

FUTURAGE:

A Road Map for Ageing Research

- Biogerontology:

towards a new ageing research agenda

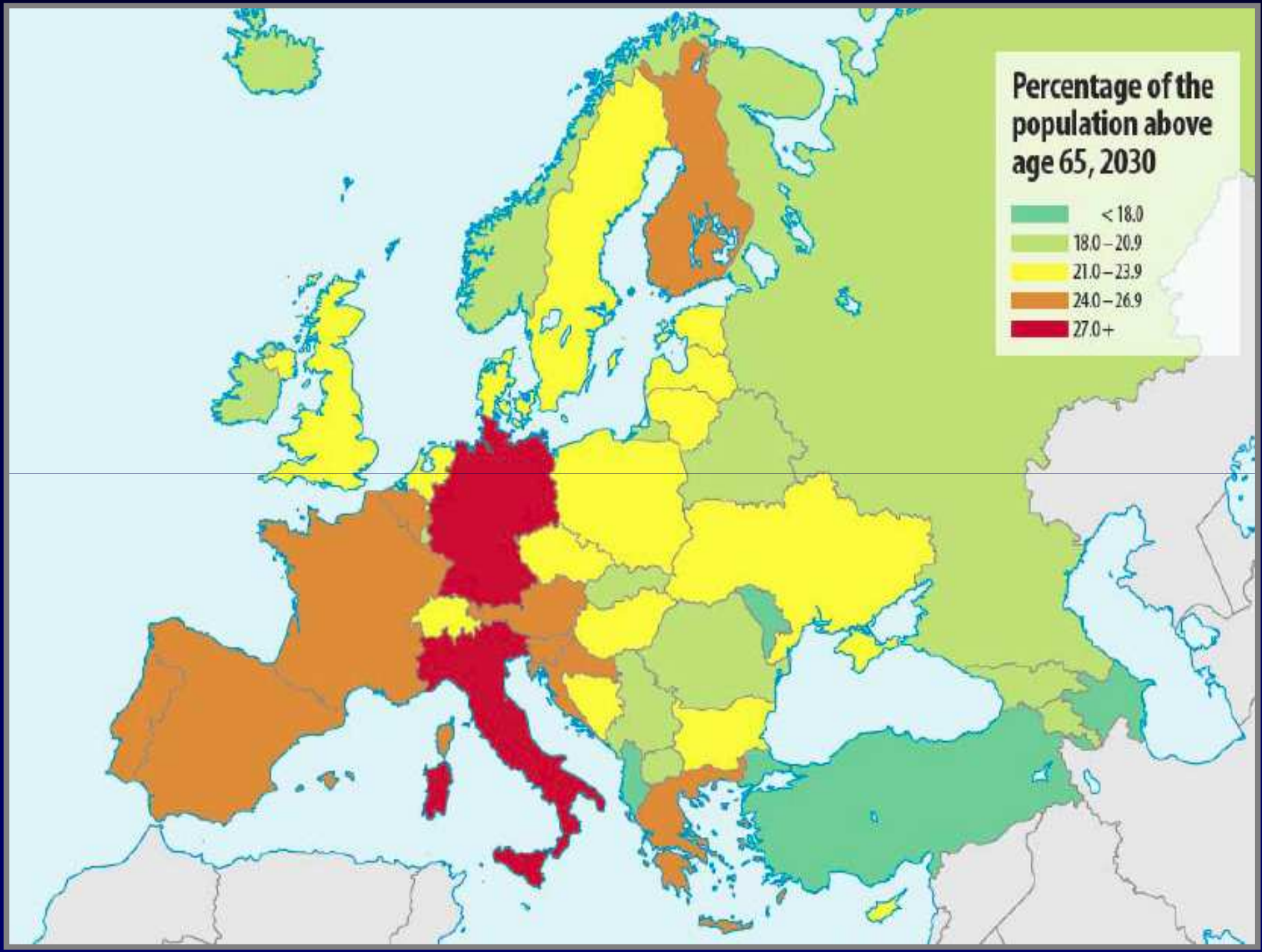
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* Executive Committee Member, International Union of Biochemistry &
Molecular Biology

Percentage of the population above age 65, 2030

- < 18.0
- 18.0 - 20.9
- 21.0 - 23.9
- 24.0 - 26.9
- 27.0+



Biogerontology:

**understanding the biological causes of
human ageing and longevity**

Biogerontology

important future research directions:

- to continue research investment in emerging anti-ageing areas
- to retain financial support in already successful and “incomplete” EU funded projects
- to invest in new global technologies

Is it a biological clock?

