

Genes, envejecimiento y longevidad

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CINVESTAV Irapuato

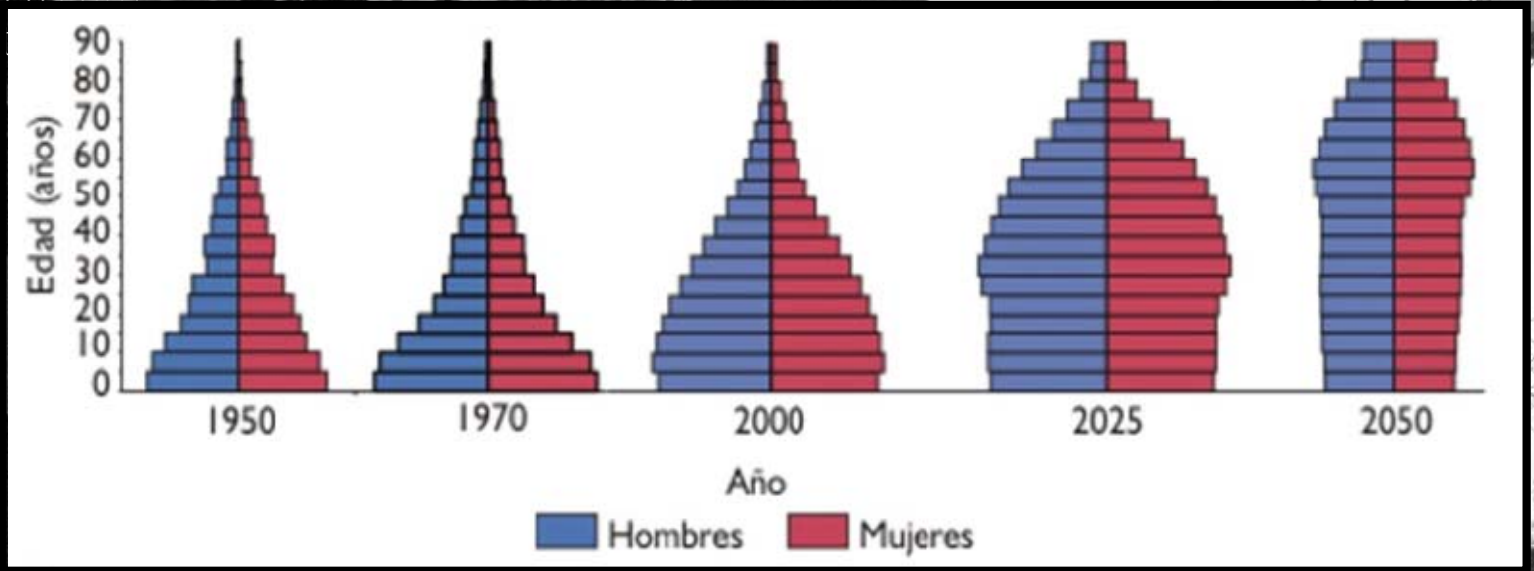
 Genetic Systems Mx @deluna_lab

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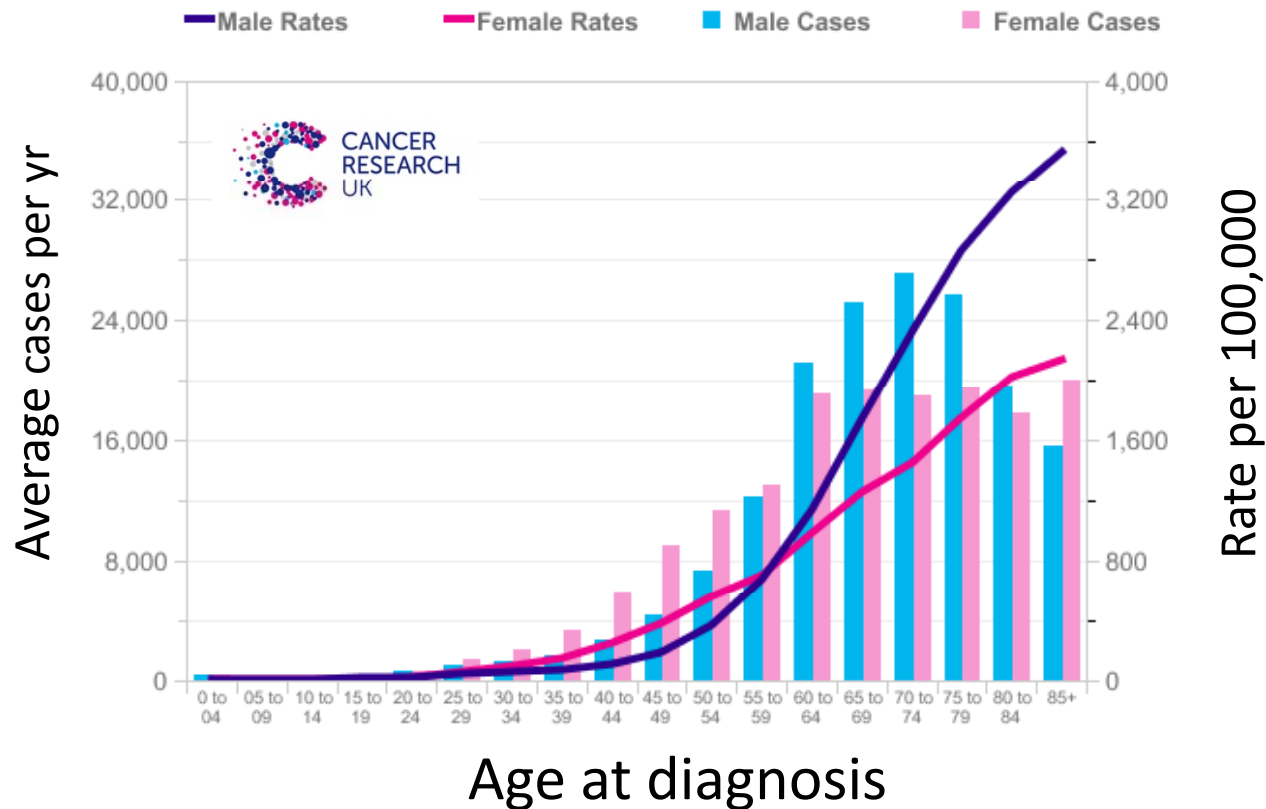


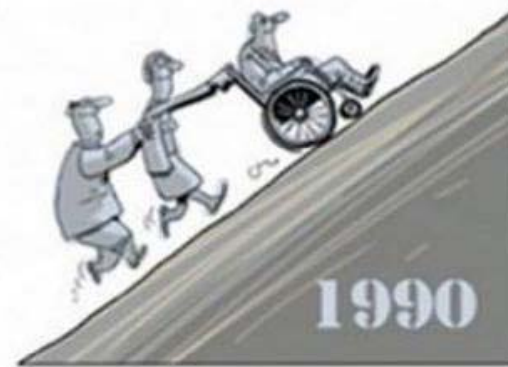
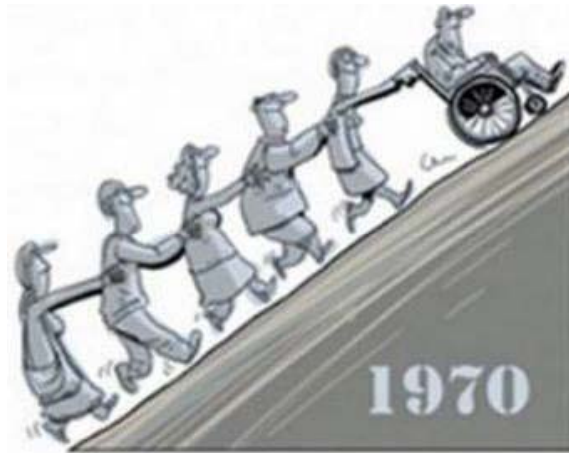
www.animalpolitico.com
Foto: Cuartoscuro



