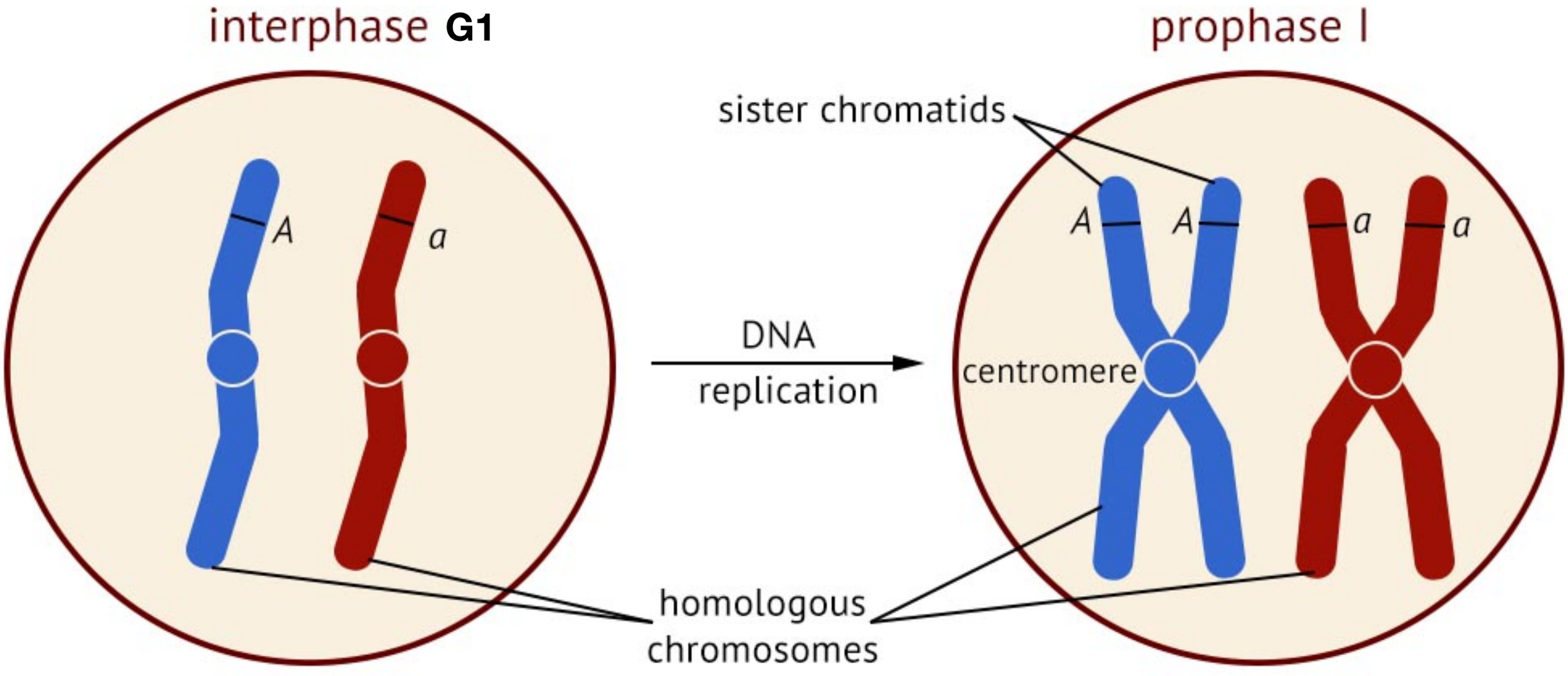
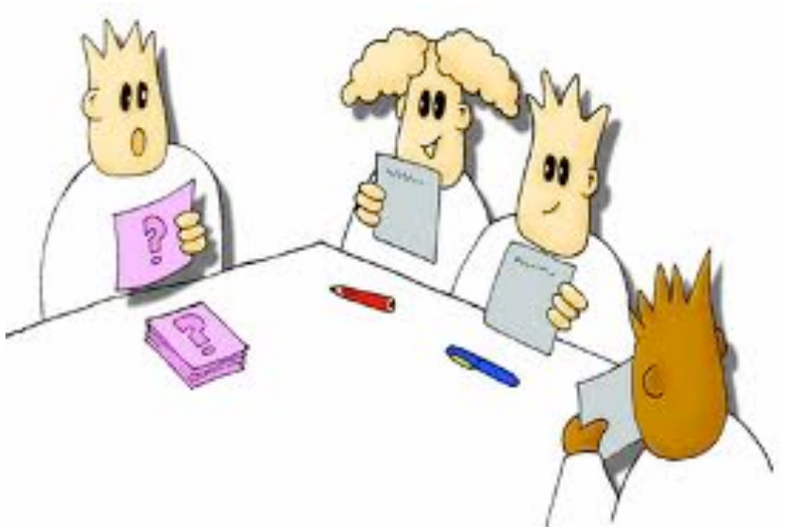
Chromosomes Revisited

