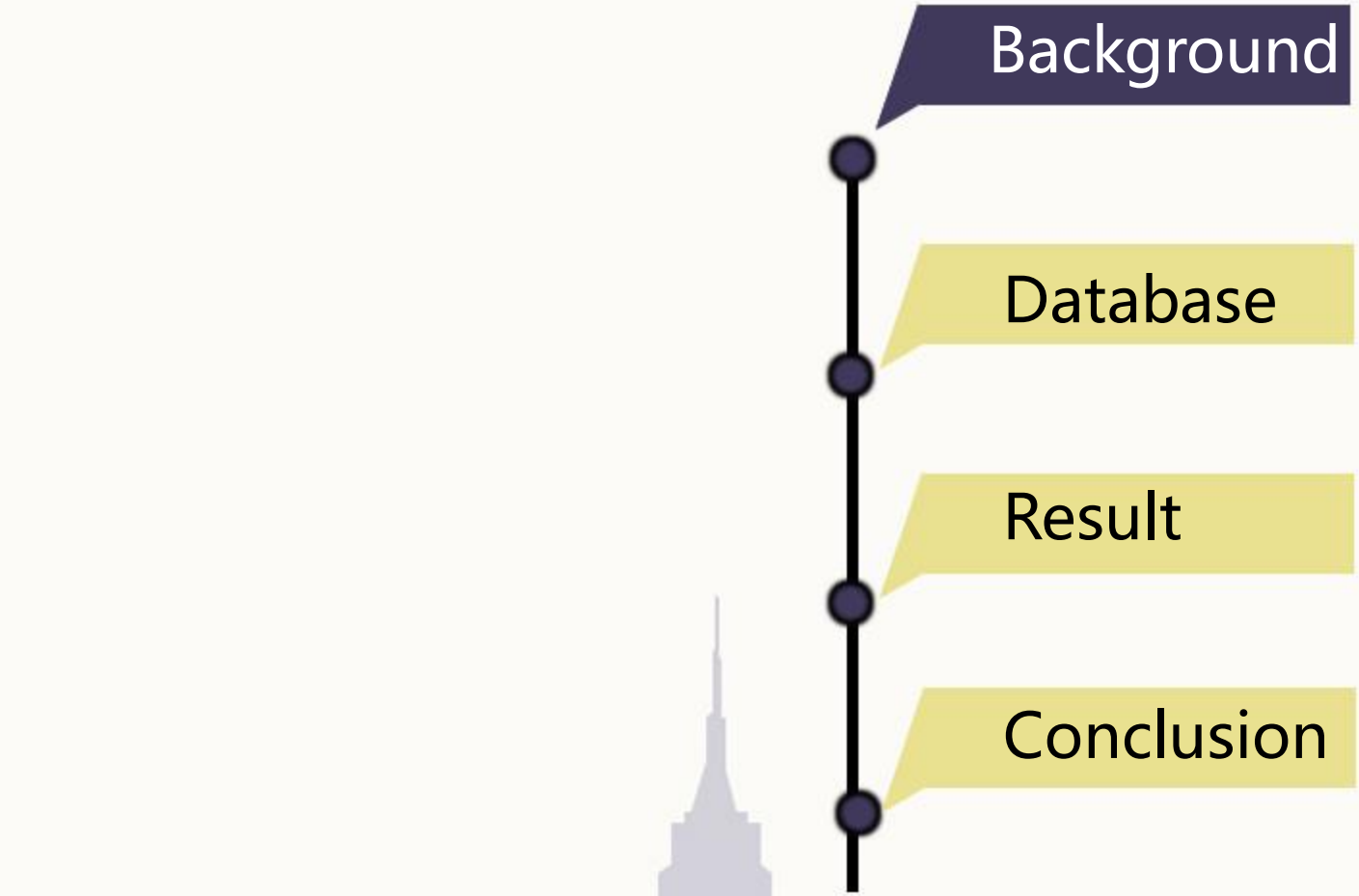
LETTER

Evidence for a limit to human lifespan

Xiao Dong[1]*, Brandon Milholland[1]* & Jan Vijg[1,2]

汇报人：张思佳
专　业：生物信息
学　号：20163171110018

目录



Background

1. Driven by technological process, human life expectancy has increased greatly since the 19th century.
2. Maximum lifespan is, in contrast to average lifespan, generally assumed to he a stable characteristic of a species.