El envejecimiento es el principal factor de riesgo para el desarrollo de enfermedades crónicas

Cancer incidence by age: UK

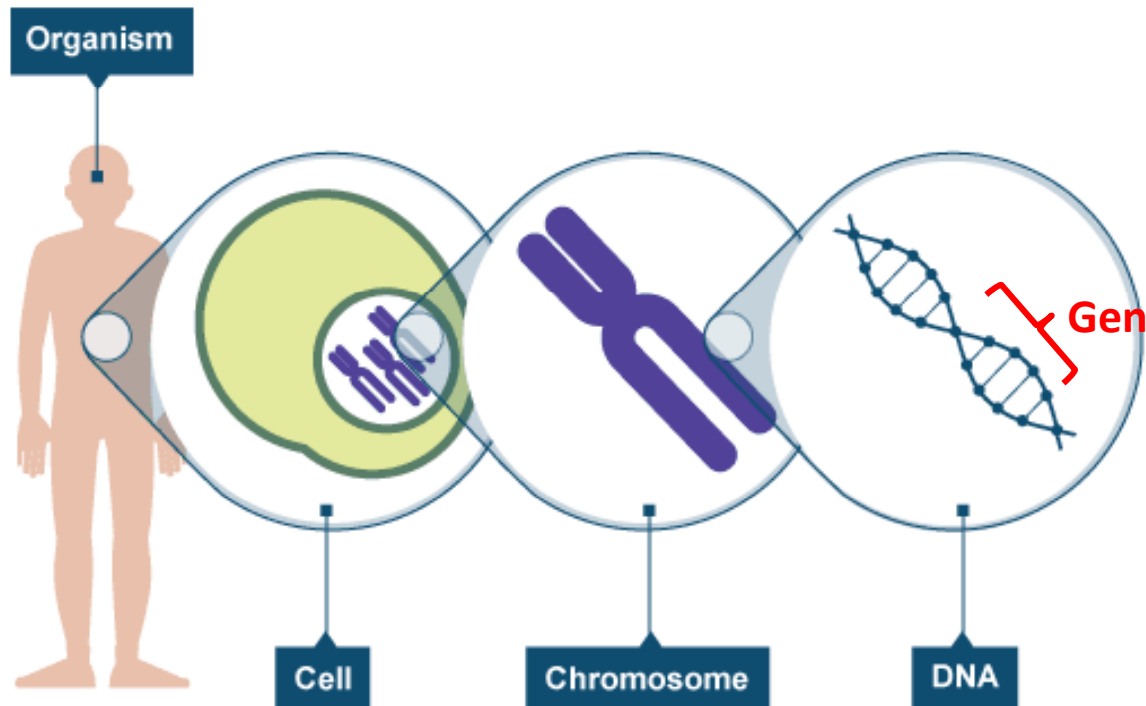




VIA 9GAG.COM

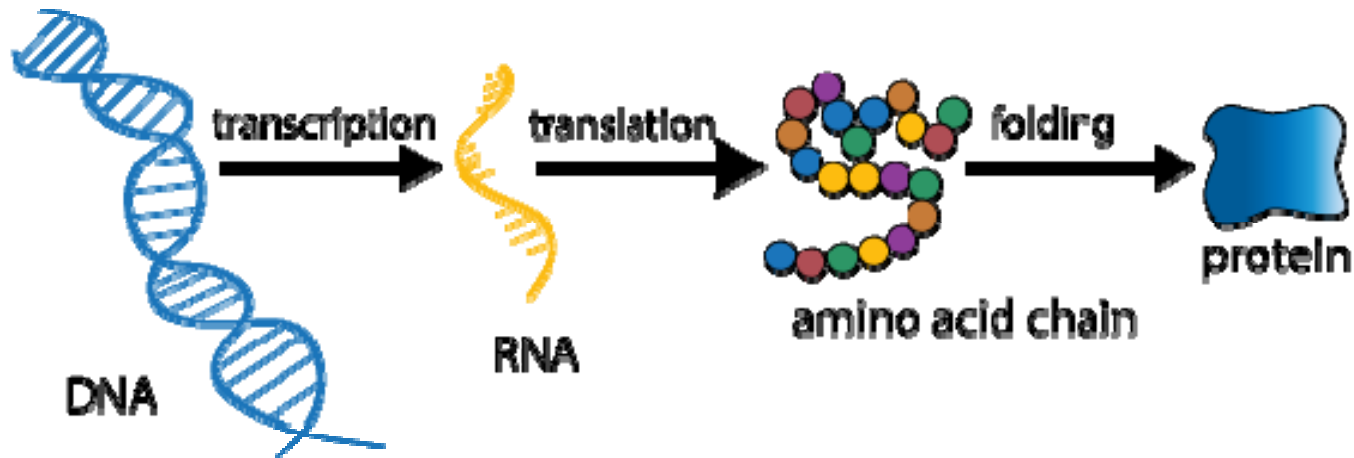
¿Existen genes que determinan la tasa de envejecimiento y la longevidad de los organismos?

Los fenómenos biológicos están controlados por genes y sus interacciones



Genoma humano: ~20,000 genes

Los genes contienen la información para producir proteínas con funciones específicas

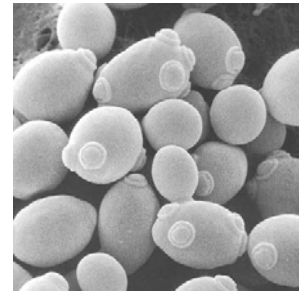
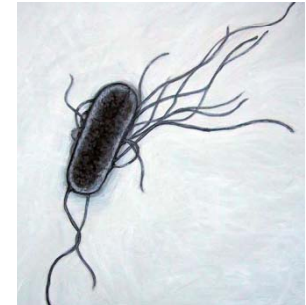
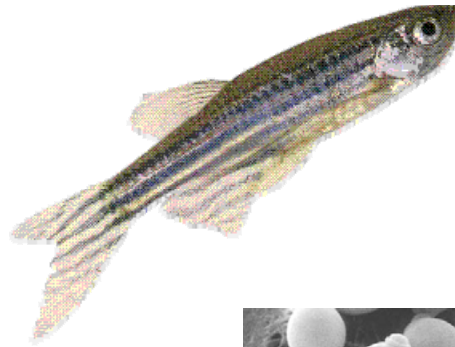