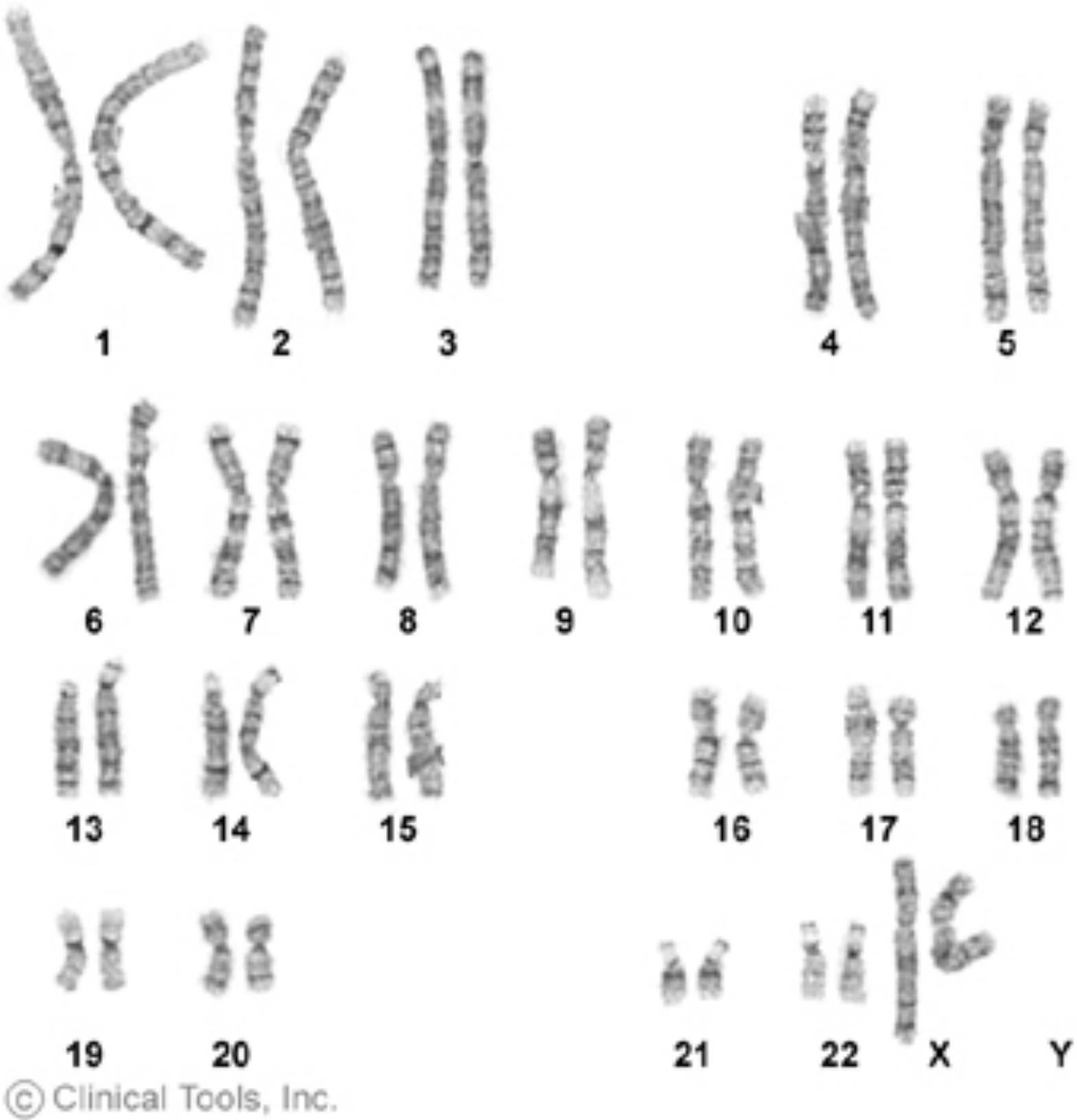


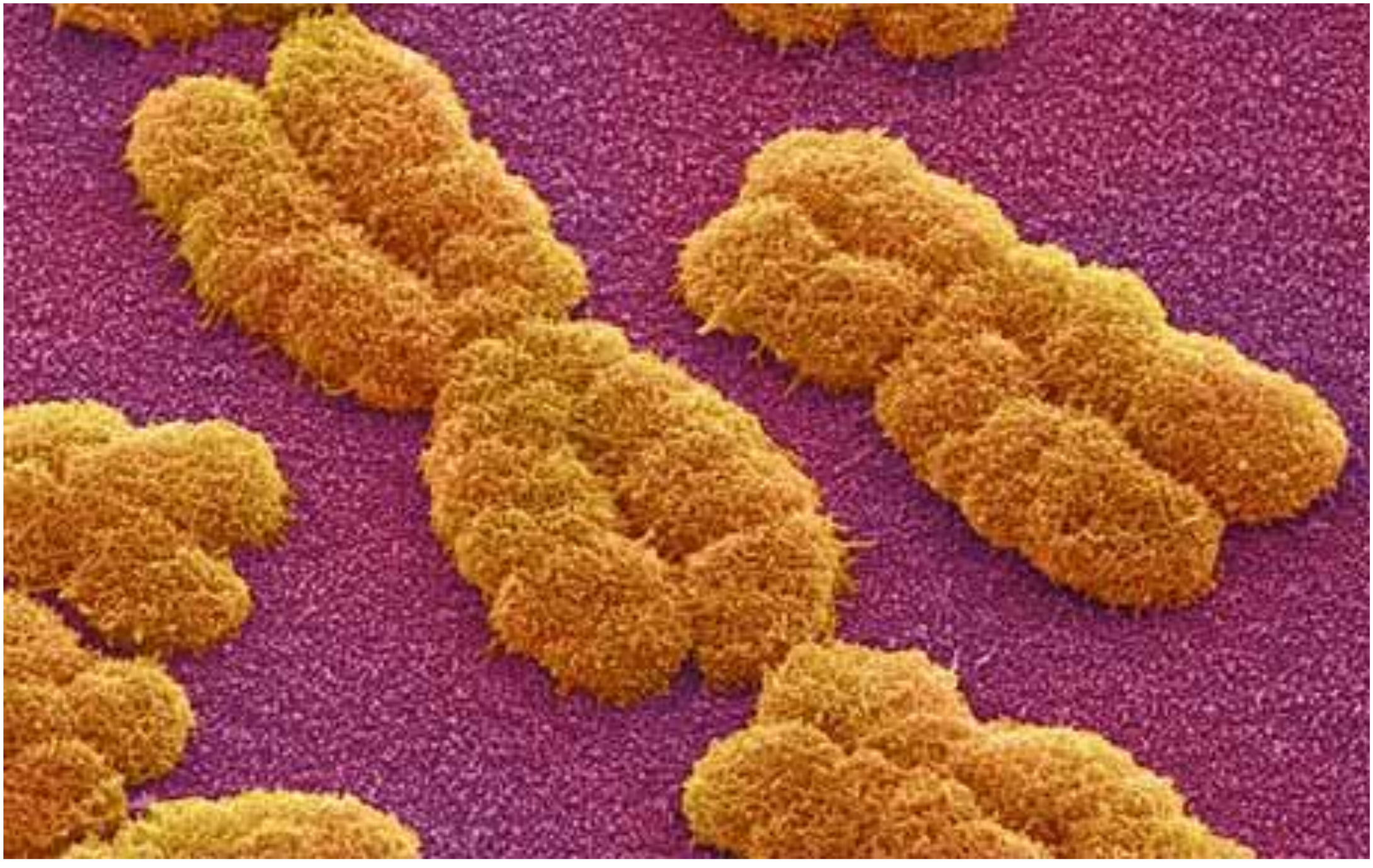


Review time

Get a white board

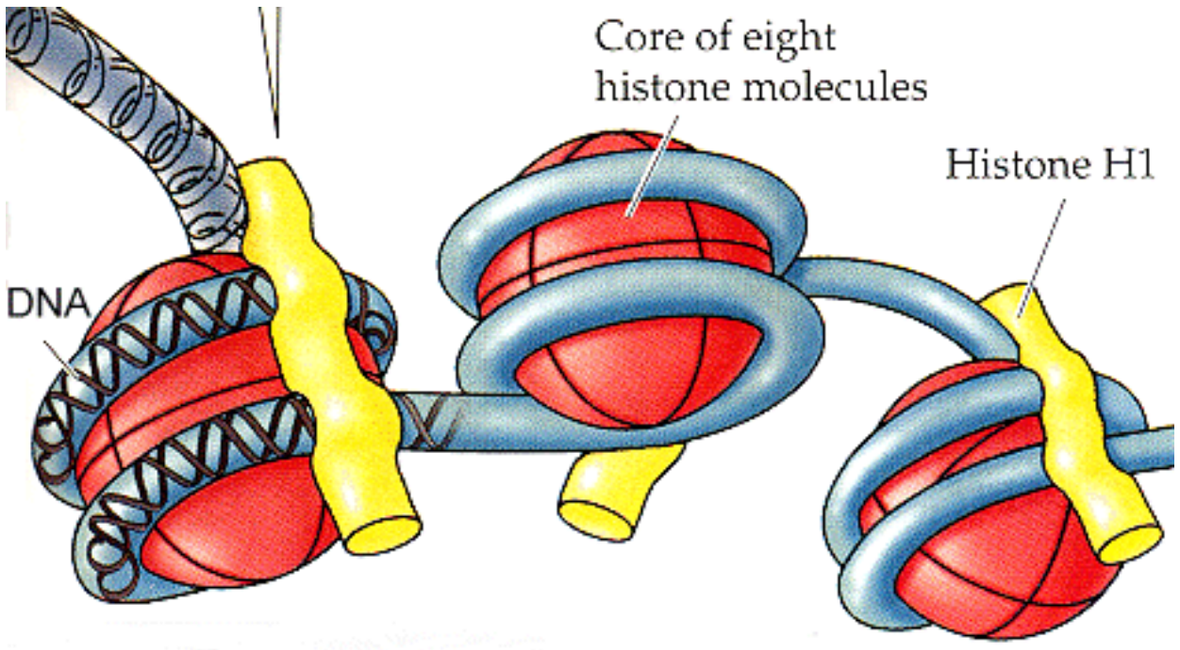
Eukaryotic Chromosome Organization





Chromosome Organization

- if all of the DNA was stretched out, it would measure 1.8 metres in length
- *How does it fit into a typical human cell nucleus, 10 micrometres in diameter?*
- there is a hierarchical organization
- DNA is coiled around a group of 8 stabilizing proteins called **histones**, forming **nucleosomes**



