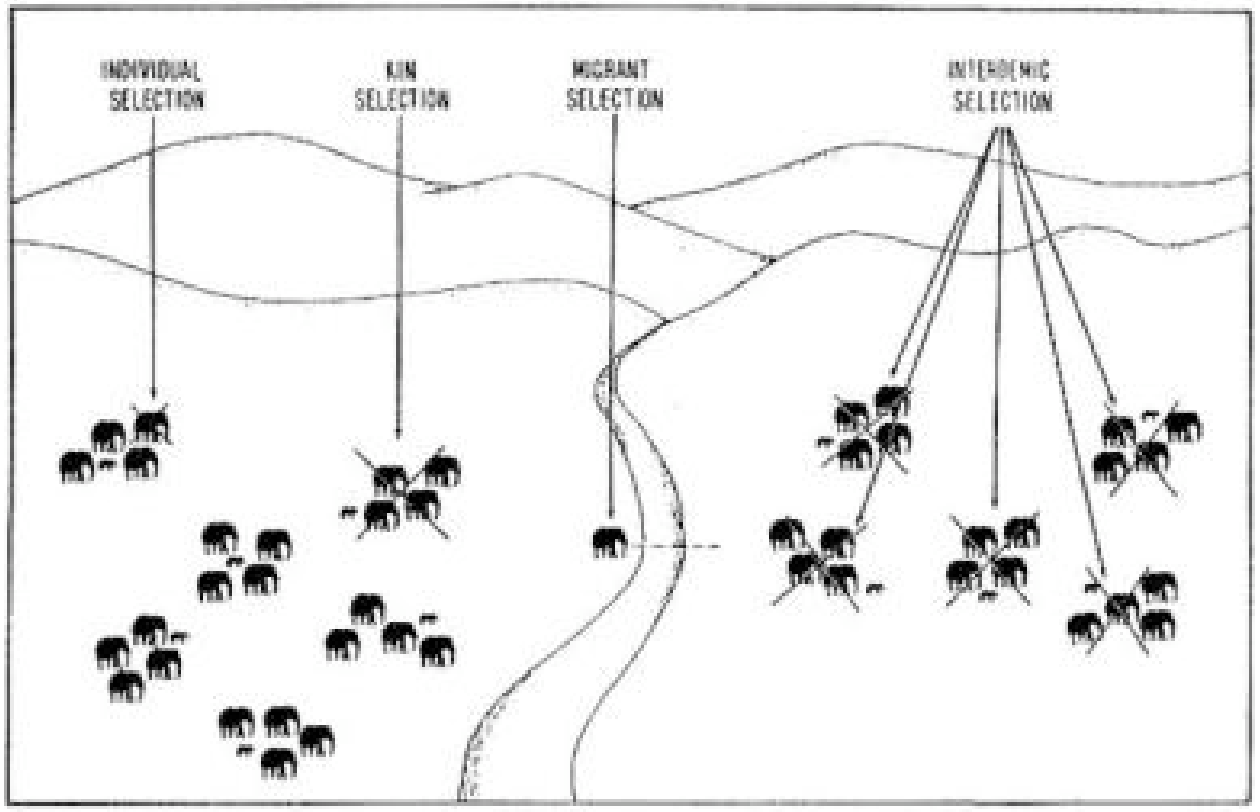
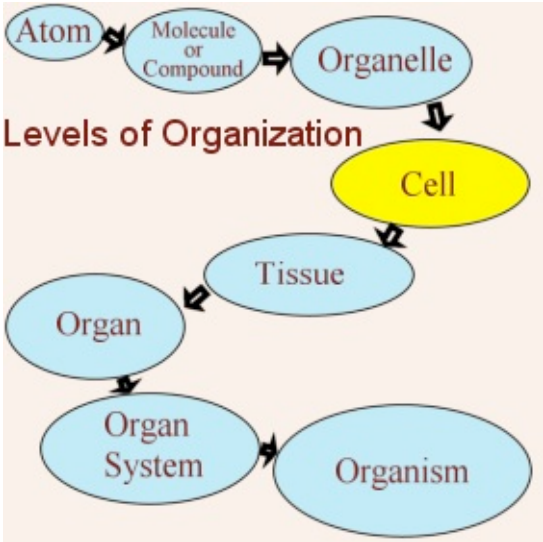
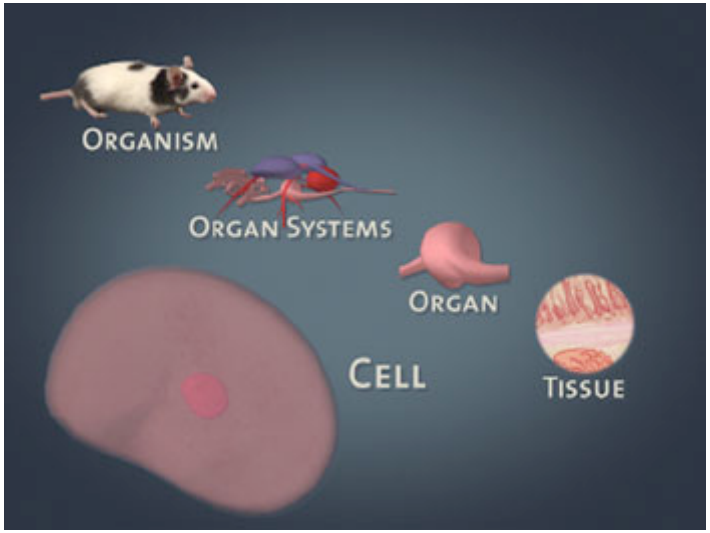
UNIDADES DE SELECCION