Genoma humano: ~20,000 genes





La investigación en genética se suele hacer sobre organismos modelo





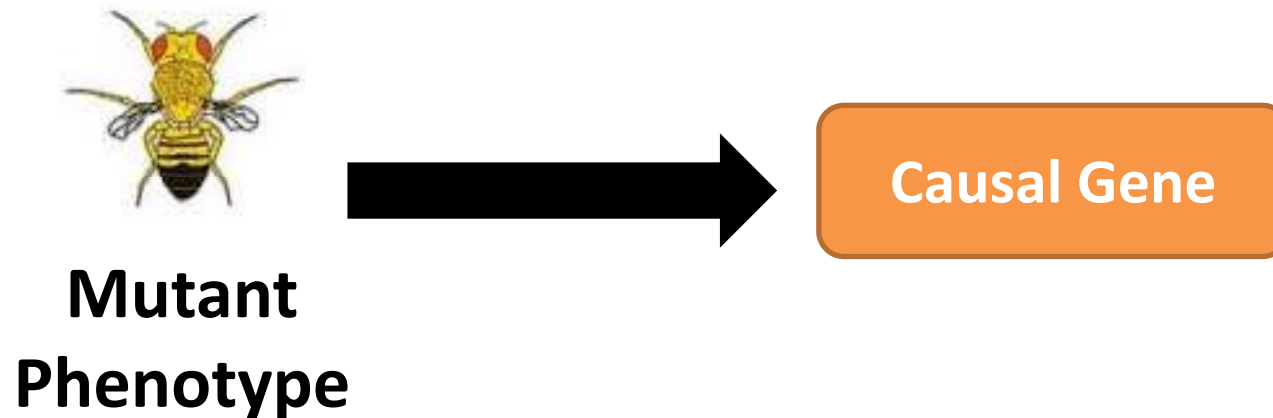
Ratón: 2-3 años



Rata topo: 25-30 años

Las mutaciones son la herramienta principal del genetista

Cuál es el gen determinante?

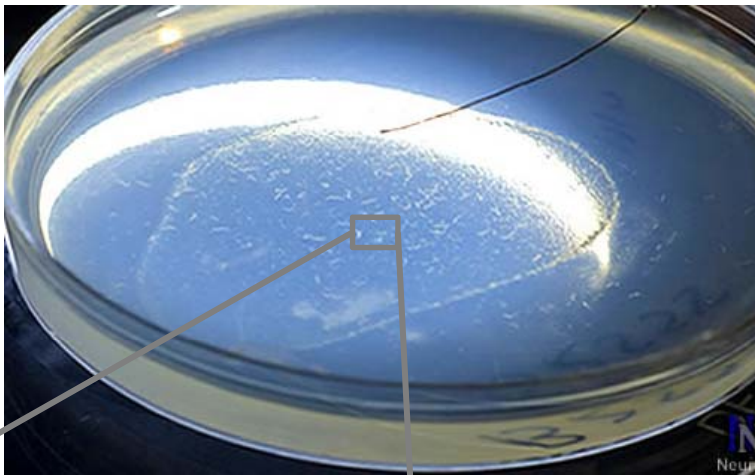


Starting material: Mutant phenotype

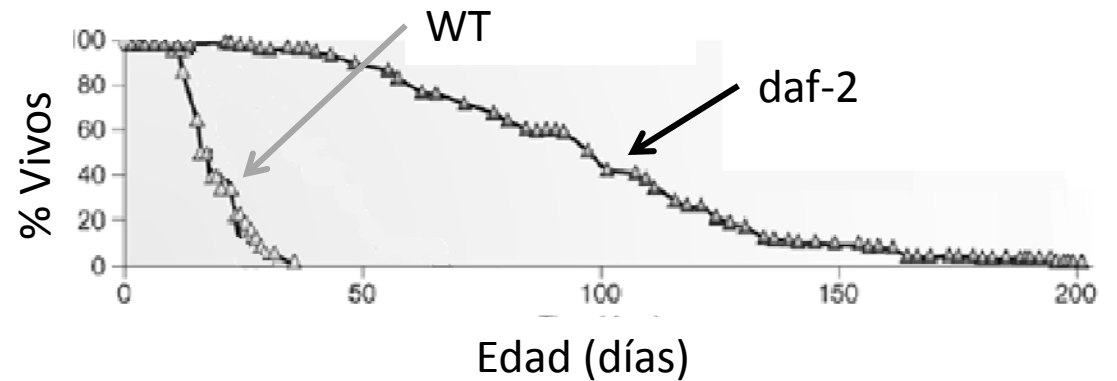
Question: What gene causes this phenotype?

Origin of mutant genes: Induced by random mutagenesis

La inactivación del gen DAF-2 alarga el tiempo de vida de los gusanos nemátodos

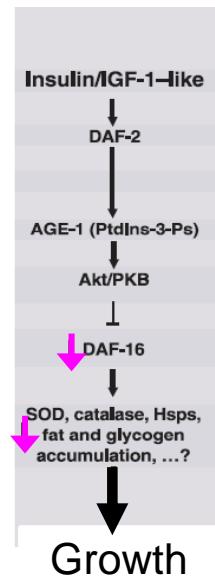
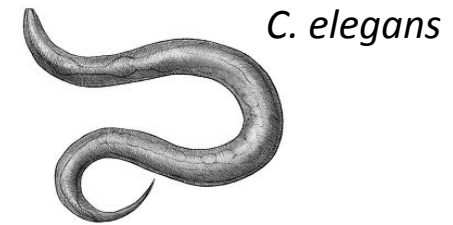
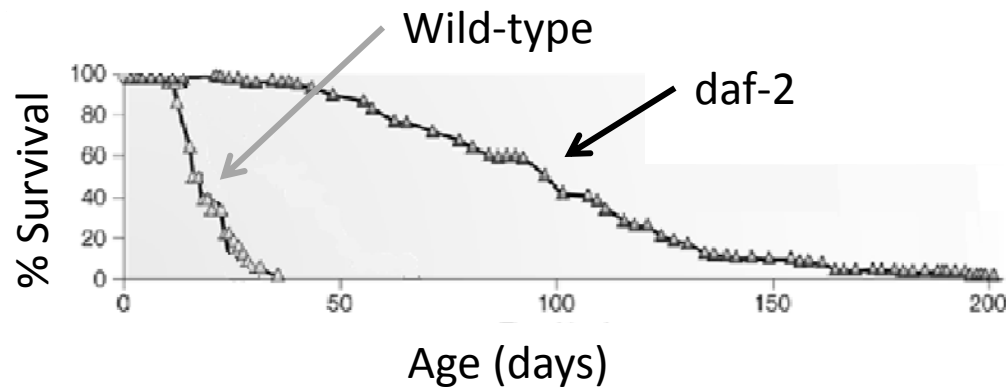