The discovery of telomeres

Nobel prize, 2009

Ageing associates with accumulation of damage

The discovery of the major cellular
proteolytic machinery

Nobel prize, 2004

The genetics of healthy ageing in Europe

- ❖ Recruitment of 90+ years old siblings (i.e. 0.5% of the longest lived population in Europe) and younger controls from 12 European countries & China
- ❖ Perform a genome scan in order to identify candidate longevity genes

Biobank:

<i>Families with two siblings:</i>	<i>2,347</i>
<i>Families with three siblings:</i>	<i>195</i>
<i>Families with four siblings:</i>	<i>22</i>
<i>Families with five siblings:</i>	<i>4</i>
	<i>5,390 (total samples)</i>
<i>Controls (spouses of their children):</i>	<i>2,493</i>



“MARK-AGE”

European Study to Establish Biomarkers of Human Ageing
(HEALTH-F4-2008-200880; <http://www.mark-age.eu/>)

April 2008 - March 2013



Population Study (~3,700 volunteers)

(1) “**RASIG**” (randomly recruited age-stratified individuals from the general population covering the age range 35-74 years. ~**2,400 volunteers**)

(2) “**GO**” + “**SGO**” (**GEHA** Offspring + Spouses of **GEHA** Offspring). ~**700 + 600 volunteers**)

(3) A small number of patients with **progeroid syndromes** (CS: **Cockayne's Syndrome** patients, DS: **Down's Syndrome** patients, WS: **Werner's Syndrome** patients).

**It is essential retaining
continuity between successive
Framework Programmes**

**‘OMICS’:
global profiling using *ad hoc* technologies**

- *Genomics*
- *Epigenomics*
- *Transcriptomics*
 - *Proteomics*
 - *Modificomics*
 - *Metabolomics*