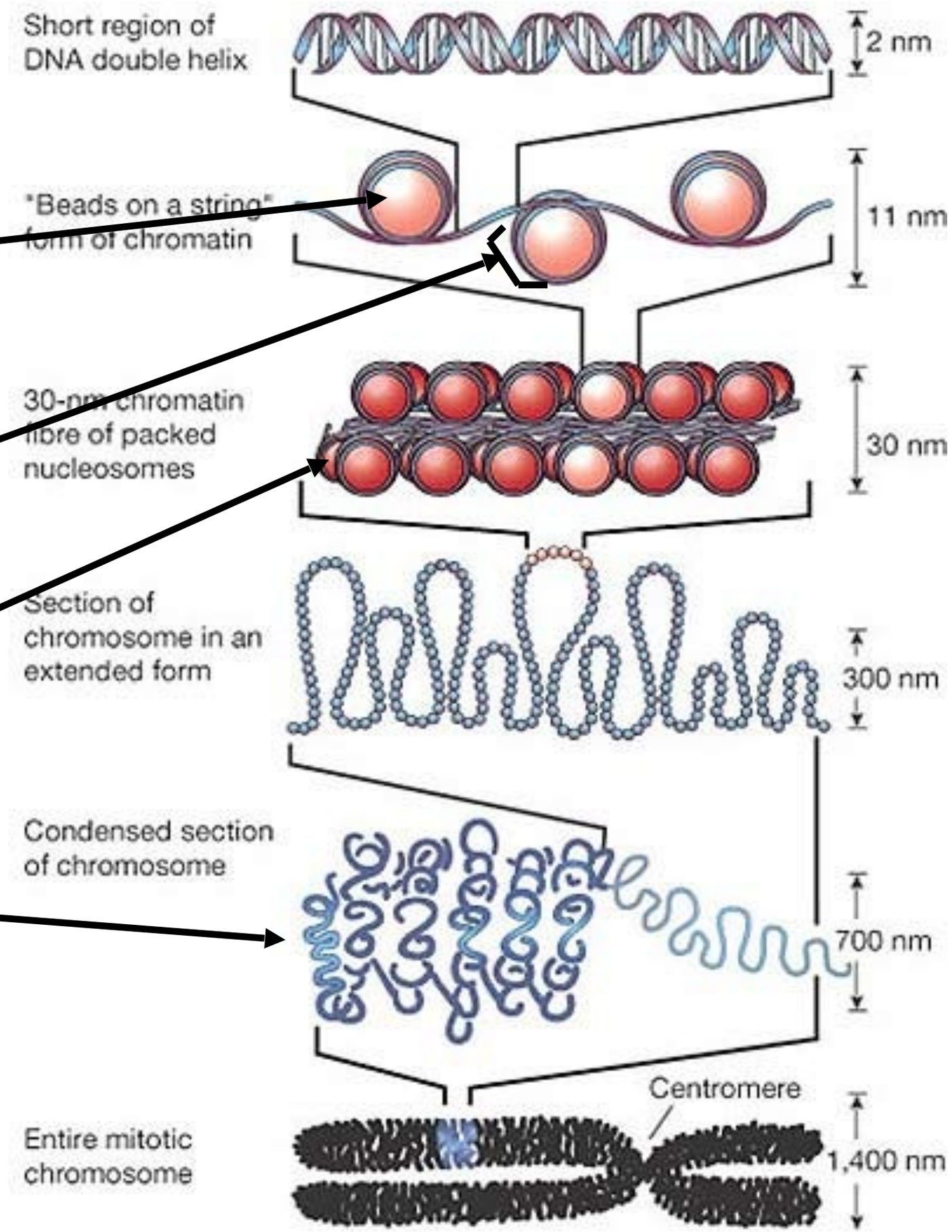
Chromosome Organization

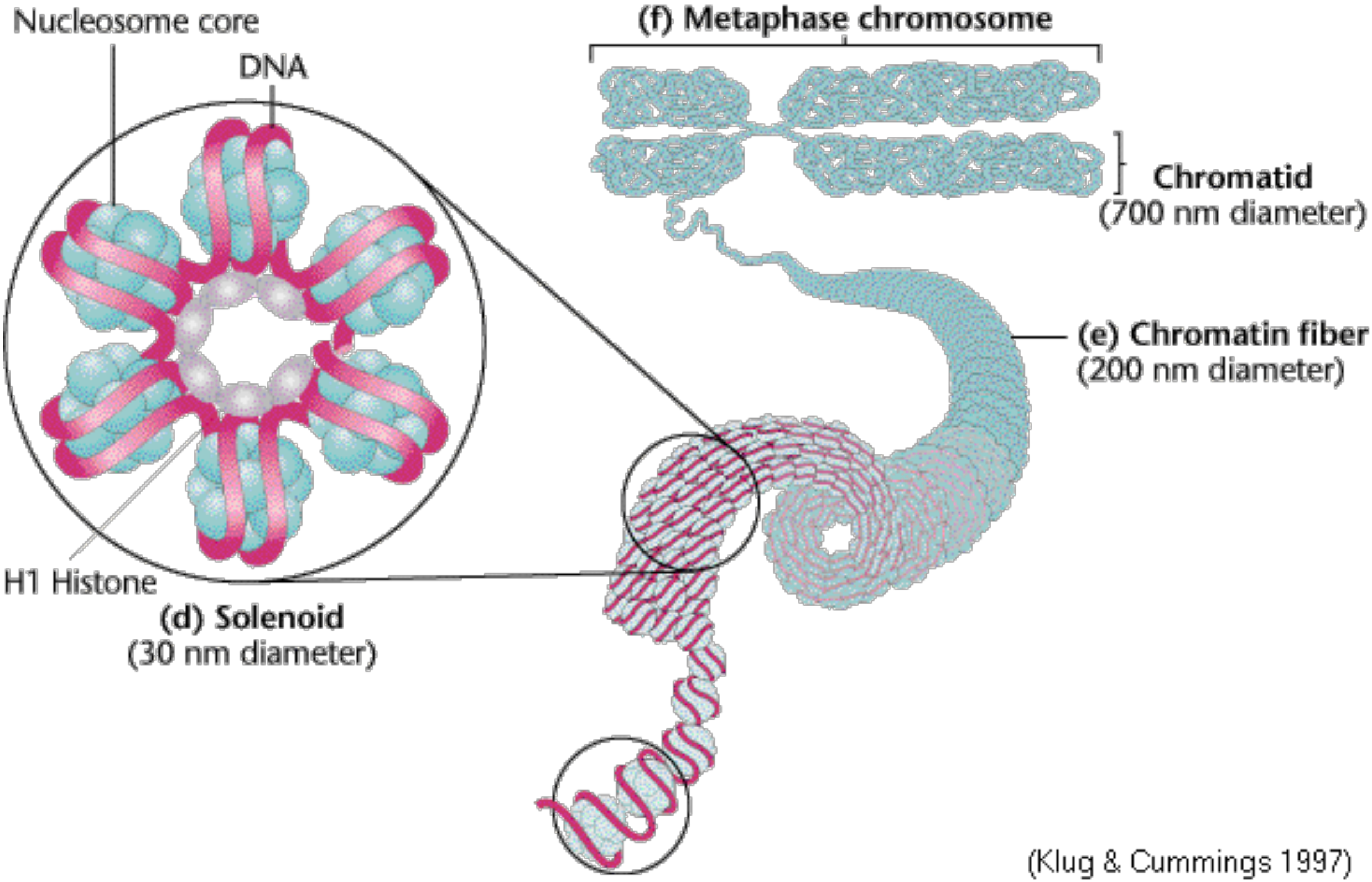
Histones

Nucleosome