C. elegans



Kenyon et al. *Nature* 1993

El envejecimiento está regulado por procesos celulares conservados

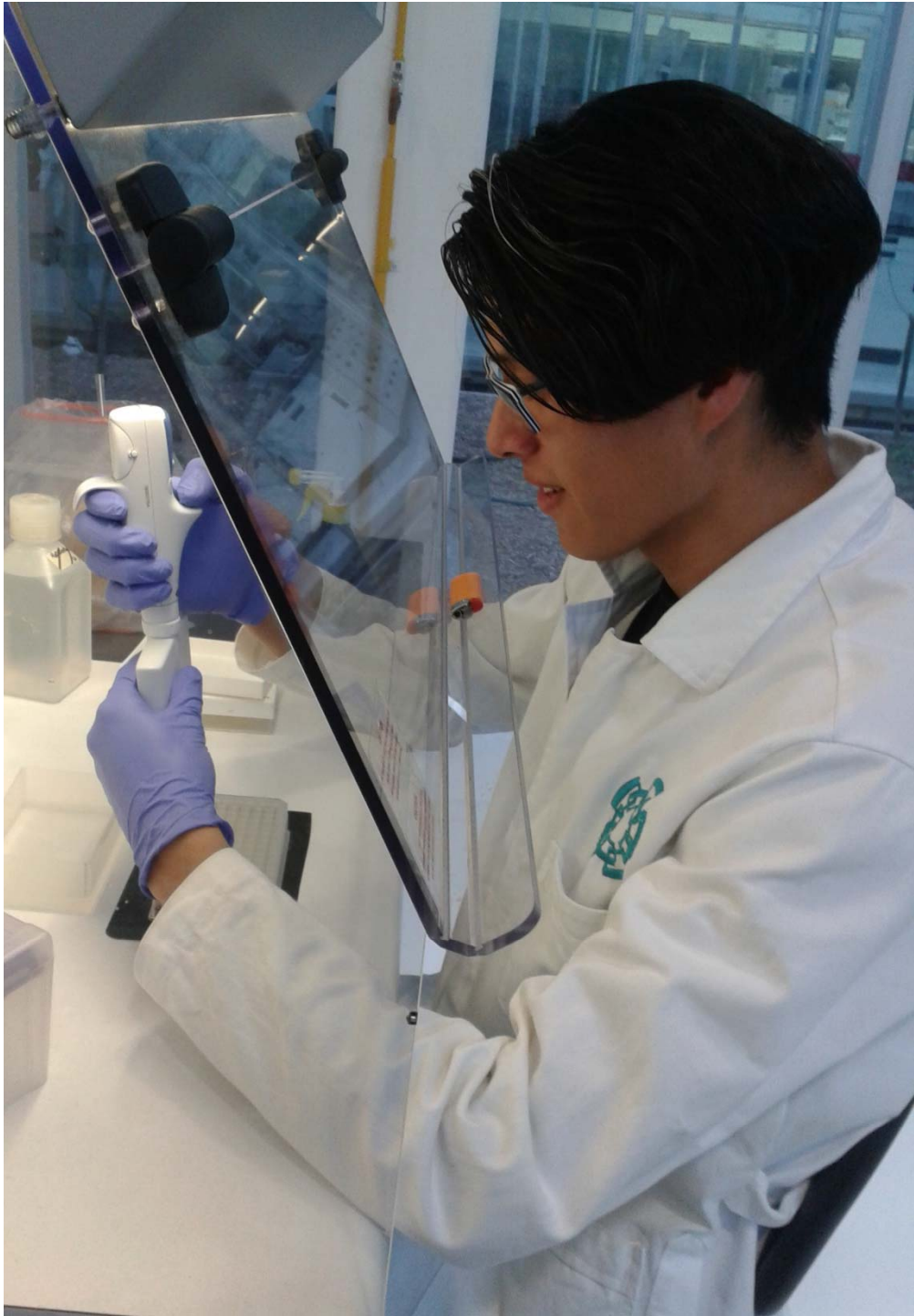


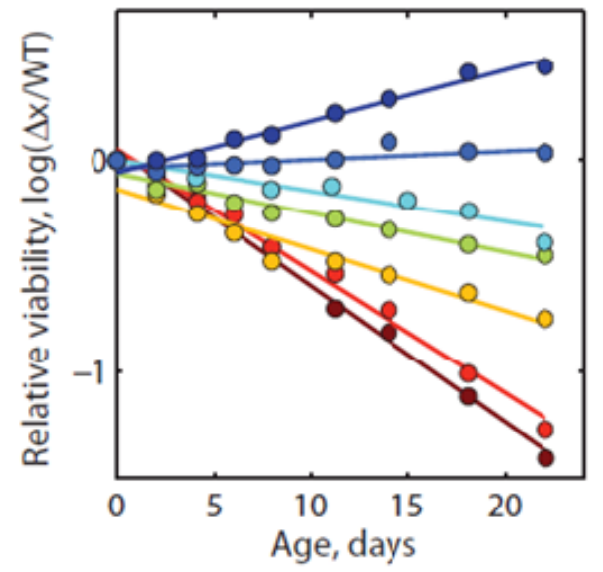
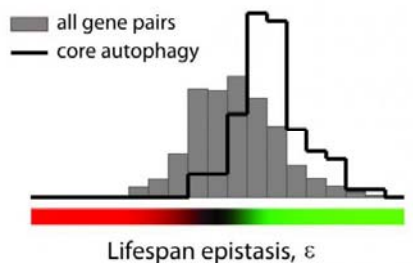
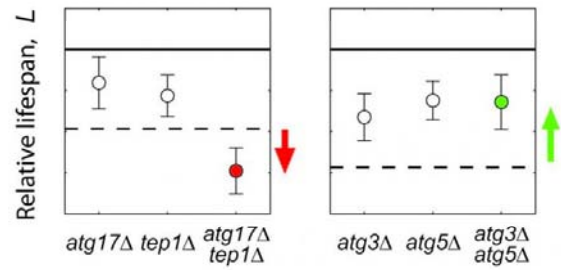
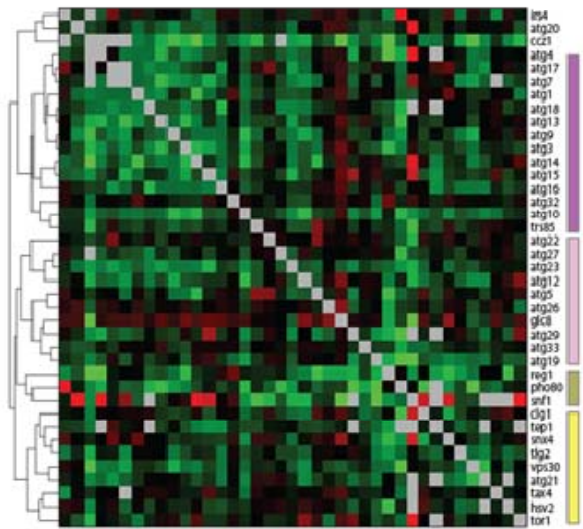
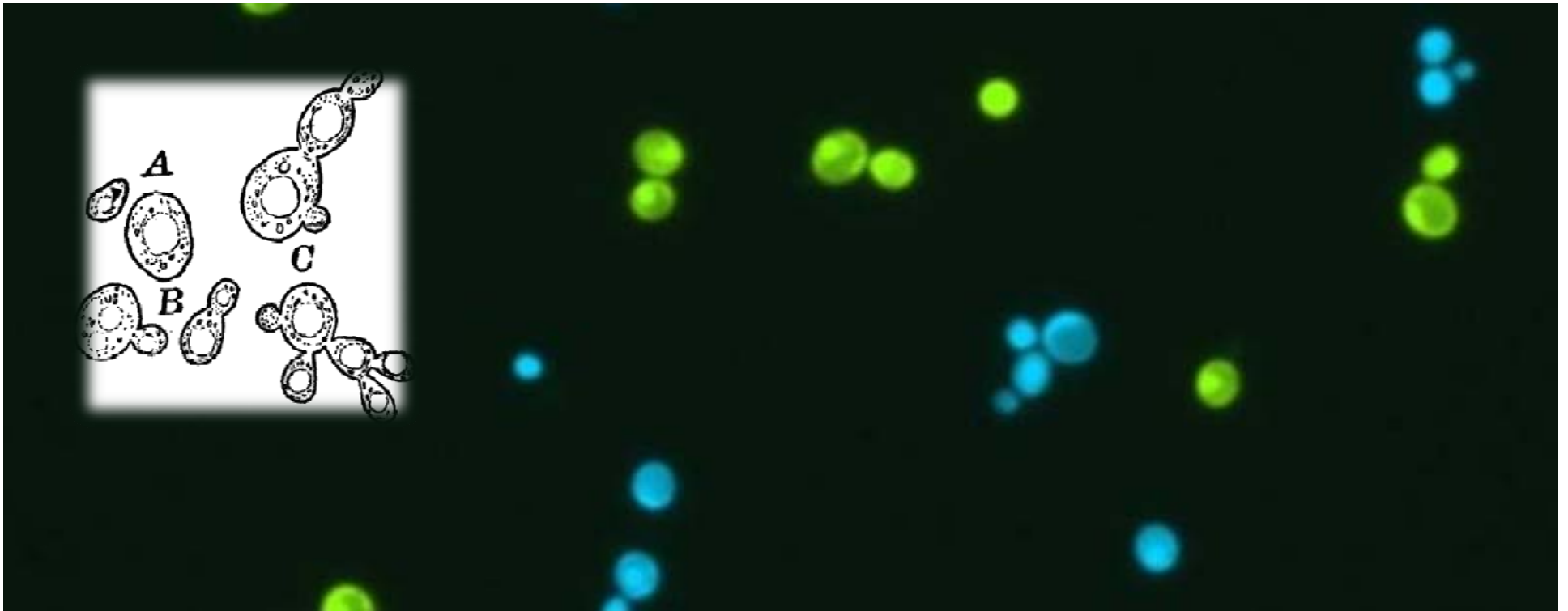
¿Cuáles son los genes que determinan la tasa de envejecimiento y la longevidad?