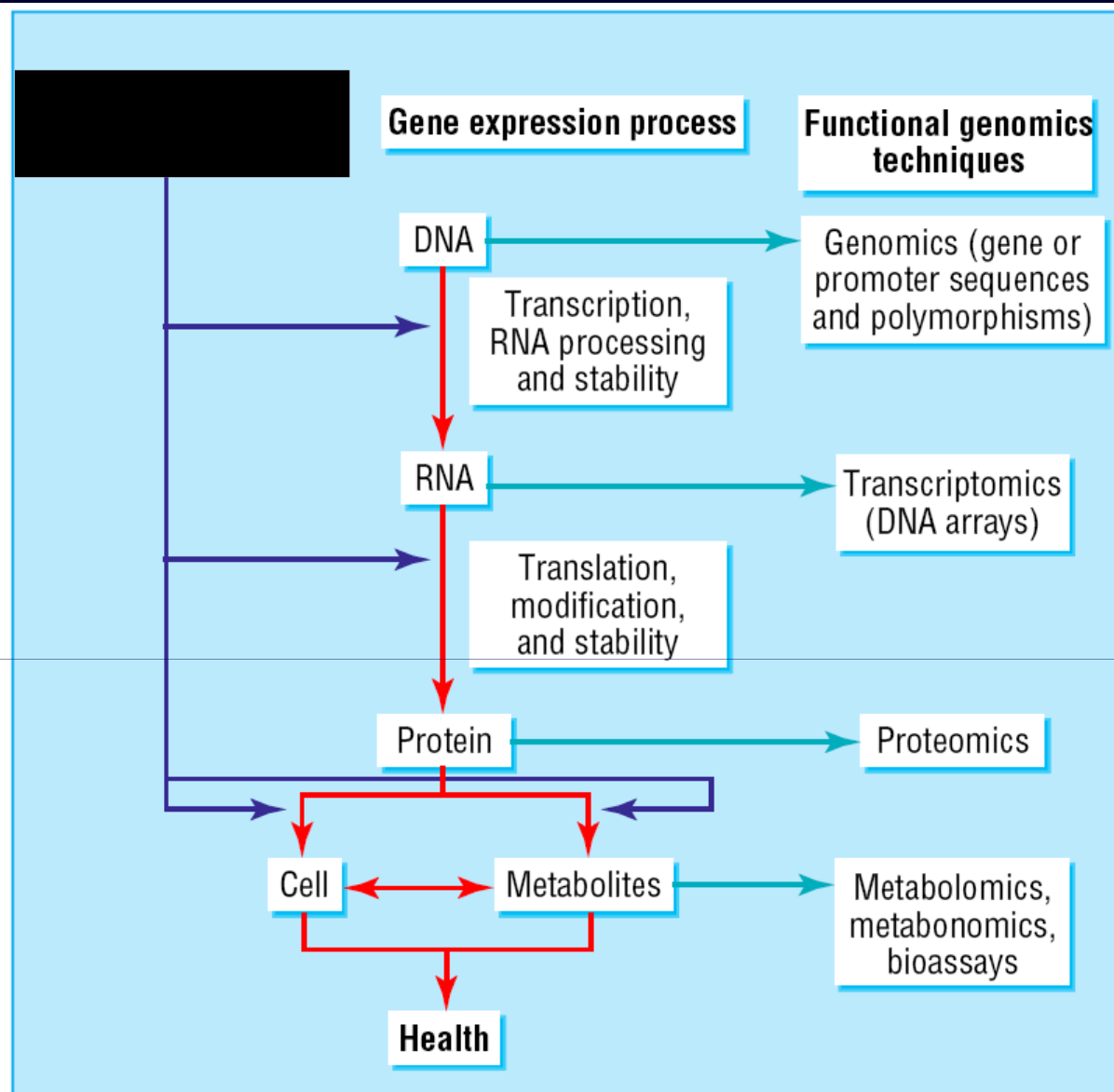


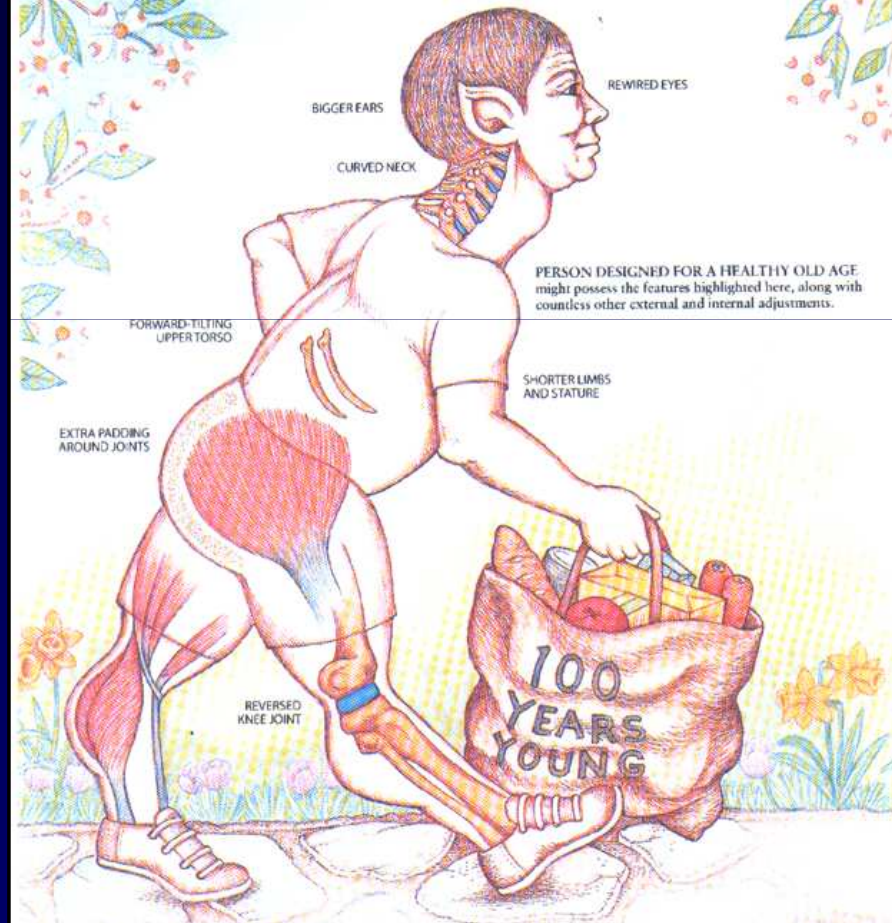
Fig 1 Schematic representation of the steps involved in gene expression (centre), the stages at which diet can modulate these processes (left), and the functional genomics techniques used to analyse each stage (right)

Resetting the clock?