(8 histones)

Solenoid
(6 nucleosomes)

Supercoil



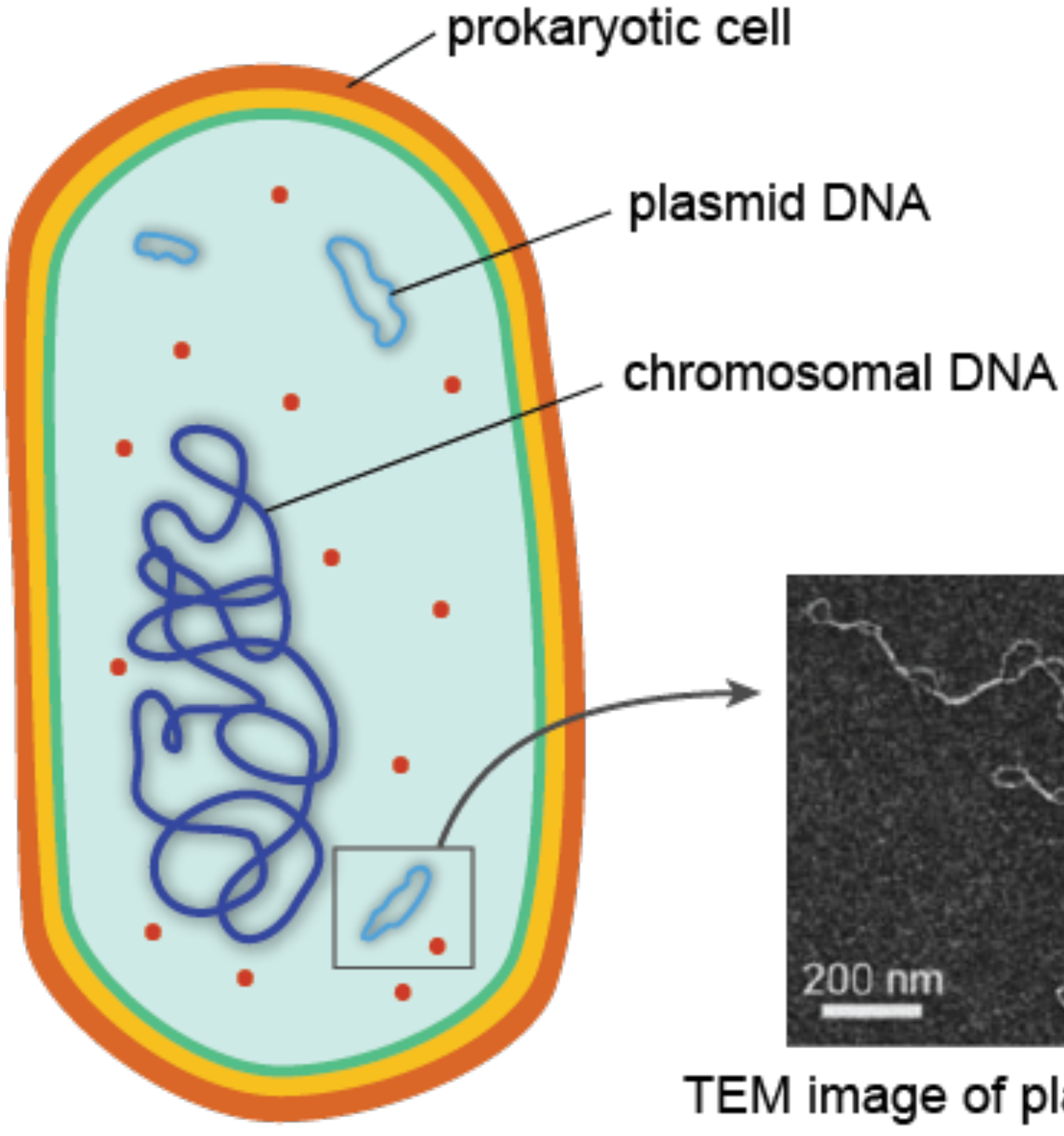


(Klug & Cummings 1997)

