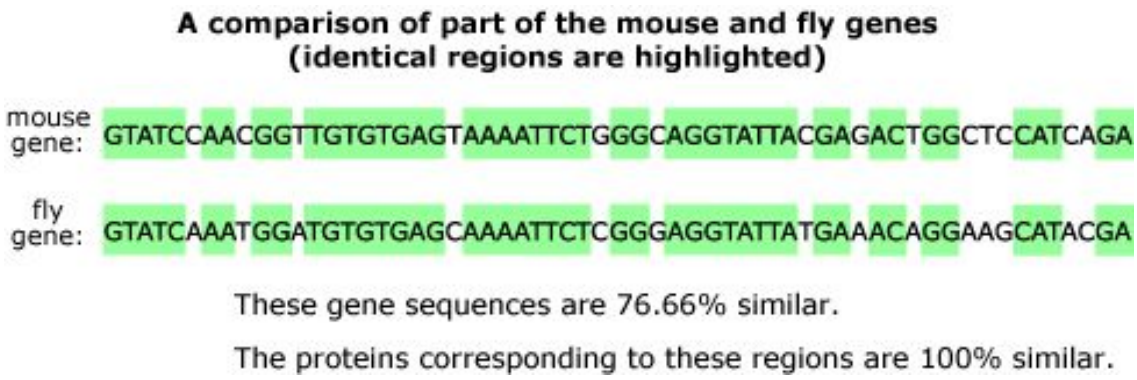
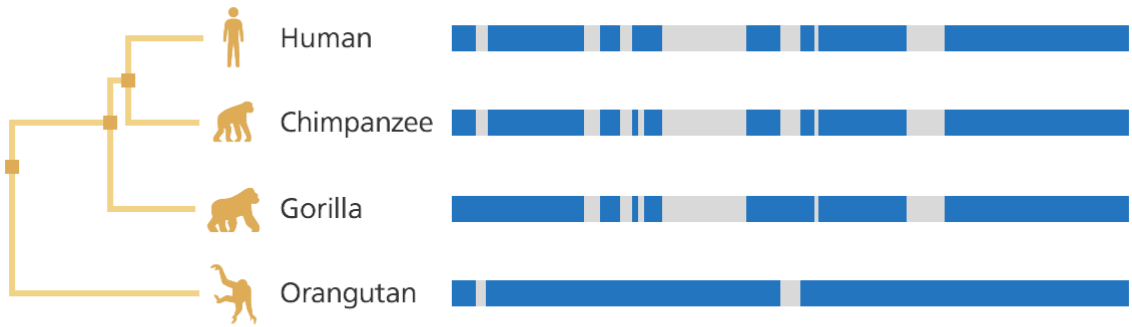
Investigating Diversity

Comparison of DNA base sequences (pg 249)



- The more closely related two organisms are, the more similar their DNA base sequence
- Genotypes codes for phenotype, so organisms in one species will have very similar genotypes (apart from point mutations)



Comparison of amino acid sequences in a protein (pg 250)

Species	Sequence of Amino Acids in the Same Part of the Hemoglobin Molecules
Human	Lys–Glu–His–Iso
Horse	Arg–Lys–His–Lys
Gorilla	Lys–Glu–His–Lys
Chimpanzee	Lys–Glu–His–Iso
Zebra	Arg–Lys–His–Arg

- the same protein must be compared across different species
- protein sequence depends on DNA base sequence
- the degree of similarity in the amino acid sequence between two species reflects how closely related they are to each other (Fig 2, pg 250)

Immunological comparison of proteins (Fig 4, page 252)

Serum = blood without the RBCs, WBCs or platelets

- Take serum from human, inject into a rabbit. This serum contains the protein albumin. The rabbit will produce anti-human anti-albumin antibodies. Purify this antibody from the serum of the rabbit.

- Extract serum from all species that are to be compared

- Add the same concentration of antibody to each serum sample. Use serum from human as the control.

- Anti-albumin antibody will bind to albumin in serum. The more the degree of similarity between the two tertiary structures, the better the binding

- binding can be visualised as the formation of a precipitate

Full example on pg 251

Index of Diversity (pg 243)

- A method used to quantify the biodiversity of a habitat.
- It takes into account the number of species present, as well as the abundance of each species.

Species Richness

The number of species per sample is a measure of richness. The more species present in a sample, the 'richer' the sample.

Species Evenness

Evenness is a measure of the relative abundance of the different species making up the richness of an area.

A community dominated by one or two species is considered to be less diverse than one in which several different species have a similar abundance.

$$D = \frac{N(N-1)}{\Sigma n(n-1)}$$

n = the total number of organisms of a particular species
N = the total number of organisms of all species

	Numbers of individuals	
Flower Species	Sample 1	Sample 2
Daisy	300	20
Dandelion	335	49
Buttercup	365	931
Total	1000	1000

Species	n	n-1	n (n-1)
Daisy	300		
Dandelion	335		
Buttercup	365		

The higher the value of d, the greater the species diversity