Stem cells

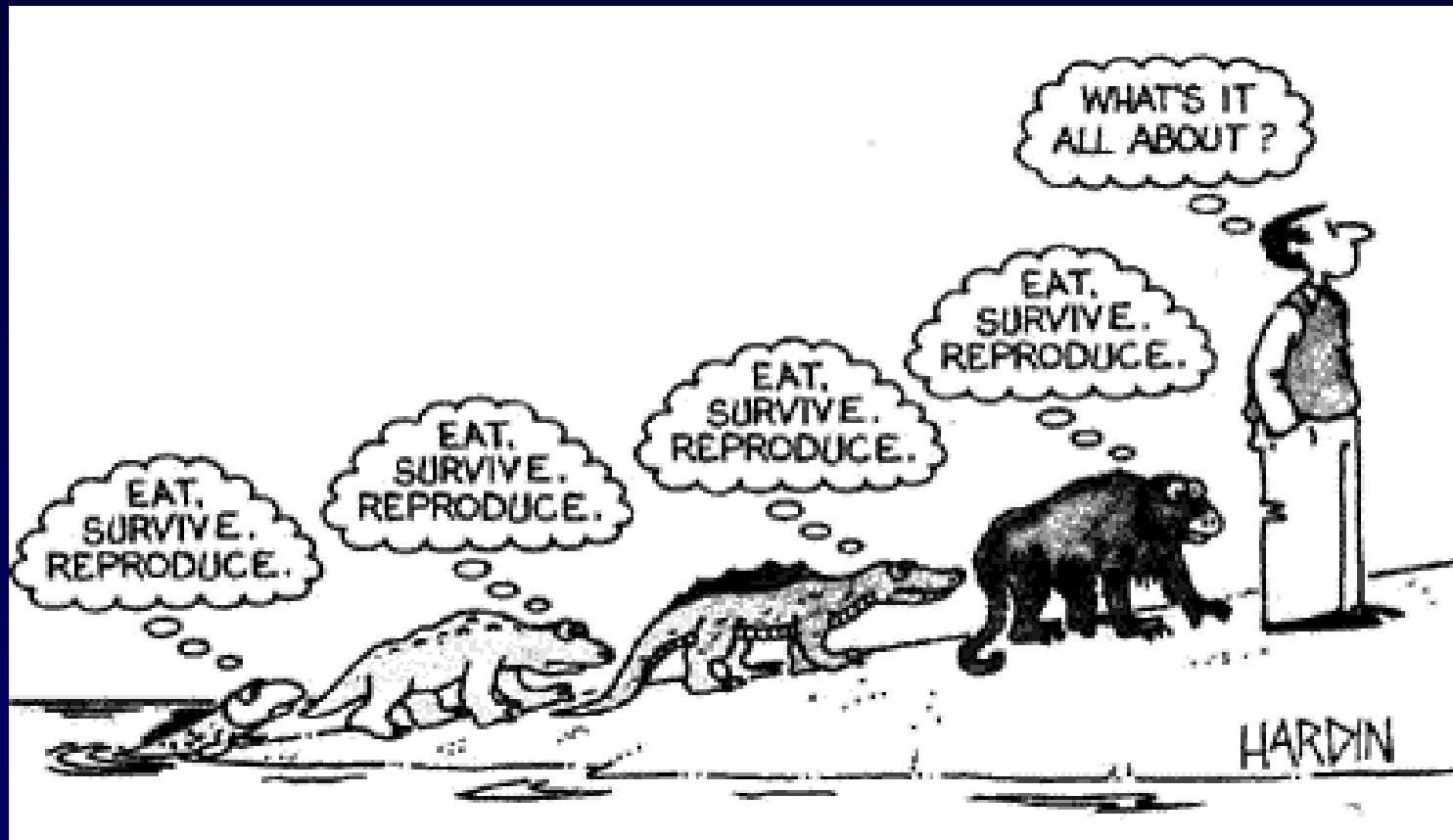
If Humans Were Built to Last

by S. Jay Olshansky, Bruce A. Carnes and Robert N. Butler



Scientific American, March 2001

**To add life to years
not years to life**



**To understand and to “attack”
human ageing we require
interdisciplinary approaches**