Towards Priorities for Aging Research

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Who & Why?

- Leading Technology Group has been investing in life sciences field
- Our future investment focus is on SENS type opportunities, in particular vascular aging
- Here we discuss the prioritisation approach that lead to this decision
Aim: Priorities for Aging Research

• Ideally, with a SENS view, we would prioritise instances of aging damage
• No standard definitions or demographic data on damage, so we prioritise disease
• We use Australian Burden of Disease Data
• Here we briefly review the path to our approach and the results
Character of Mortality

- Australian All Cause Mortality
- Gompertz-Makeham
Disease Curves Vary

Fig. 5. Cardiovascular-Renal Diseases (Group B).
(Simms 1946)

Fig. 1. Mortality from selected causes by age. Plotted from data in the U.S. National Office of Vital Statistics report [1].
(Kohn 1963)
Disease Curves Vary Over Lifespan

(Horiuchi, Finch et al. 2003)
High-level Findings

1. Accelerate in old age/post reproductive:
   - Dementia (Vascular & Alzheimer’s)
   - Several infectious diseases (Influenza)
   - Accidental injuries associated with frail musculoskeletal system (Falls, Suffocation etc)
   - Digestive system (Bowel obstruction)
   - Genital/urinary system (Kidney disease)

2. Decelerate in old age/post reproductive
   - Life style: heavy drinking (Liver disease), smoking (Lung cancer), and obesity (Type 2 Diabetes)
   - Disease history (Rheumatic heart disease, Hepatitis)
   - Genetic factors (Multiple sclerosis, some Cancer)
Summary Interpretation

1. Accelerating: dominated by senescent processes from normal metabolism
2. Decelerating: dominated by individual specific risk factors

• With a focus on aging, our ranking should
  – Over weight diseases that accelerate
  – Under weight diseases that decelerate
Prioritisation

• Several methods were considered:
  – Rank by old age mortality growth rate and acceleration
  – Exclude risk factor associated deaths
• Two simple ranking methods chosen. Diseases are ranked by their relative:
  1. % of Deaths for Ages 60+, post reproductive
  2. % of Deaths for Ages 85+, oldest old
• DALYs too, largely aligned
Increasing Ranking

- Dementia
- Acute Respiratory
- Genital/Urinary
- Digestive
- Falls
Steady-Decreasing Ranking

- COPD
- Type 2 Diabetes
- Lung Cancer
- Suicide
Vascular Aging

- Cardiovascular
- Ischaemic Heart Disease and Stroke
- All Other
- Cancer

Graph showing the percentage of total deaths, deaths in the 60+ age group, and deaths in the 85+ age group for different causes.
Current Research Funding

Mortality (All Ages)

- Ischaemic Heart Disease and Stroke: 33%

Funding (NIH)

- Ischaemic Heart Disease and Stroke: 6%

(Gillum, Gouveia et al. 2011)