Database

- the Human Mortality Database (http://www.mortality.org)
- the International Database on Longevity (IDL)
- the Gerontological Research Group (GRG; http://www.grg.org/)

Result

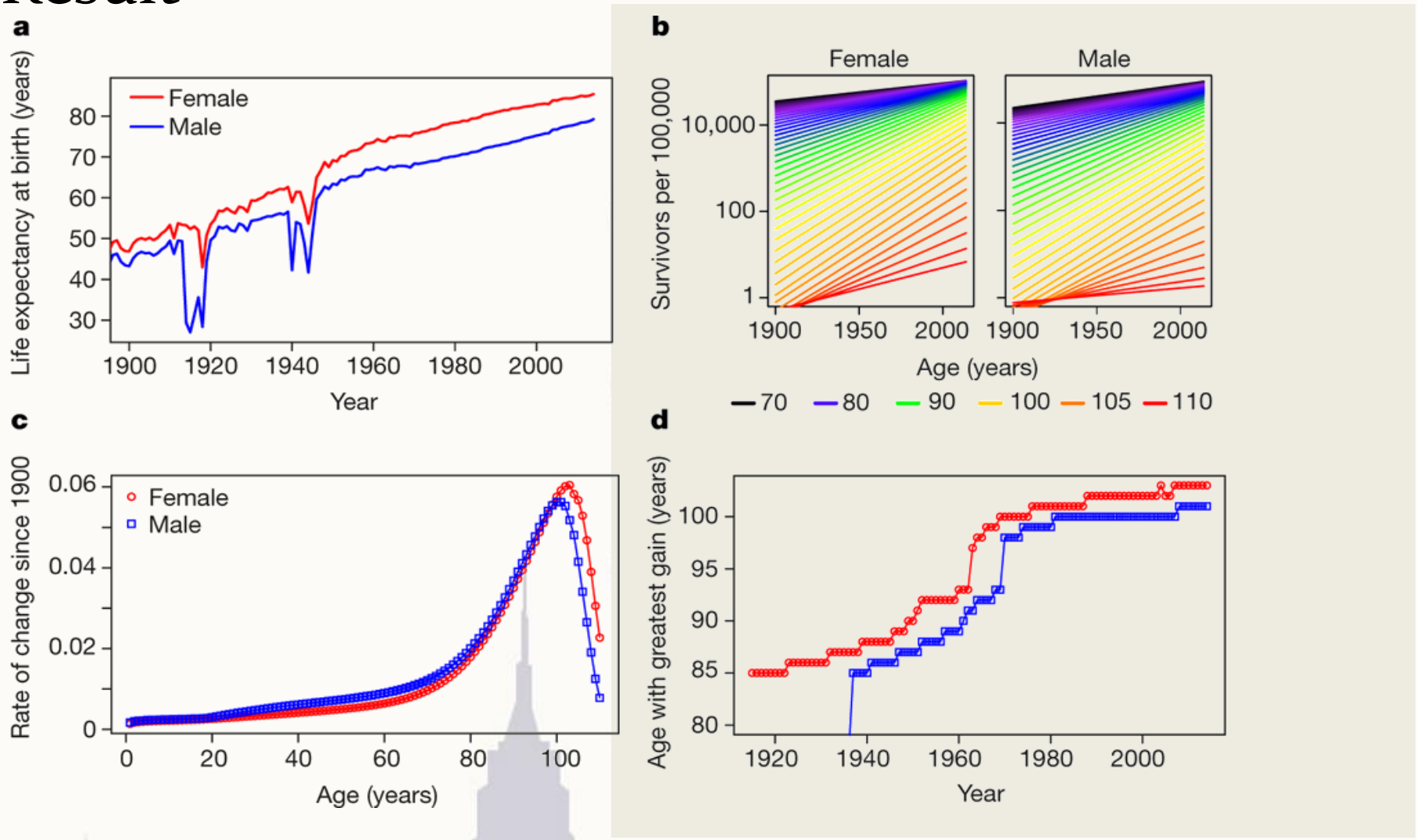