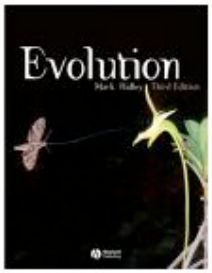
La vida está estructurada jerárquicamente





QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

M. Ridley 2004. Evolution

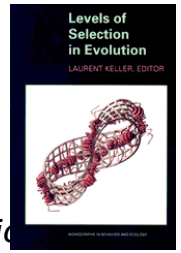


Interactores vs. replicadores

Tabla 1

Jerarquía de interactores y replicadores que se puede dar considerando diferentes escenarios selectivos. Modificada de Brandon 1990

ESCENARIO DE SELECCIÓN	INTERACTOR	REPLICADOR
Orígenes de la vida	Fragmentos de ARN	Fragmentos de ARN
Selección génica	Fragmentos de ADN	Fragmentos de ADN
Presión meiótica	Cromosoma o parte	Cromosoma o parte
Selección durante el desarrollo		
Gamética	espermatozoides	Genes o genoma
A nivel de embriones	embriones	Genes o genoma
Selección somática	Partes de organismos	Genes o genoma
Selección organísmica		
Asexual	Organismo	Genoma
Sexual	Organismo	Genes
Selección de grupo		
Intradémica	Grupo	Genes
Interdémica	Grupo	Grupo
Selección de avatar	Avatar	Avatar
Selección de especies	Especie	Especie
Selección de clado	Clado	Clado



L. Keller 1999. Levels of selection in evoluti

Selección multinivel

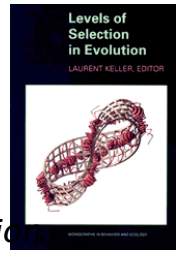
Para que una entidad viva pueda ser afectada por la selección natural, debe cumplir una serie de requisitos.

1) Debe reproducirse (imperfectamente).

2) Debe tener caracteres heredables.