Image: M. Das Murtey & P. Ramasamy





Nobel 2001 | Reguladores del ciclo celular



Leland H. Hartwell



Tim Hunt



Sir Paul M. Nurse



Nobel 2009 | Protección de cromosomas



Photo: U. Montan
Elizabeth H.
Blackburn



Photo: U. Montan
Carol W. Greider



Photo: U. Montan
Jack W. Szostak

Nobel 2013 | Transporte de vesículas



Photo: A. Mahmoud
James E. Rothman



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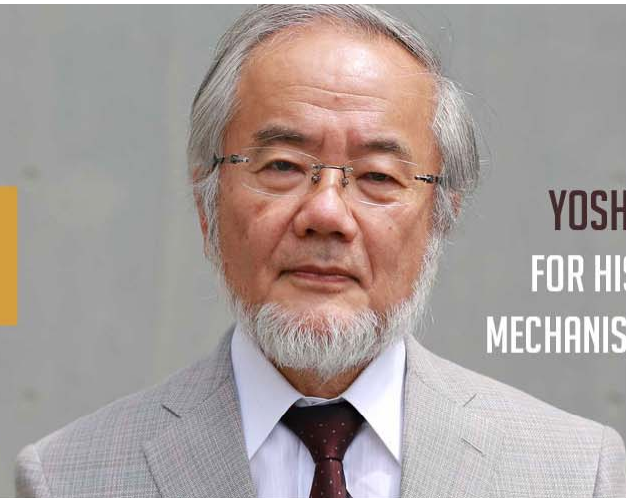
THEMICROBIOLOGY09
www.youtube.com



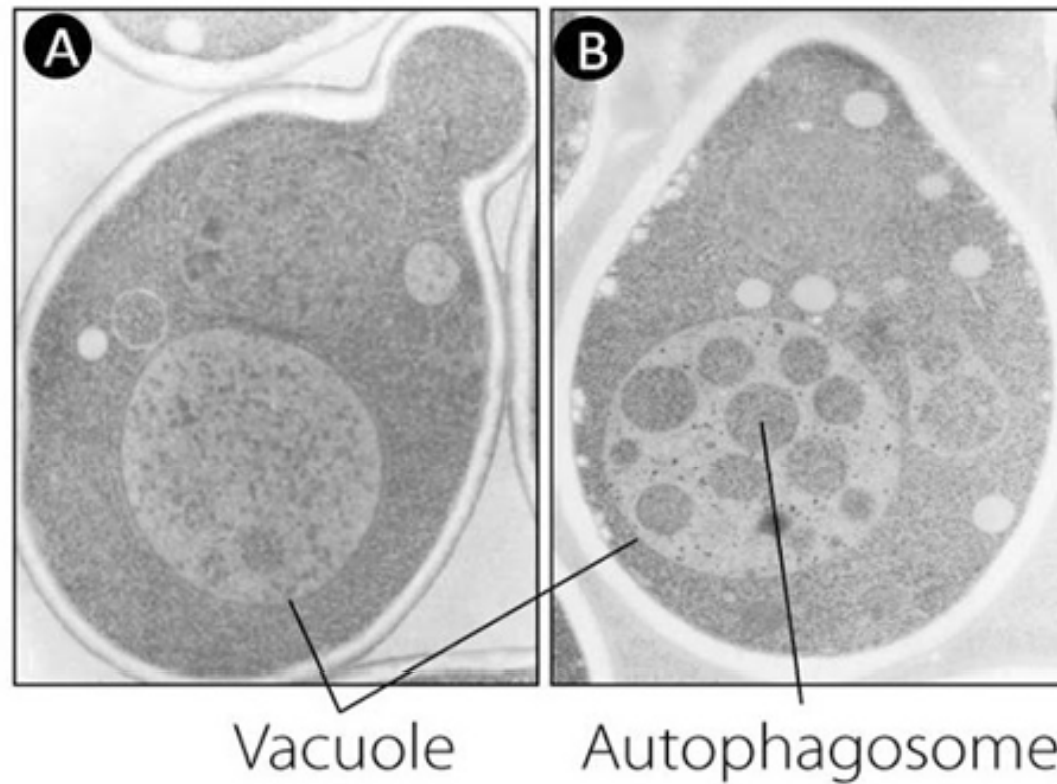
SPENCER TUNICK
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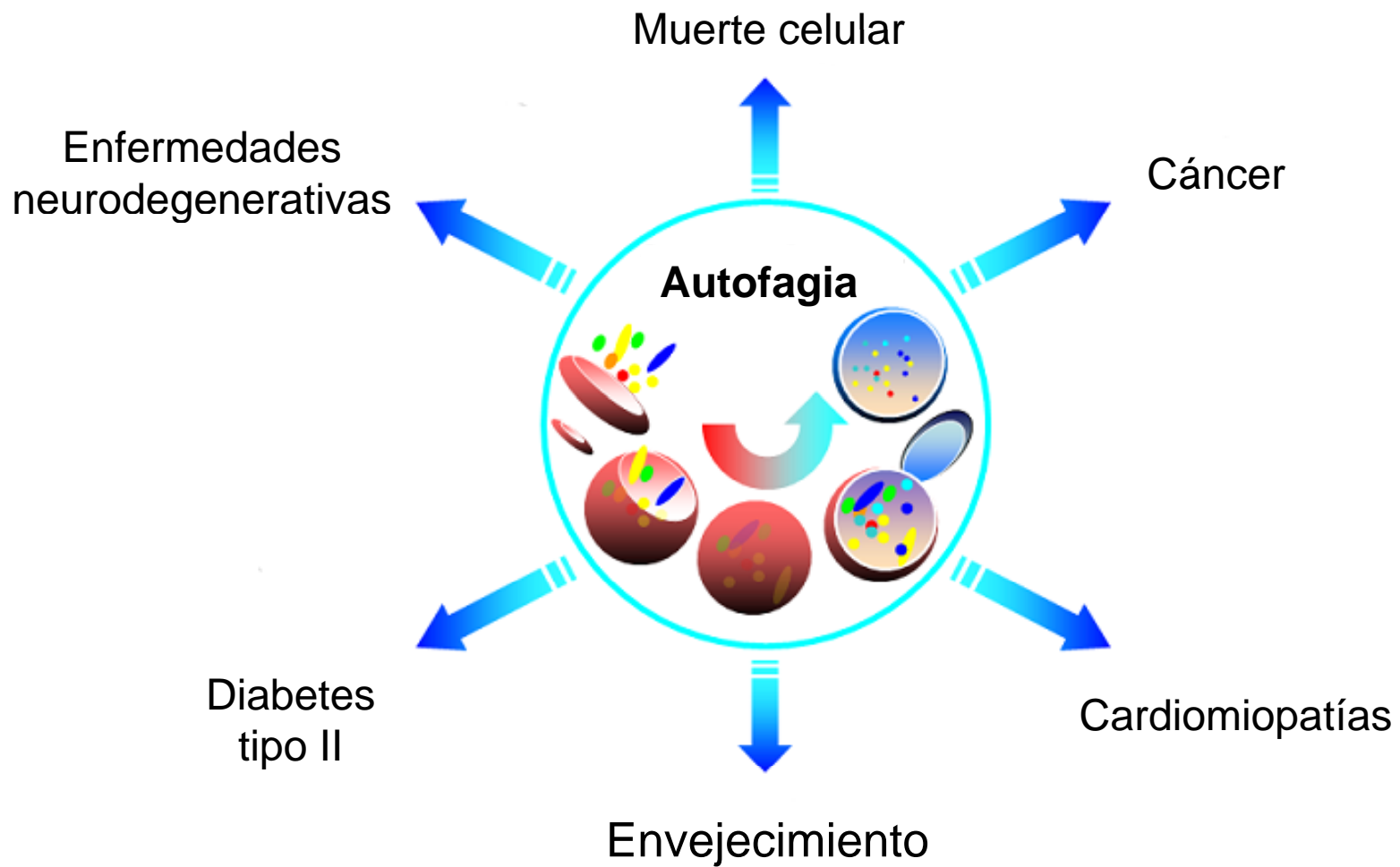