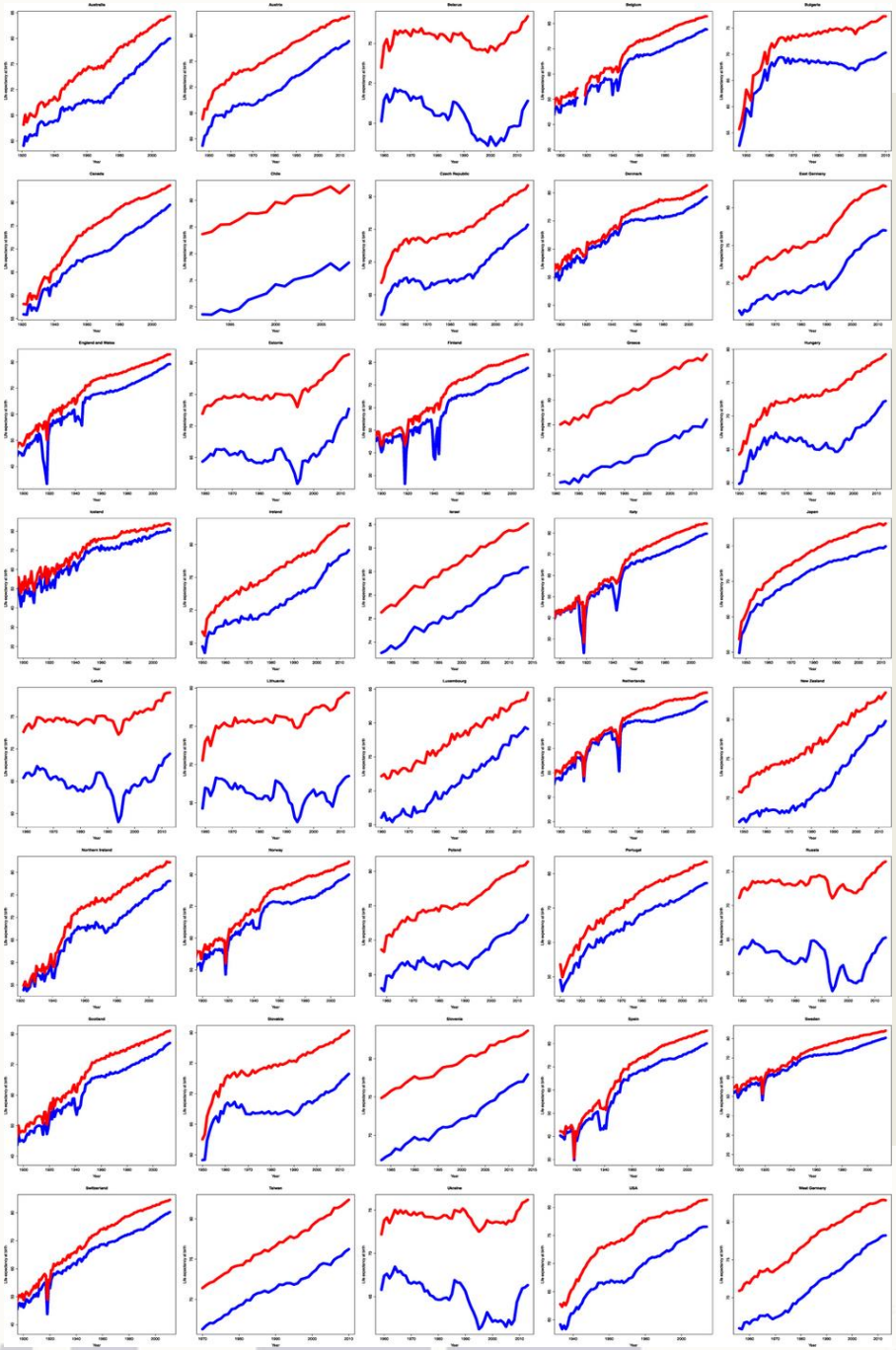
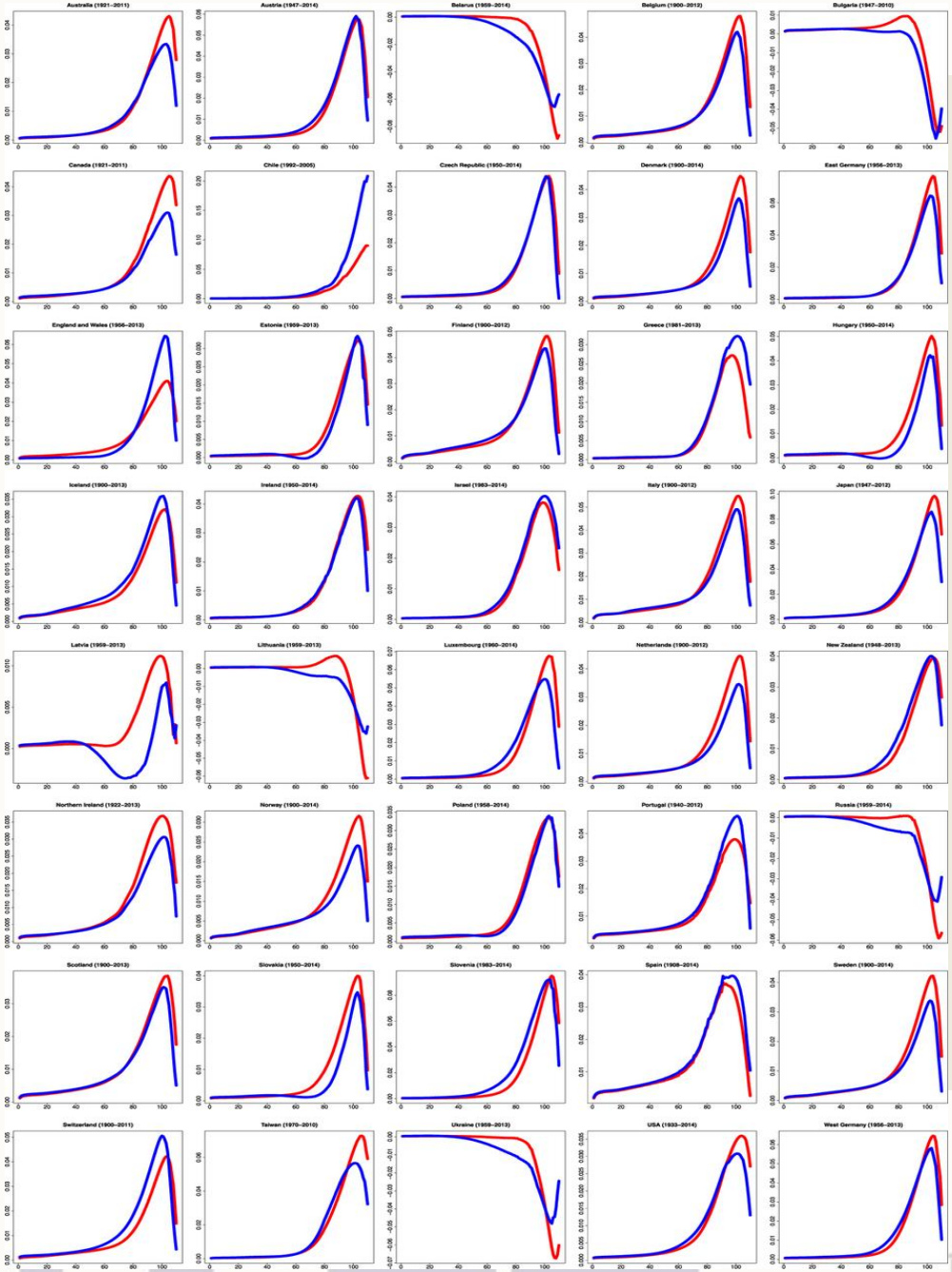