3) Debe variar en su eficacia

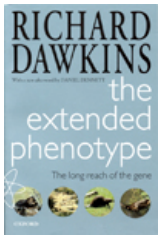
4) Debe poseer rasgos que le confieren esa mayor eficacia

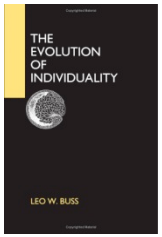


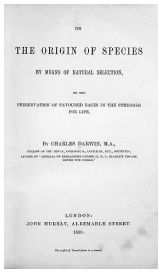
L. Keller 1999. Levels of selection in evolution

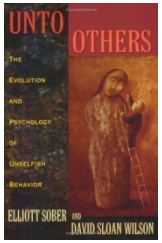
Principales unidades de selección

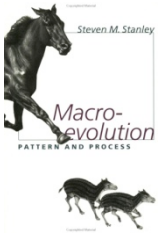
Selección a nivel de gen	Dawkins 1982. *The extende phenotype*.
Selección a nivel de célula	Buss 1987. *The evolution of individuality*.
Selección a nivel de organismo	Charles Darwin 1859. *On the origin of species*.
Selección a nivel de grupo	Sober and Wilson 1998. *Unto others*.
Selección a nivel de especie	Stanley 1979. *Macroevolution*.





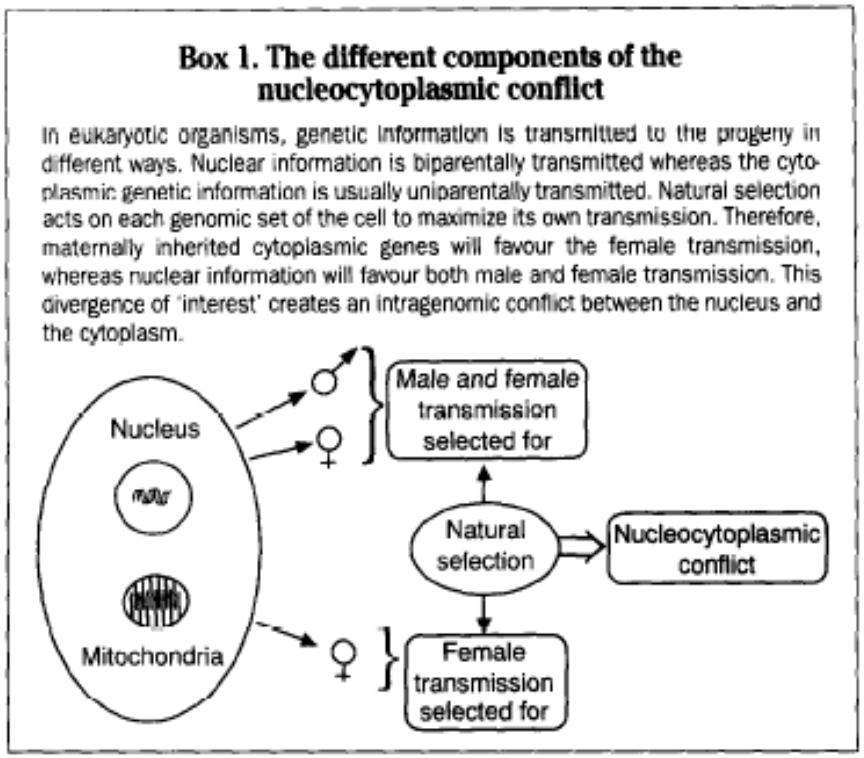






Conflictos entre unidades de selección

Conflicto entre unidades de selección ocurre cuando un rasgo es seleccionado en una dirección en un nivel y en otra dirección en otro nivel, o cuando diferentes genes afectando al mismo rasgo experimentan presiones selectivas contradictorias porque siguen reglas de transmisión distintas.



