The Metabo-Age score predicts mortality comparable to DNAmethylation age score. Per year older 4-6% higher mortality risk. Perhaps the first for vascular health and eth second for cancer.


5. Repeated measures; clinical studies (resilience) ; systematic comparison of predictors and relevant points in lifecourse
VOILA: Vitality Oriented Innovations for the Lifecourse of the Ageing Society (PPS proposition)

- Reversing cellular damage and repair senescence
  - Fast mimicking diet
  - Scenolytic drugs
  - Young Blood components

- Detect/monitor physiological vulnerability turn into healthy ageing
  - Diagnostics
  - Diets
  - Complex carbohydrates
  - Pre-biotics

- Retain & restore metabolic and hormonal homeostasis
- Role of the ‘healthy’ Microbiota

Physical activity
- Diets
- Sleep
- Stress
Acknowledgements for the scientific part and DuSRA

Section of Molecular Epidemiology
  Eline Slagboom
  Marian Beekman
  Jurriaan Barkey Wolf
  Joris Deelen

Department of Medical Statistics
  Jelle Goeman
  Hein Putter

Department of Internal Medicine
  Stella Trompet

Department of Internal Medicine
  Wouter Jukema

Leiden Computational Biology Center
  Marcel Reinders

BBMRI-NL Consortium Partners