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PHYSIOLOGY OR MEDICINE**



**YOSHINORI OHSUMI
FOR HIS DISCOVERIES OF
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Adaptado de *Autophagy Database* (Homma et al., 2011)



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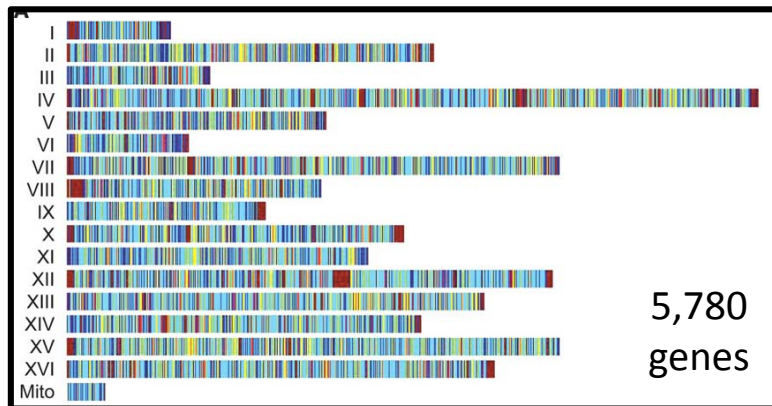
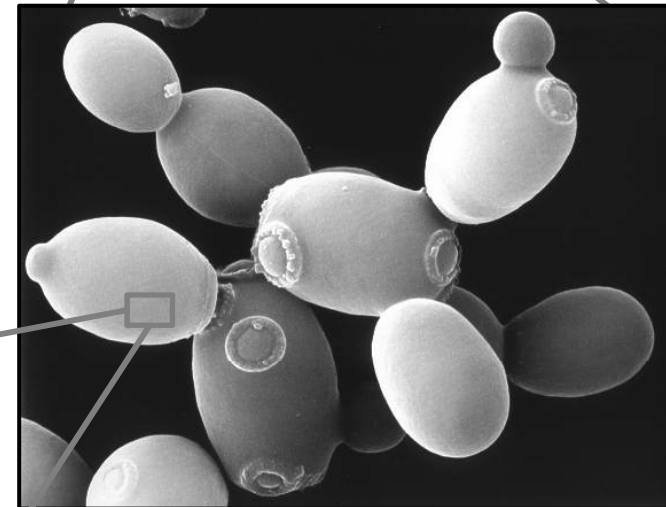
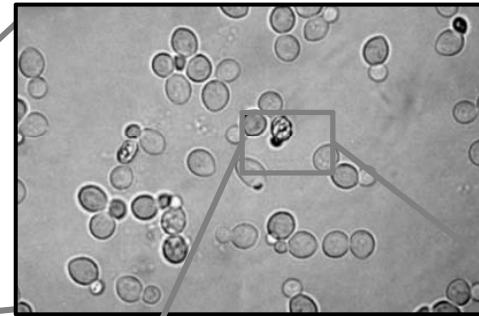