Conflictos entre unidades de selección

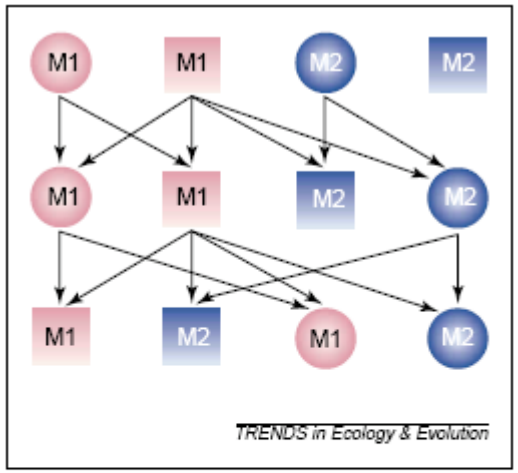


Fig. 1. Transmission of mitochondrial DNA (mtDNA). Pedigree demonstrating that a reduction in male fertility will not affect the frequency of mtDNA genotypes in future generations. Males (squares) with the M2 mtDNA genotype (dark shaded) are sterile and do not produce any progeny. The M2 genotype does not affect females. Progeny inherit their mtDNA genotype from their mothers (circles). The frequency of the M2 genotype, therefore, remains constant even though it causes male sterility.