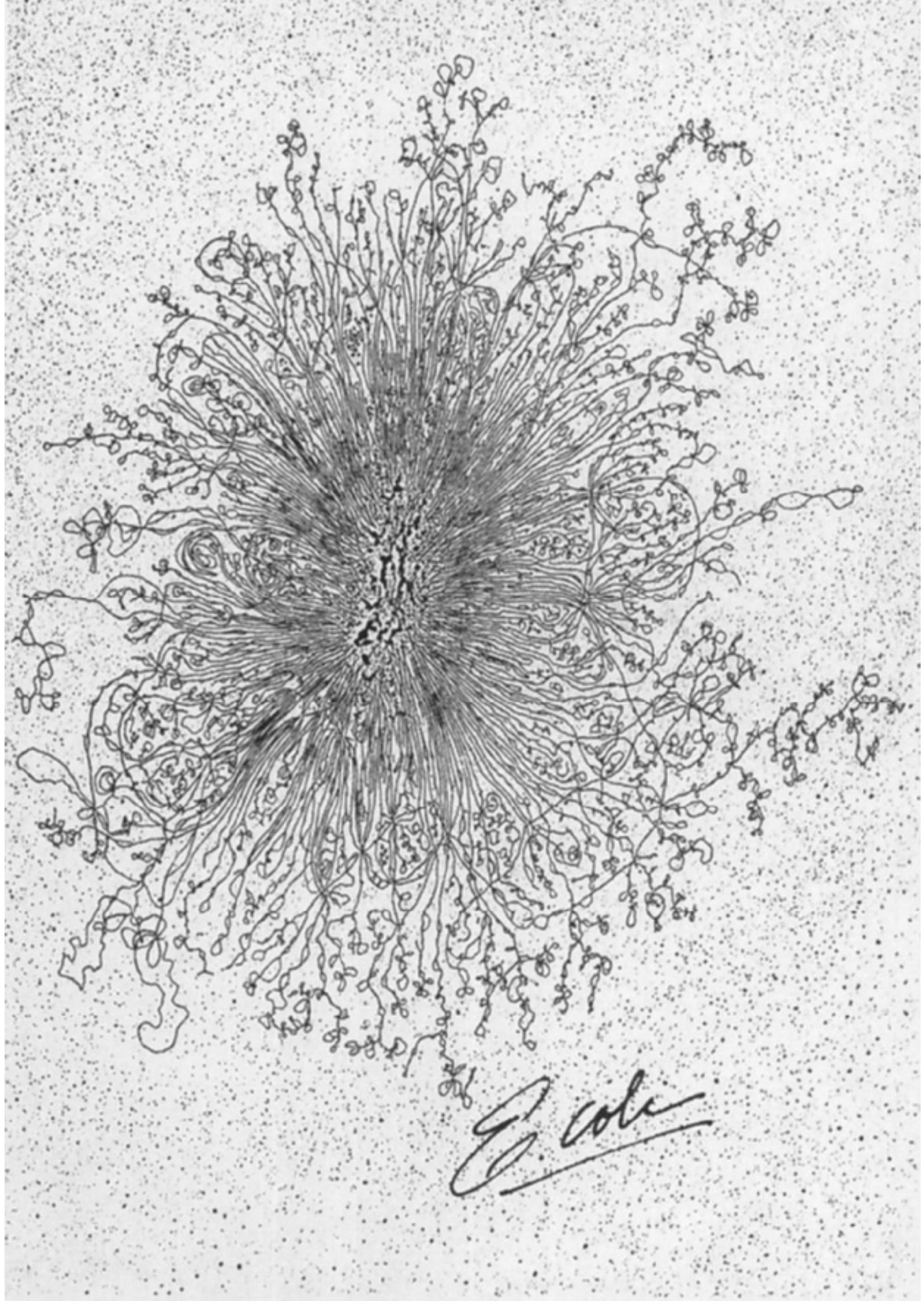
Chromosome Organization

- **Solenoid** = a group of 6 **nucleosomes** coiled into chromatin fibres
- chromatin fibres fold into final chromatin structure through **supercoiling**.