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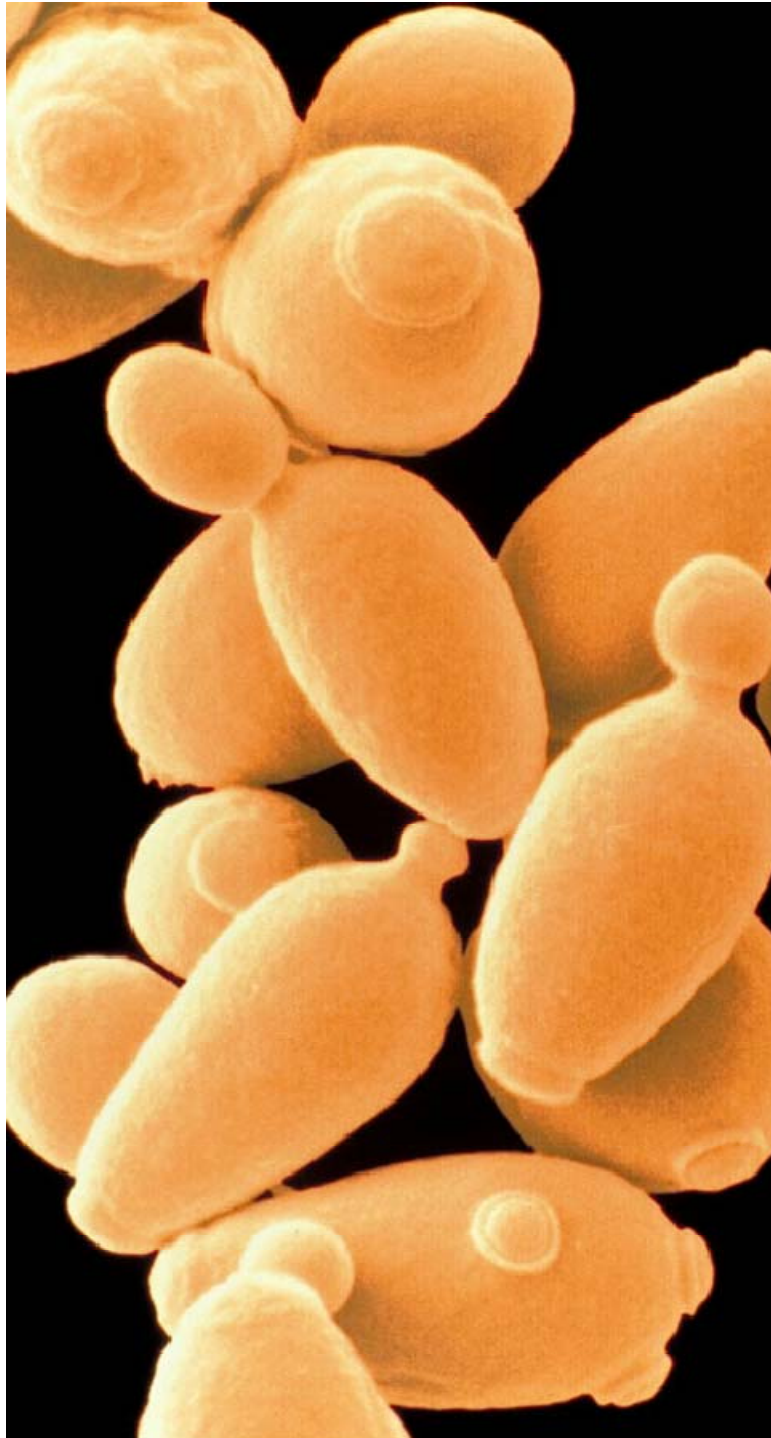


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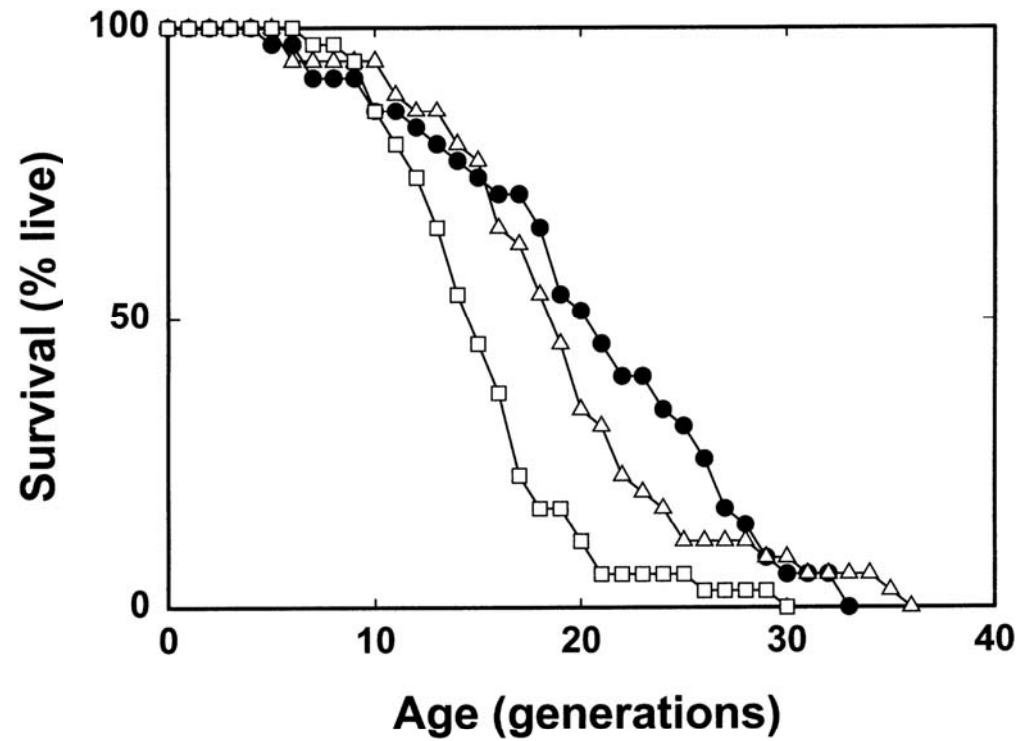
La levadura *S. cerevisiae* tiene casi 6,000 genes y la mayoría están conservados con humanos



5,780 genes

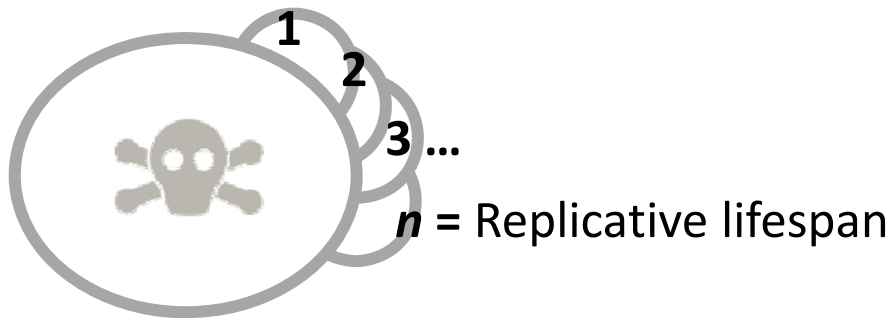


Las células de levadura envejecen

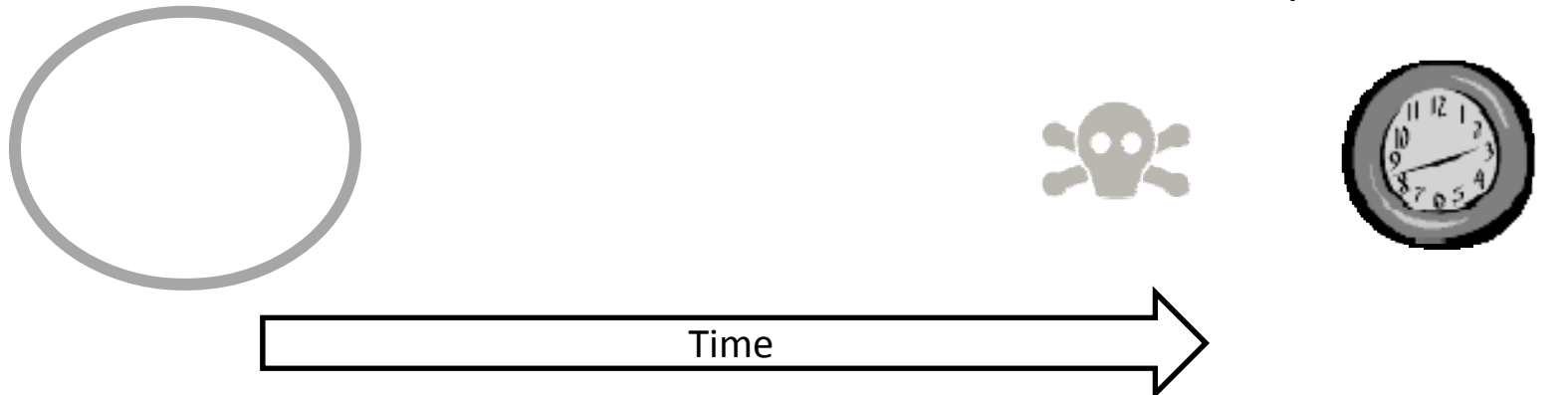


La levadura es uno de los organismos modelo más usados para el estudio del envejecimiento