Fig.1 Trends in life expectancy and late-life survival



Extended Data Fig1

Life expectancy over time since 1900(or the earliest year for which data was available) in 40 countries and territories. There is a generally positive trend over time; life expectancy in Japan appears to be reaching a plateau, but the increase looks unabated in many of the other countries. The data represent the entire population for each region, except Scotland, where it represents only the civilian population.



Extended Data Fig2

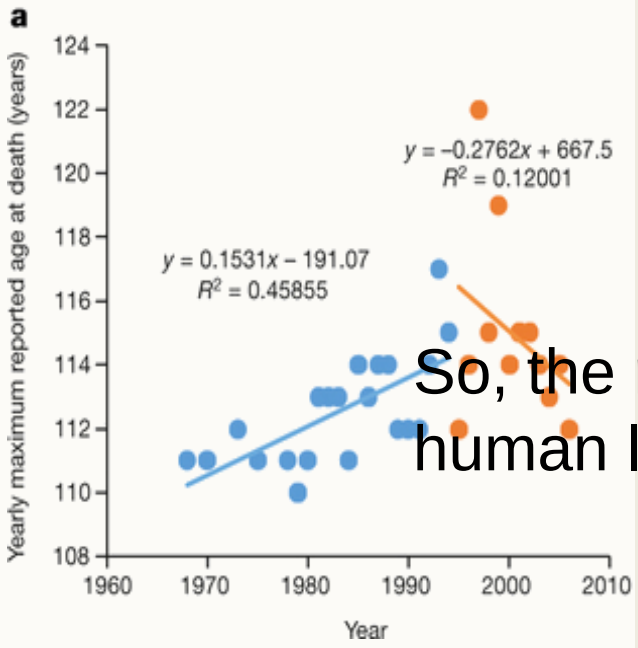
Rate of change in survival since 1900 (or the earliest year for which data was available) to a given age as a function of that age in 40 countries and territories.

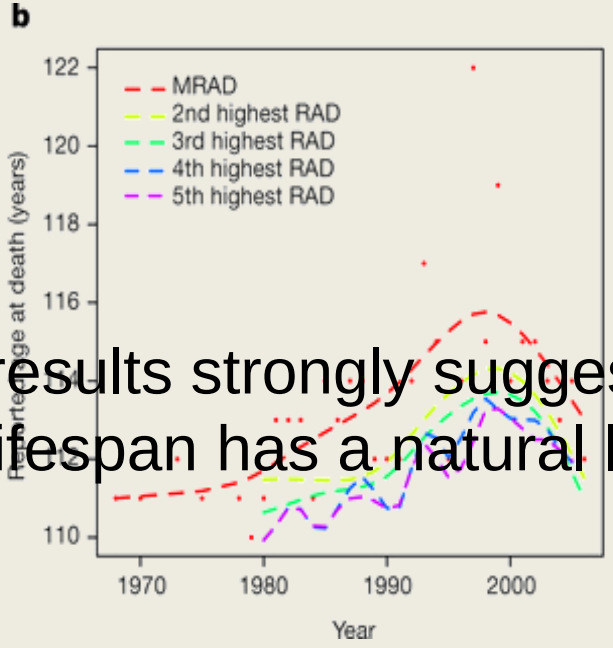
Result

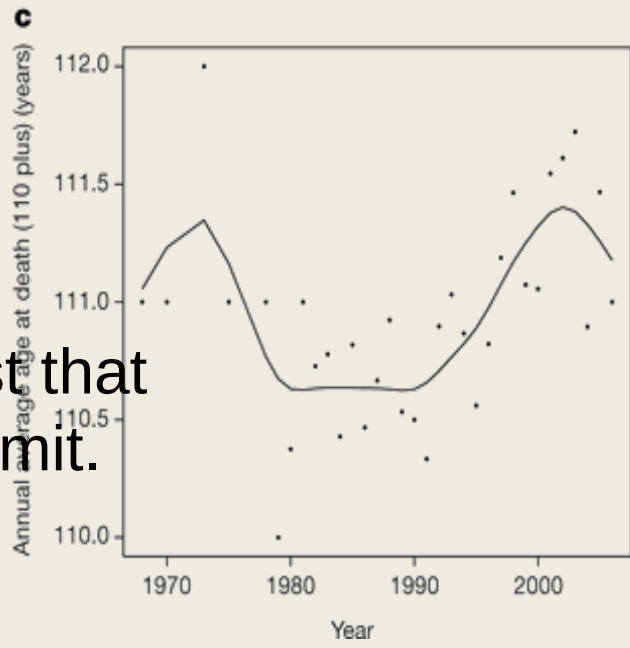
Together, these findings suggest, but do not prove, that human lifespan may have a natural limit.