Prokaryotic DNA



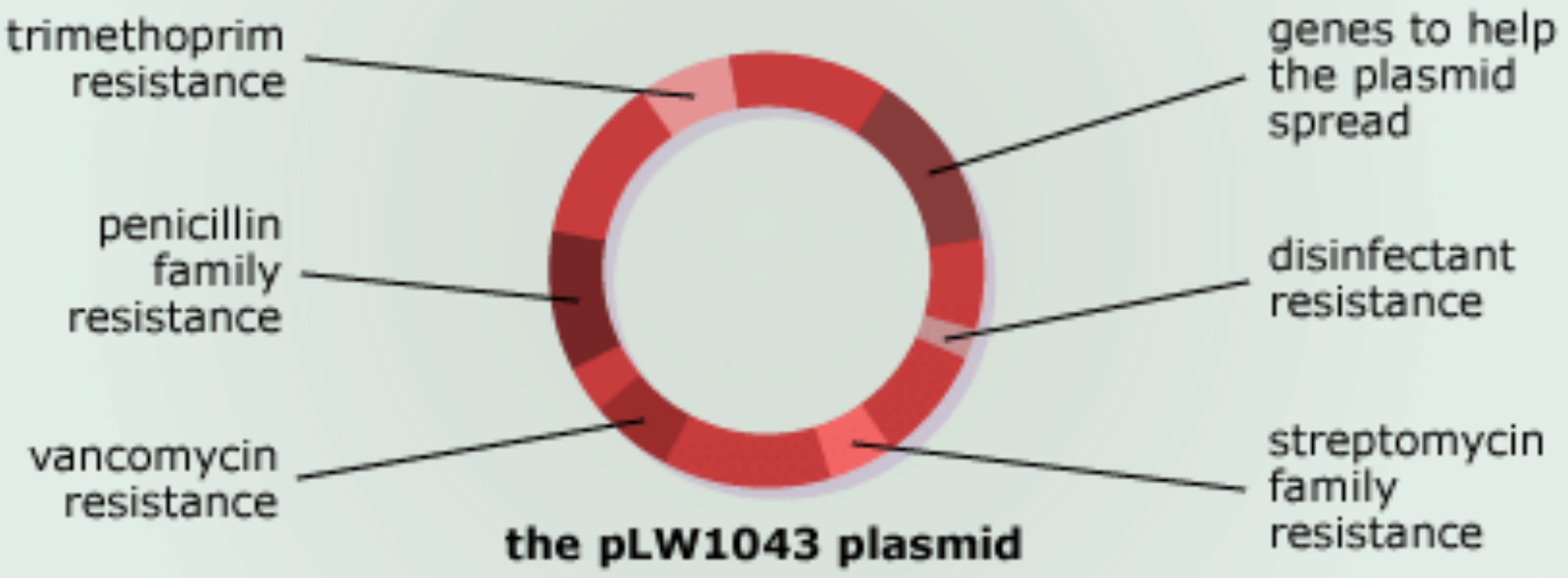
TEM image of plasmid DNA



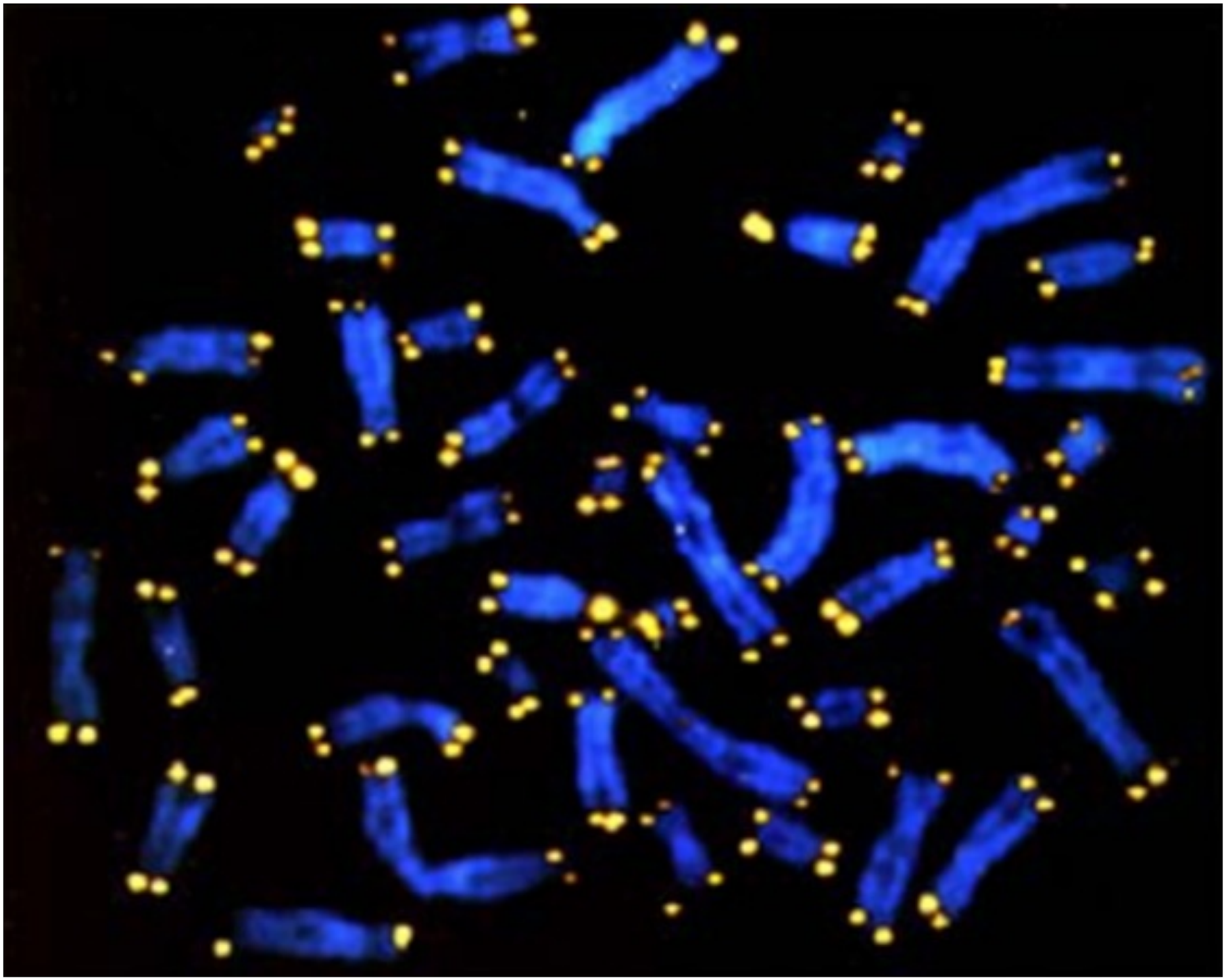
Prokaryotic DNA

- primary DNA is single circular chromosome
- **supercoiling** happens in prokaryotes
- plasmids are other circular pieces of DNA contained in prokaryotes
- plasmids can be exchanged through **conjugation** OR **DNA** sharing which is where antibiotic resistance comes from in Bacteria and is spread. EVEN to different species of bacteria.

A single plasmid can carry the genes to resist many different antibiotics.