Replicative lifespan (RLS):
Number of mitotic divisions



Chronological lifespan (CLS):
Number of days viable in stationary phase

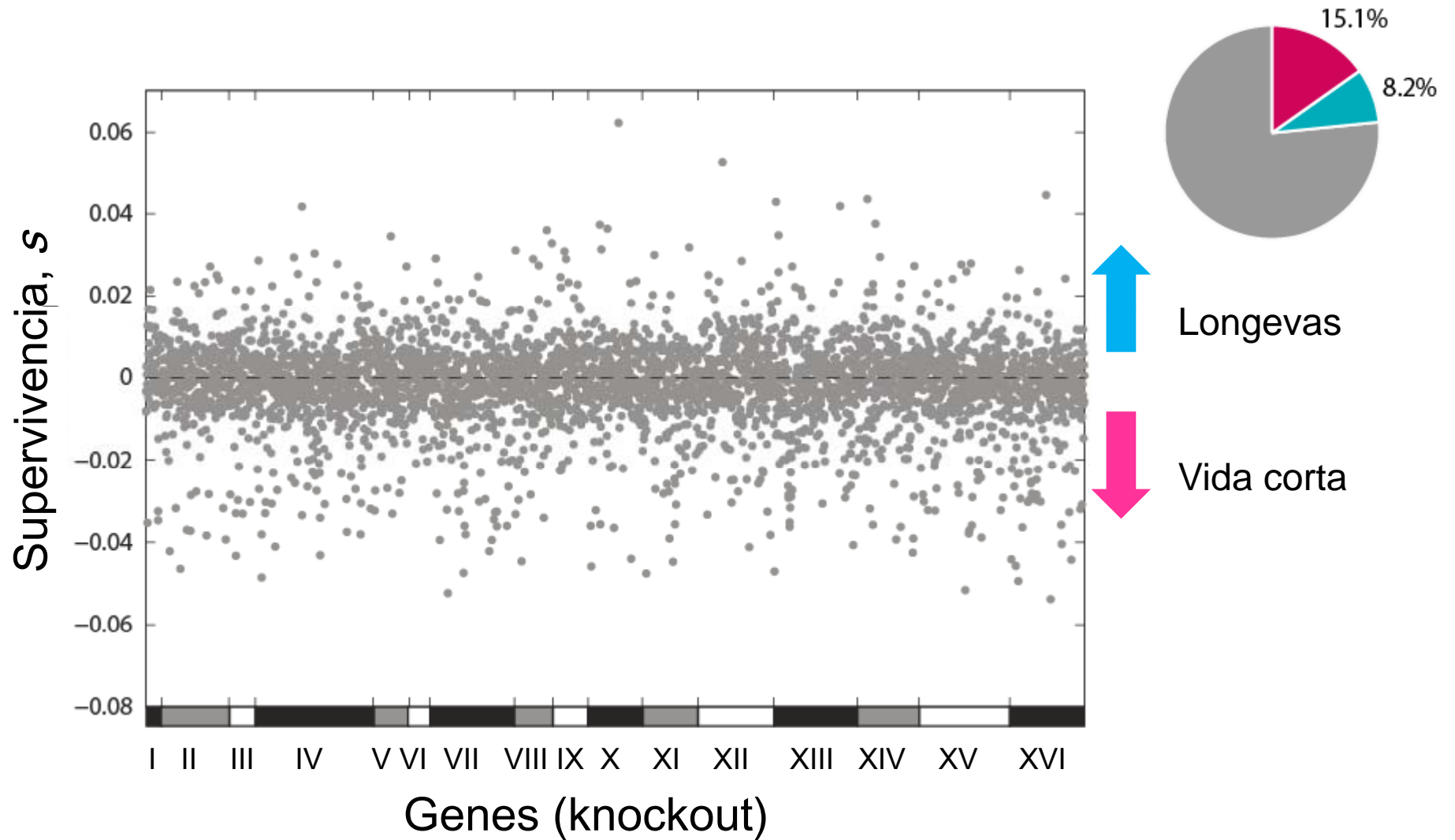


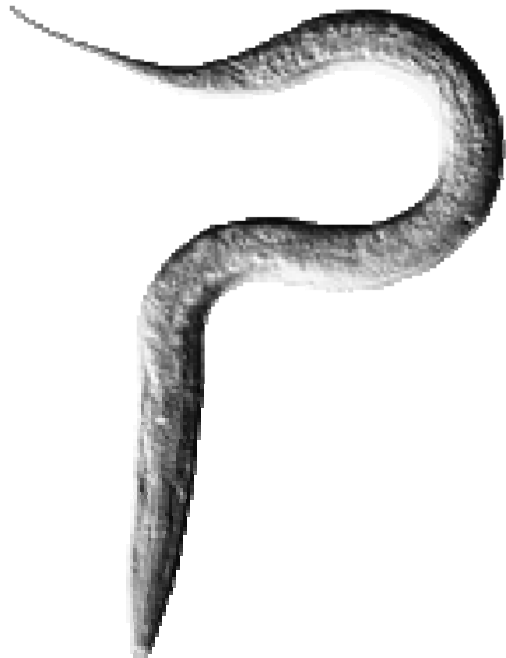
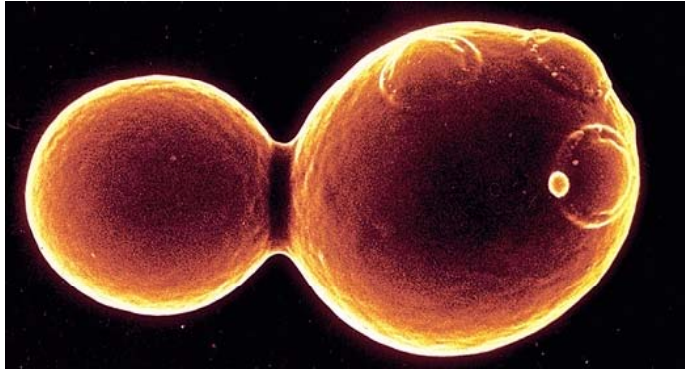


Desarrollamos un método para caracterizar de manera automática la longevidad de levaduras



Logramos revelar la longevidad de las mutantes en todo el genoma de la levadura





L A N G E B I O

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