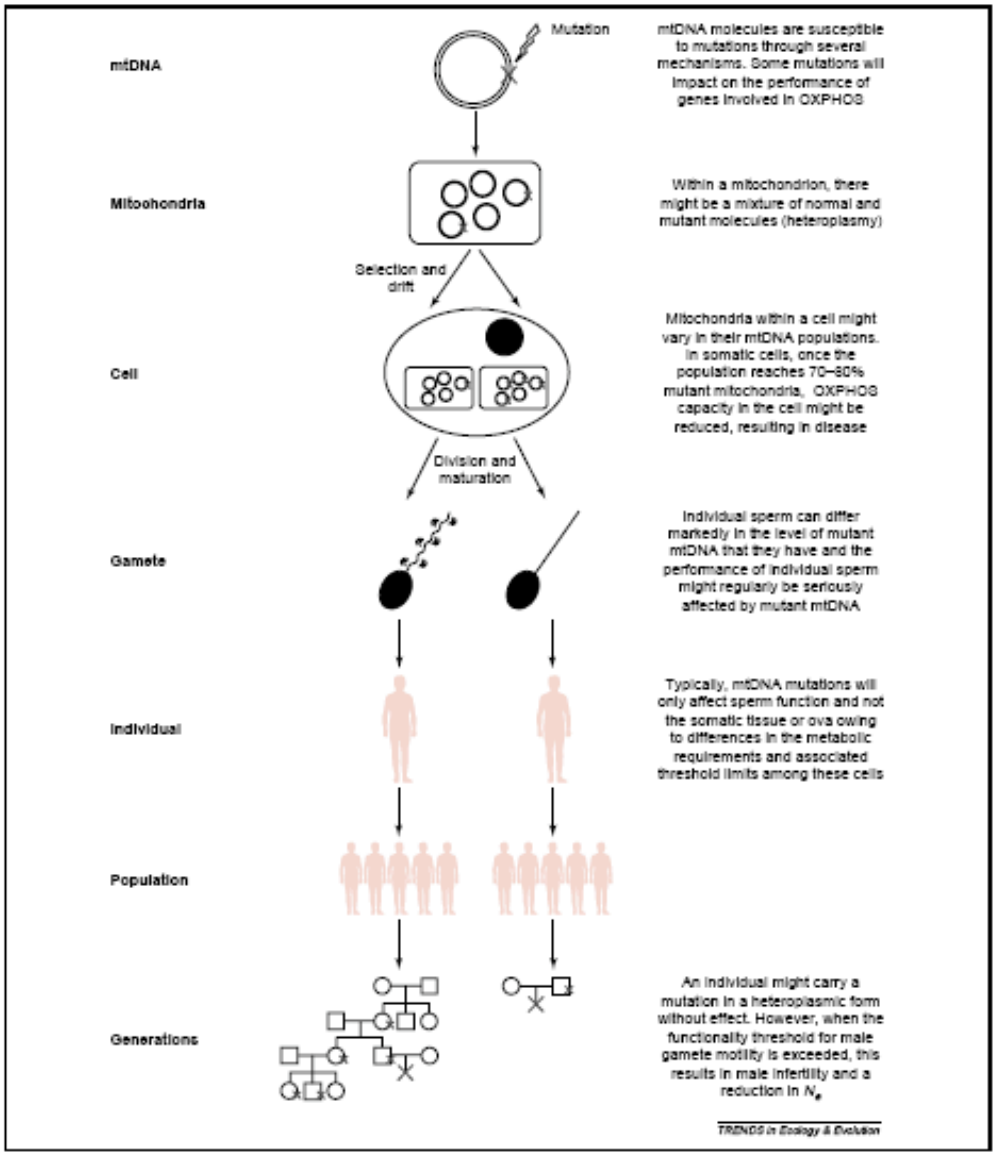


Figure 1. The nested hierarchy of mtDNA. Mitochondrial DNA (mtDNA) exists in a nested hierarchy of populations within an individual, which offers some protection from deleterious mtDNA mutations. When mtDNA mutations occur, they are generally heteroplasmic within a mitochondrion. Drift can alter the proportion of mutant and normal mtDNA in different mitochondria, even within the same cell. Sperm, which have very low numbers of mitochondria (c. 10–20) and very high metabolic demands, will suffer greatly from the random sorting of mutant and normal mtDNA. By contrast, the oocytes and somatic cells have lower energy requirements and higher numbers of mtDNA than sperm. Consequently, the selective disadvantage of mtDNA mutations might be much greater for males than for females. A male carrying mutant mtDNA will suffer lowered fertility and might sire few or no offspring. A female carrying mutant mtDNA will be unaffected and will continue to pass the mutation on to future generations, affecting the fertility and viability of her male offspring.

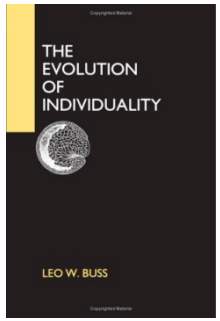
Conflicto entre presiones selectivas a nivel celular y organísmico

"Much of the evolution of development in metazoans reflects the conflict between selective pressures acting at the level of the cell and those acting at the level of the multicellular individual.

This perspective can shed new light on phenomena as diverse as cancer, gastrulation, and germ line sequestration.

Cancer, e.g., occurs when individual cells in the body mutate and develop the ability to proliferate without the restraints normally in place that serve the interests of the individual organism. This selection for unconstrained proliferation is in conflict with the fitness interests of the individual, and thus there is tension between selection at the level of the cell and selection at the level of the individual. Since the proliferation of specific cells of the vertebrate immune system to fight off infecting pathogens is a case of programmed and exquisitely contained cellular proliferation, it represents a case of the individual manipulating selection at the level of the cell to enhance its own fitness. In the case of the vertebrate immune system, selection at the level of the cell and individual are not in conflict"

L. Buss 1987. The evolution of individuality



Conflictos entre unidades de selección

The evolutionary biology of cancer

Table 1. Contrasts between the evolution of individuals in populations and cancer cells in individuals

Process	Evolution of populations	Evolution of cancer cells
Phenotypic variation generated	Germline mutation and recombination	Somatic mutation Epigenetic alteration Genomic instability
Selection	Owing to differential survival and reproduction; main selective agents are abiotic factors, competitors, predators and parasites	Owing to differential replication and apoptosis or cellular senescence; selective pressures include intercellular competition for resources, immunosurveillance and signaling system components such as receptors and hormones
Drift	Stochastic changes in allele frequencies, owing to sampling error in small populations of individuals	Stochastic changes in genetic or epigenetic allele frequencies, owing to sampling error in small populations of cells
Inheritance	Genes transmitted intact barring mutation or recombination	Asexuality; genetic and epigenetic variants inherited intact barring mutation or epigenetic alteration
Result of process	Adaptation across generations	Large cell population adapted to rapid growth, resulting in death of the individual