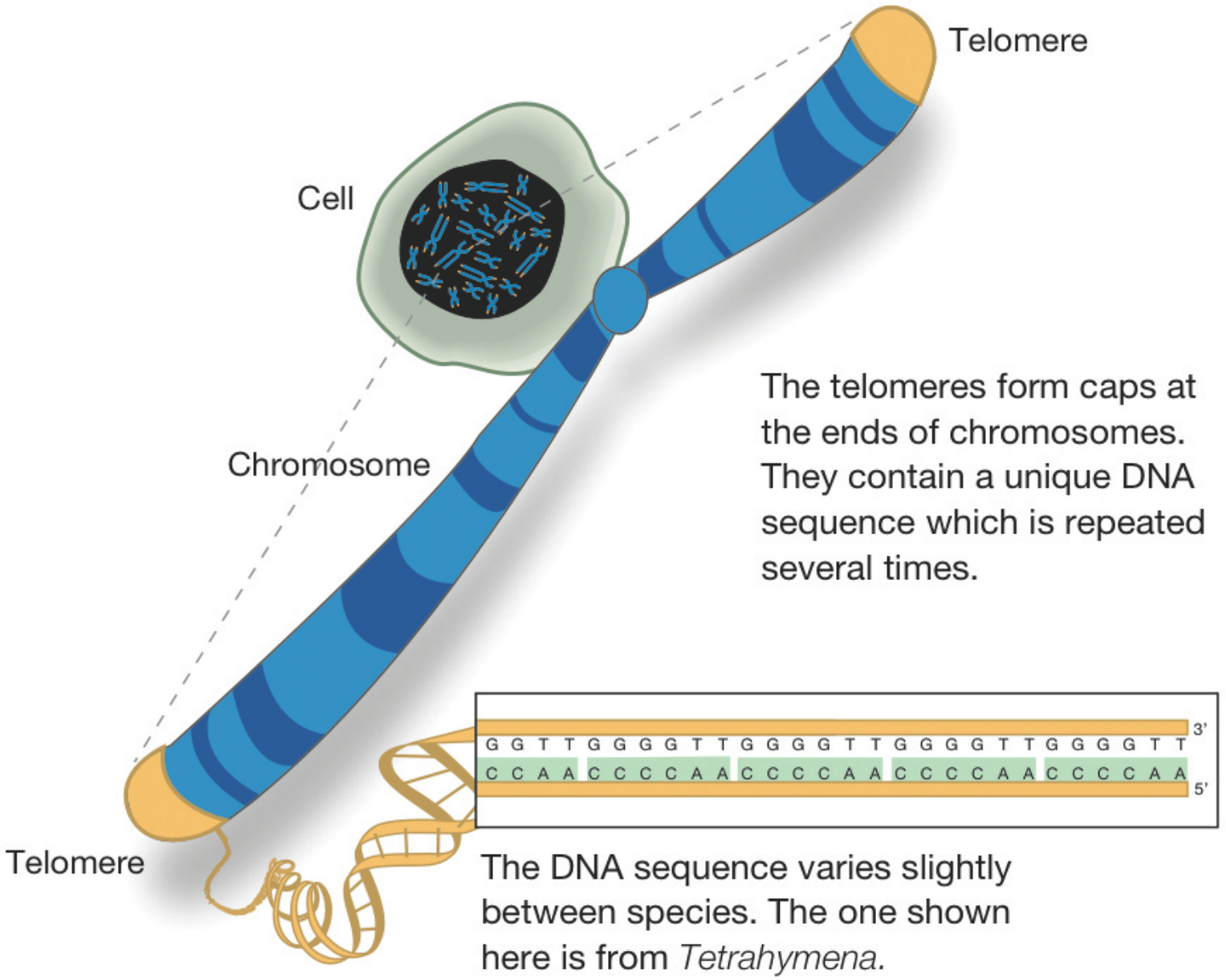


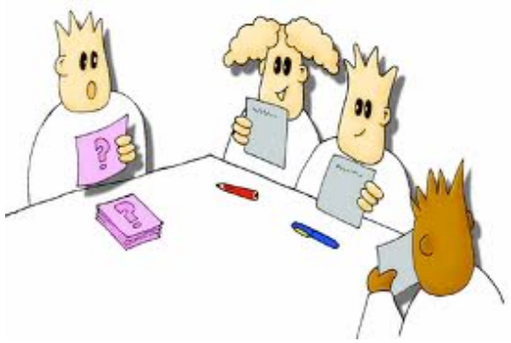
Telomeres

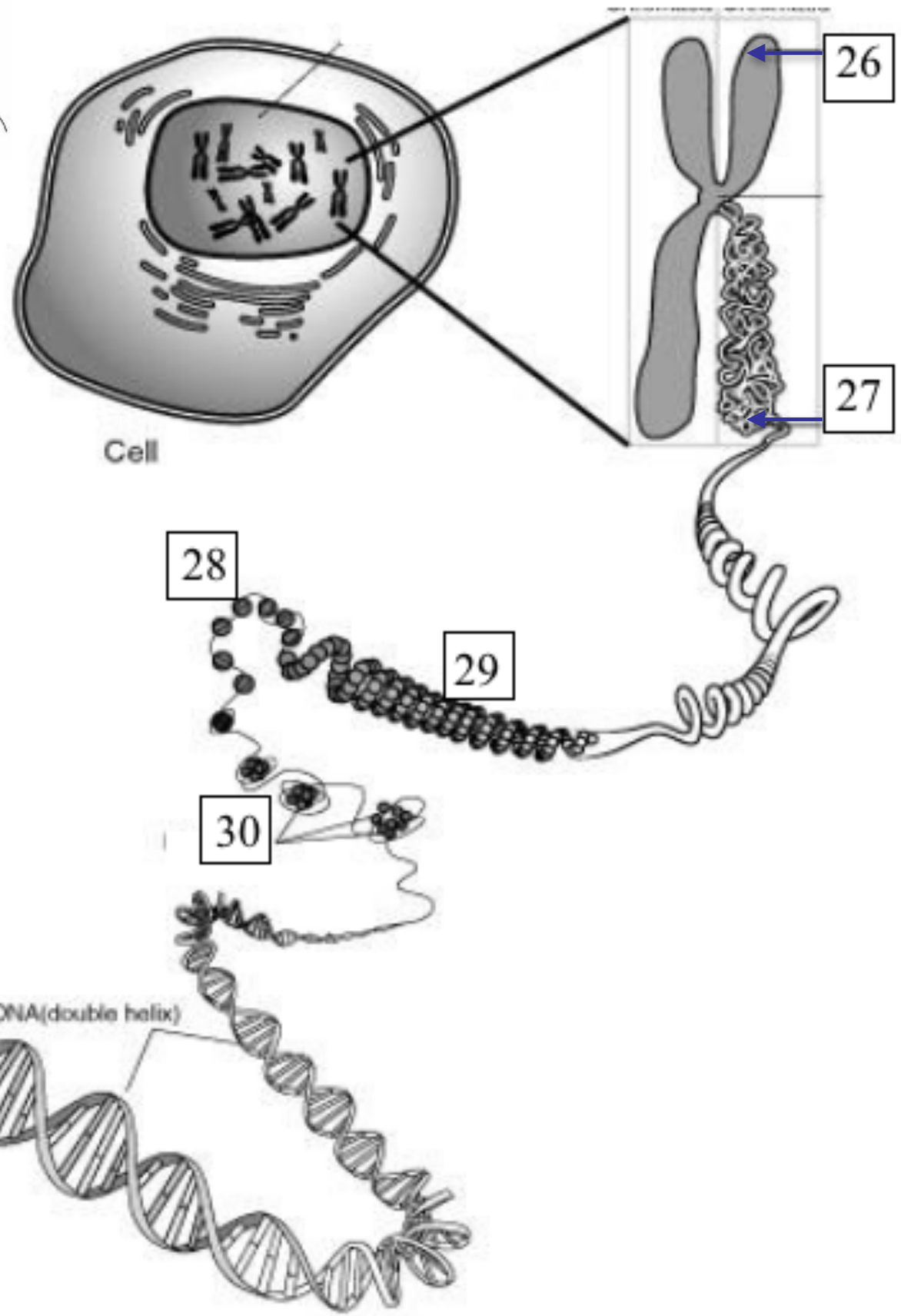


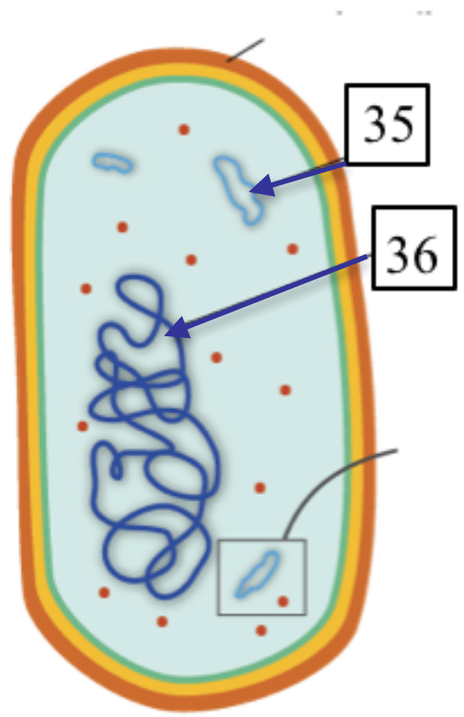
Telomeres

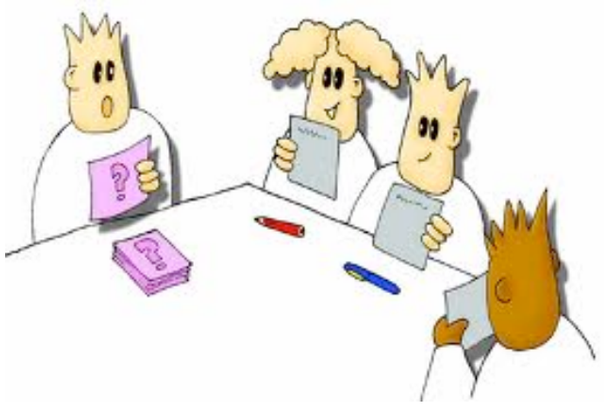
- **telomeres** are non-coding, repetitive sequences at the ends of chromosomes





