

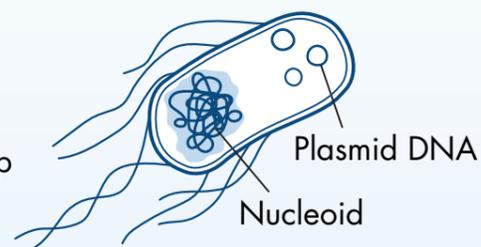
Virion DNA – Herpesviridae (HSV1)

Physical size: Ø 155 – 240 nm
Genome size: 152,000 bp



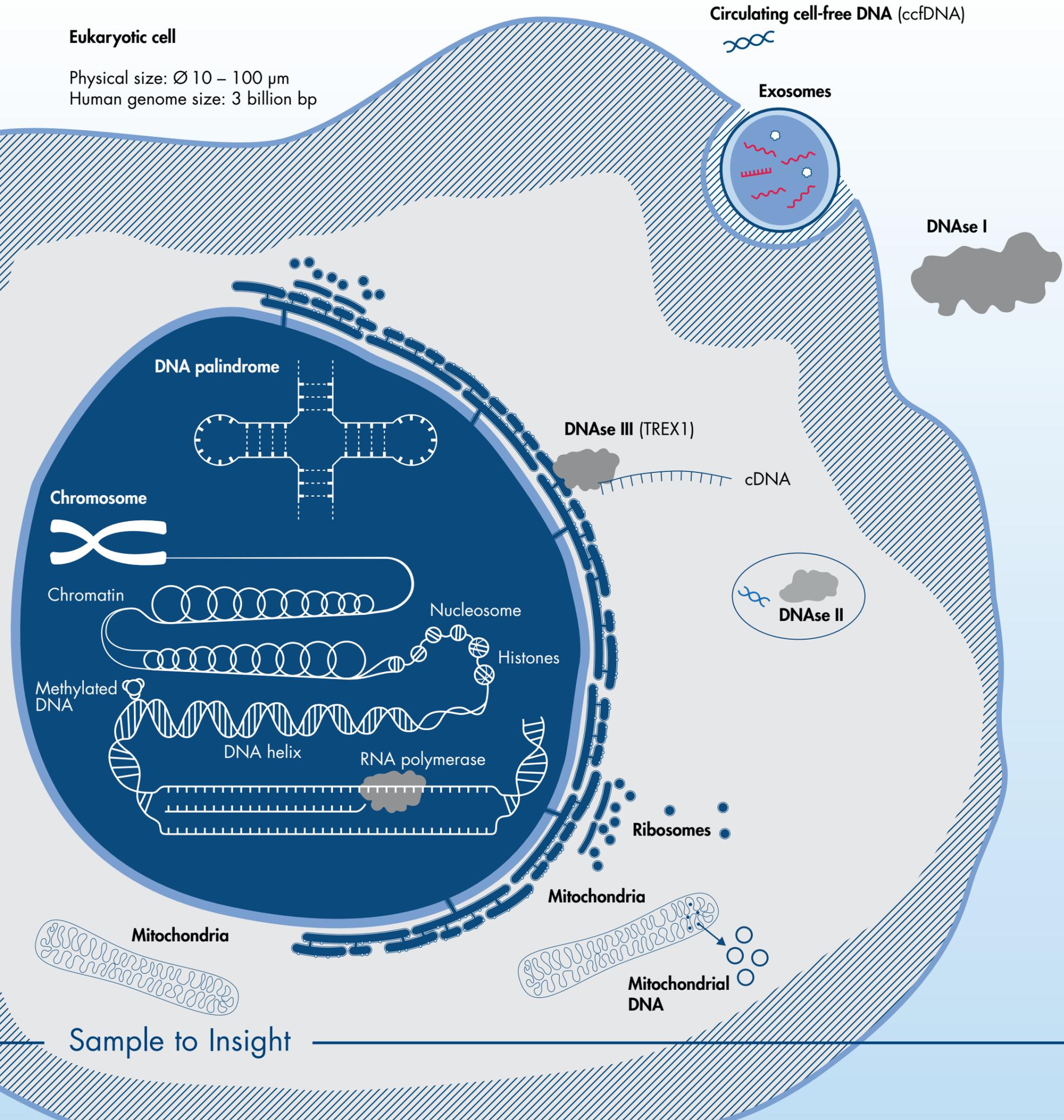
Bacterial cell – *Escherichia coli*

Physical size: 3 x 0.5 µm
Genome size: 4,639 billion bp



Eukaryotic cell

Physical size: Ø 10 – 100 µm
Human genome size: 3 billion bp



Cell type	Structural type	Description
Eukaryotic	Chromosome	Three-dimensional structure of DNA, packed with proteins, in the nucleus of eukaryotic cells, carrying genetic information.
	Chromatin	Complex of DNA and protein found in eukaryotic cells, packaging long DNA molecules into more compact, denser structures.
	Sense and antisense strand	Sense strand, or coding strand, the segment in double-stranded DNA carrying the translatable code in the 5' to 3' direction, complementary to the antisense strand, which does not carry the code in the 5 to 3' direction.
	Methylated DNA	Methylation of cytosine modulates DNA activity, gene regulation.
	DNA palindrome	Symmetric nucleotide sequence, which is equal to its reverse complement. For example ACCTAGGT is palindromic, because its complement is TGGATCCA.
	Mitochondrial DNA	Mt DNA in mitochondria, cellular organelles in eukaryotic cells responsible for cellular energy metabolism, 16,569 base pairs, encoding 13 proteins.
	ccfDNA	Circulating, cell-free DNA released from tumors, donor organs or a fetus into the blood stream, serve as biomarker in 'Liquid Biopsies', 166 basepairs.
Bacterium (<i>E. coli</i>)	Bacterial chromosome	4,639,221–base pair sequence of <i>Escherichia coli</i> K-12
	Plasmid	Small, circular, extrachromosomal DNA molecule in bacteria independent replication, used as vectors in <i>E. coli</i> for production of recombinant DNA and proteins.
Virus (Herpesviridae)	Viral genome	HSV-1 double-stranded, linear DNA genome 74 genes, 152 kbp

Molecular weight conversions for DNA

- MW of a double-stranded DNA molecule (sodium salt) = (number of base pairs) x (662 daltons/base pair)
- MW of a single-stranded DNA molecule (sodium salt) = (number of base pairs) x (331 daltons/base pair)
- MW of a DNA oligonucleotide (sodium salt, pH ≥7): $MW = (NA \times 335.2) + (NC \times 311.2) + (NC \times 351.2) + (NT \times 326.2) + P$

Where NX = the number of residues of the respective nucleotide within the oligonucleotide (the MW listed for each nucleotide is the MW of that nucleotide, with associated sodium, incorporated in the oligonucleotide)

For dephosphorylated oligonucleotides: P = -84.0

For phosphorylated oligonucleotides: P = 40.0

Visit the QIAGEN DNA resource center at www.qiagen.com/DNAresources.



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