

6 – 8 January 2016

Wednesday 6 January 2016

Session I:

Introductory session on Ageing: conceptual frameworks and defining the problem.

What is the most relevant and generic aspect of the ageing process driving (un)healthy ageing in humans? Hallmarks of human ageing compared to studies in animals.

Blood pressure regulation, insulin sensitivity, immune response etc. are modified in the course of life. Which animal models reflect these systemic age-related markers of aging that precede disease (other primates, pigs, rats, mice etc.). How can we discriminate the multiple causes of age-related functional decline in these systems? It will be important to distinguish causes based on mild dysfunction from early development onwards from those arising in middle age.

In other words on which aspects of the complex, co-morbid aspects of the elderly human can we focus and what would be criteria for animal models that best reflect rate limiting steps in this complexity or its components. How do evolutionary biology, comparative biology and genetic epidemiology/human genetics connect in this sense?

09:00 - 10:00 Arrival, office assignment, coffee and tea

10:00 - 10:15 Welcome by the Lorentz Center staff

10:15 - 10:35 **Prof. Hanno Pijl** *Clinical ageing research: the problem*

10:35 - 10:55 **Prof. Bas Zwaan** *Evolutionary basis, animal models*

10:55 - 11:15 **Prof. Eline Slagboom** *Molecular Genetics and Molecular Epidemiology of ageing*

11:15 - 12:30 **General discussion**

12:30 - 14:00 Lunch

Session II:

Compare leads from human and animal studies: which modifiable driver and inhibitor systems determine (un)healthy ageing? Which designs are being applied?

- *Ageing*: energy metabolism. Role of nutrient sensing, mitochondrial functions and endocrine mechanisms. Human and animal studies. Designs, theoretical frameworks, leads.
- *Ageing*: inflammation. Role of chronic inflammation in ageing. Human and animal studies. Designs, theoretic frameworks, leads.
- *Ageing*: endogenous and exogenous toxic compounds molecular damage, stress response.

14:00 - 15:00 *Speakers to bring forward the background and discussion points:*
Moderator: Steven Stearns

Prof. Adam Antebi *Ageing and metabolism*

Prof. Claudio Franceschi

Prof. Jan Hoeijmakers *Molecular Damage*

15.00 - 15:30	General discussion
15:30 – 16:00	Coffee and tea break
16:00 – 17:00	<i>Discussion groups and reporting on paper (for road map)</i>
17:00 -	Wine and Cheese welcoming party with poster session

Thursday 7 January 2016

Session III:

Biomarkers of ageing

- Examples of biomarkers in humans and animal studies (changes in the genome, epigenome, transcriptome, metabolome, proteome, traditional markers and risk scores, senescent cells and other hallmarks)
- Clinical assessment and markers of ageing, clinical studies of elderly, a focus on the selection of elderly to study, the study design.
- For what purpose do we need biomarkers? What are the most pressing research questions and needs of the clinic and society. Our discussions into this topic covers a) Biomarkers that can be used as phenotypes dynamic biological changes emerging as a function of age preceding loss of function, morbidity and/or mortality as well as markers of (co)-morbidity and mortality, b) Monitoring Markers of a response to an exposure (in intervention studies) and c) Classifiers to be used in the clinic or society for risk assessment and stratification among elderly persons and patients.
- Such markers are used in - etiological studies to discriminate subgroups in a (human or animal) population as phenotypes of ageing in identification of drivers of ageing rate (genetic studies), - for risk assessment in populations, precision medicine in patient populations, monitoring health improvement in interventions etc.
- How can random and non-random change and damage provide useful biomarkers of the rate of ageing (chronological and biological), of early stage functional decline, markers of well-being and be of help in discriminating reversible from non-reversible biological change.

09:00 - 10:00 *Speakers to bring forward the background and discussion points.*
*Moderator: **Sophia de Rooij***

Prof. Gerard Jan Blauw *Need in the clinic: Geriatric assessment and biomarkers in the clinic*

Prof. André Uitterlinden *What does epidemiology need/ offer*

Prof. Andrzej Bartke *IIS and systems markers*

10.00 - 10.30	General Discussion
10.30 - 11.00	Coffee and tea break
11.00 - 12.00	Discussion groups and reporting
12.00 - 13.30	Lunch

Session IV:

- Modification of the ageing process: intervention studies of the future in man and animal model.
- Selection of Intervention studies in humans and animals with respect to nutrition and exercise
- Selection of pharmacological Intervention studies in humans and animals.
- What is necessary to perform proper intervention studies in society and the clinic? How can fundamental studies of ageing support this translational goal? What is being done, what is successful with respect to lifestyle changes, to influencing behavioral change, prevention in society and in influencing outcome of therapy in the clinic?
- The middle aged and elderly human in the centre. What novel preventive and therapeutic interventions can we expect? Again, which components in the biological ageing process are shown or expected to be modifiable, reversible which means are feasible, how to monitor (including well-being, sleep, etc.), how can group definition using biomarkers assist in this effort?
- Translating research into ageing and age-related disease towards clinical applications and societal needs. What is missing (infrastructure, technology, methodology, design, cohorts, reach elderly in society an unselected way, generate the right models et cetera).

13.30 - 14.30

Study groups road map

14.30 - 15.30

Speakers to bring forward the background and discussion points.

*Moderator: **Luigi Fontana***

Prof. Gerald de Haan *Stem cells, pharma intervention*

Prof. Lisette de Groot *Voeding/ouderen/society*

Prof. Erik Buskens *Economic evaluation in health care*

15.30 - 16.00

Coffee and tea break

16.00 - 18.00

Discussion groups and reporting

18:00

Departure by bus to boat (Zijldijk, Leiderdorp)

18:00 – 18:30

Boat tour and Indonesian workshop dinner

22:30

Departure from boat to Leiden train station, Lorentz Center or hotel Van der Valk

Friday 8 January 2016

09:00 – 10:00

Free time to bring up novel developments, possibly high lighting 5-10 minute lectures, illustration of innovative ideas relevant for the roadmap.

10.00 – 10:30

Coffee and tea break

10:30 – 12:30

Constructing the road map

12:30 – 14:00

Lunch

Session V:

Summary and plenary discussion. **Eline Slagboom** and **Gerald de Haan**. Moderator: **Bas Zwaan**; *Delineating a (translational) research agenda to identify biomarkers and modifiable aspects of human ageing, and design feasible interventions to extend healthy lifespan.*

14:00 – 14:30

Prof. Steve Cummings *Biomarkers, longevity, public/private collaborations: 5 years experience of the US Longevity Consortium. Constructing the road map*

14.30 - 15.00

Prof. Valter Longo *Endocrine/nutrient sensing in human and animal*