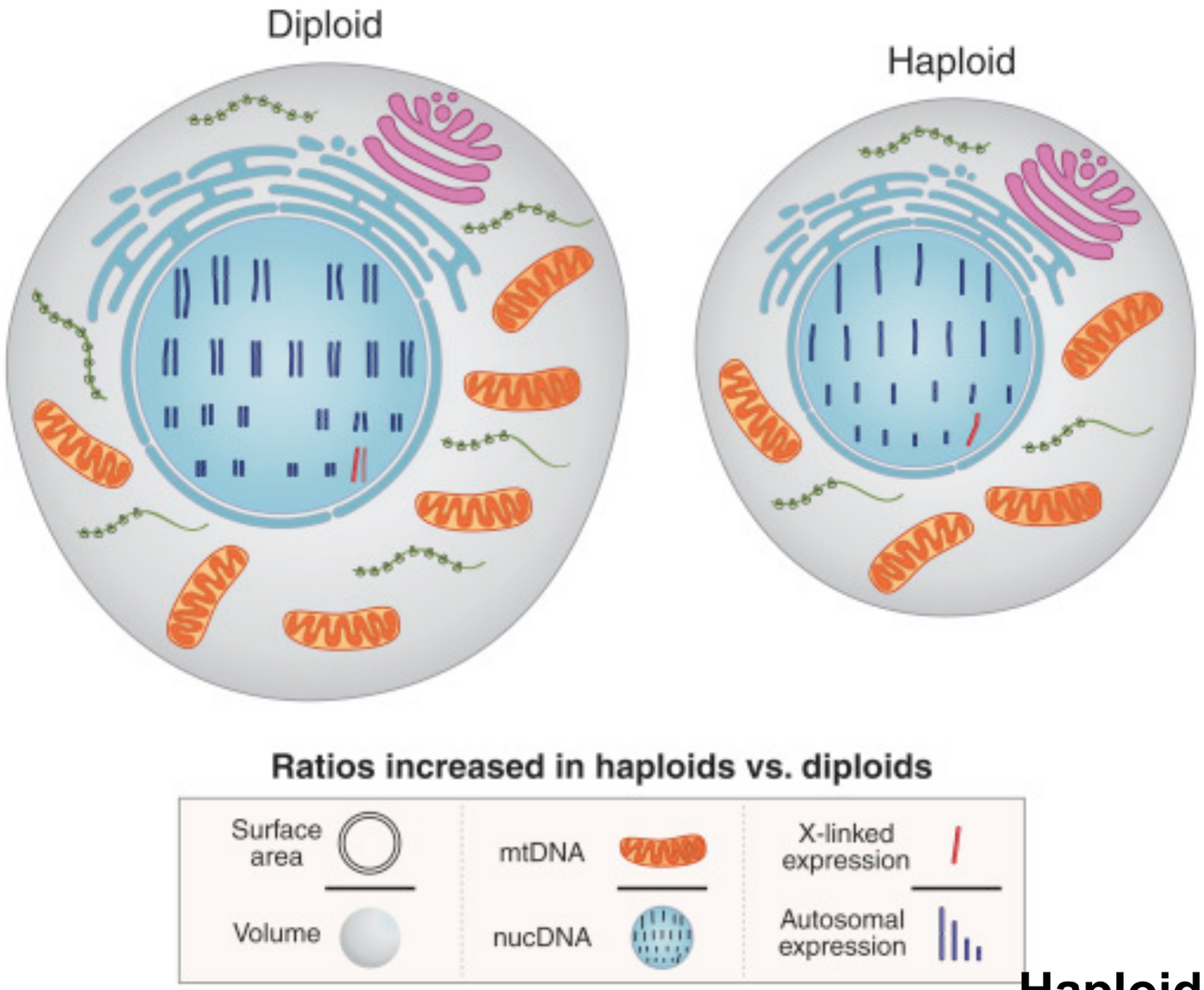

26
27
Cell
28
29
30
31
DNA(double helix)


35
36



Place the following structures in order of size, from smallest to largest: solenoid, nucleosome, chromosome, histone, telomere

Haploid Vs Diploid



Diploid

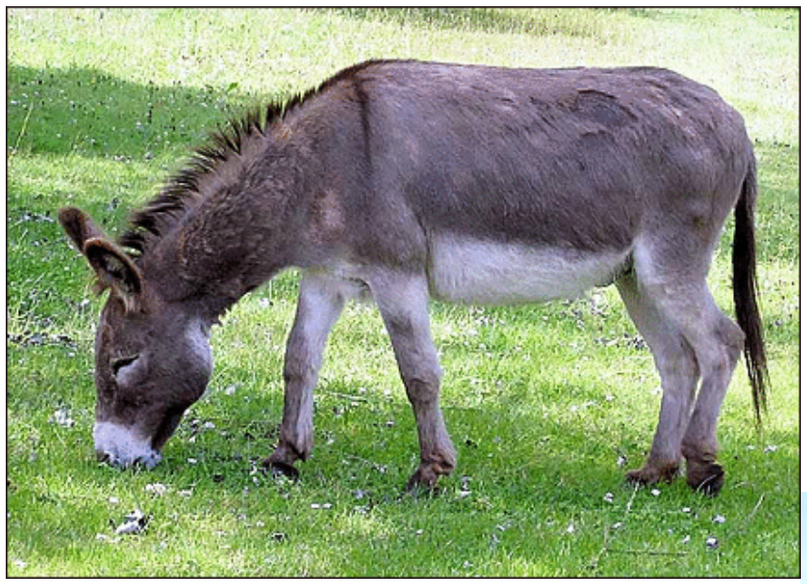
- two sets of chromosomes
- Only in somatic or all body cells
- 46 is the chromosome number in humans
- Chromosome number is unique in species

Haploid

- one set of chromosomes
- Only in sperm or egg cell in humans (called Gametes)
- 23 in humans

Differences in <u>species</u>?

- Chromosome number is one barrier that prevents species from interbreeding



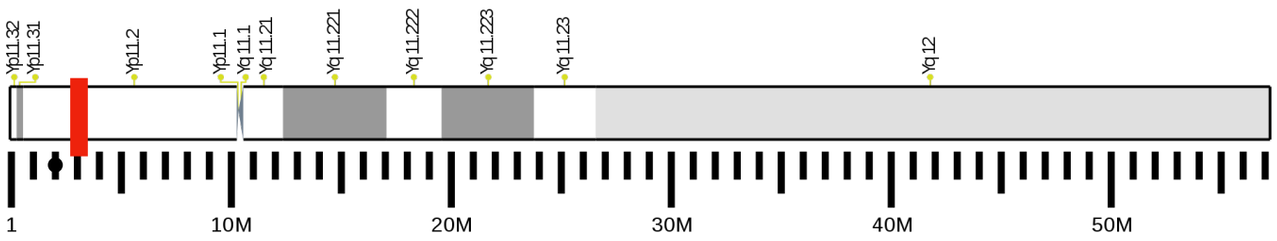
Donkey
2N= 62

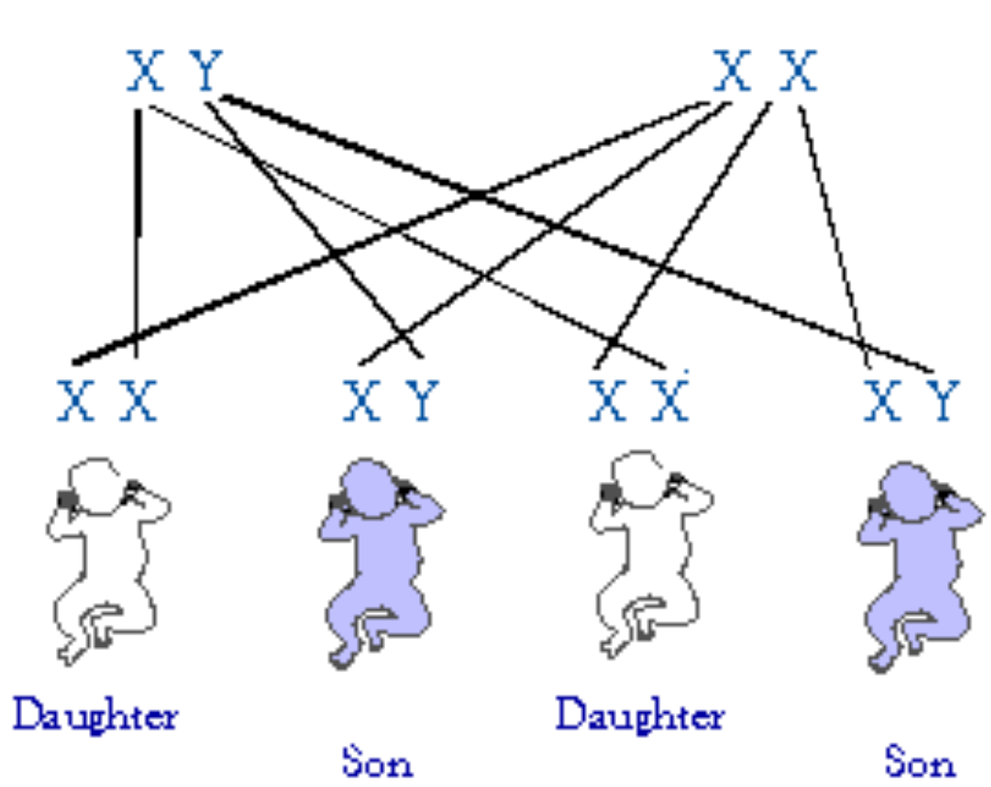
Mule
2N= 63

Horse
2N= 64

Sex Determination

- Sex determination
- Father's chromosome determine the sex, mother alway codes for female
- Babies must have a X to survive
- The Y chromosome contains a gene called TDF on the Sex determination locus called SRY





Assignment

- Data Based questions on pg 153
- Data Based Questions on pg 156
- Read and make a summary note listing Cairn's Work with Autoradiography