To further investigate this idea, we turned our attention from late-life mortality to maximum human lifespan itself and examined the ages at death of the world's oldest individuals.

Result



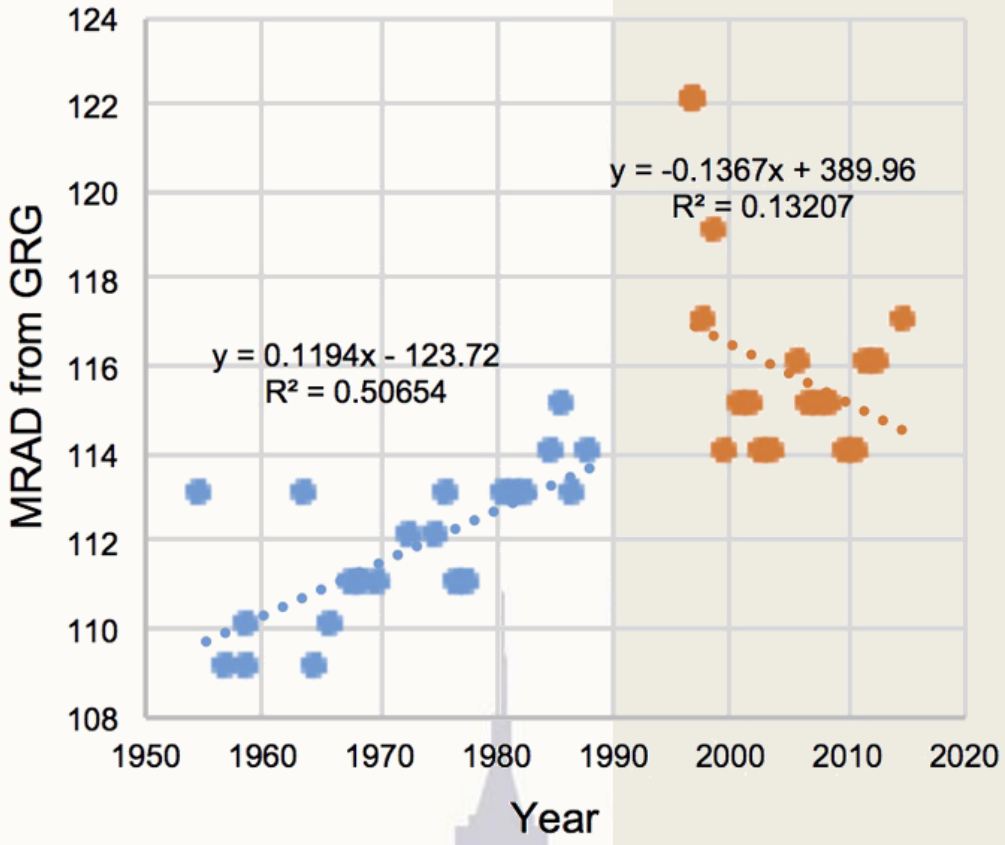




So, the results strongly suggest that human lifespan has a natural limit.

Fig.2 Reported age at death of super centenarians

Result



Extended Data Fig.3 The yearly maximum reported age at death from the GRG database (worldwide, 1972-2015). The lines represent the functions of linear regressions.

Arguments

对持相同观点的研究分析：

1、 In 1980 Fries argued that increased prevention of premature deaths would lead to a compression of morbidity owing to a finite Lifespan.

However, his arguments for such a limit to life, that is, the lack of a detectable increase in centenarians or in the maximum reported age at death, while correct at that time, have been refuted since.

2、Ten years later, Olshansky et al. estimated the upper limits to human longevity based on hypothetical reductions in mortality rates, concluding that life expectancy at birth would not exceed 85 years.

Like Fries, Olshansky et al. also suggested a biological limit to life based on the lack of an increase in the age of the verified longest-lived individual.

What could be the biological causes of this limit to human lifespan?

个人观点：

缺点：纯数据分析，无法与生物理论相结合；数据样本仍不够充分

创新点：该文章能被Nature所接收，可能在于其与有一定的数据作为依据，没有包含复杂的影响因素，直接使用历年人类寿命的数据，且观点能给人一定启示，特别是研究延长人类寿命的学者

Thank you for listening !