

Largest and Smallest Genome in the World

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One of the **largest genomes** belongs to a very small creature, Amoeba dubia. This protozoan genome has 670 billion units of DNA, or base pairs. The genome of a cousin, Amoeba proteus, has a mere 290 billion base pairs, making it 100 times larger than the human genome.

Human genome is 3000.000.000 base pair, if we publish it as a book it needs 1000 books of 1000 pages.

Smallest genome identified is from a Viroid family, Viroids are the *smallest* known pathogenic agents and one of the smallest belongs to the Grapevine yellow speckle viroid with 220 nucleotide and Rice yellow mottle virus satellite with 220 bp then avocado sunblotch viroid (ASBV) linear; genomic RNA with 247 BP size (<https://www.ebi.ac.uk/genomes/viroid.html>)

Genome size

Organism type	Organism	Genome size (base pairs)	Note
Virus	Bacteriophage MS2	3,569 3.5kb	First sequenced RNA-genome
Virus	SV40	5,224 5.2kb	
Virus	Phage Φ-X174	5,386 5.4kb	First sequenced DNA-genome
Virus	HIV	9,749 9.7kb	
Virus	Phage λ	48,502 48kb	Often used as a vector for the cloning of recombinant DNA.
Virus	Megavirus	1,259,197 1.3Mb	Largest known viral genome.
Bacterium	Haemophilus influenzae	1,830,000 1.8Mb	First genome of a living organism sequenced, July 1995
Bacterium	Carsonella ruddii	159,662 160kb	Smallest non-viral genome.

Organism type	Organism	Genome size (base pairs)	Note
Bacterium	Buchnera aphidicola	600,000 600kb	
Bacterium	Wigglesworthia glossinidia	700,000 700Kb	
Bacterium	Escherichia coli	4,600,000 4.6Mb	
Bacterium	Solibacter usitatus (strain Ellin 6076)	9,970,000 10Mb	
Amoeboid	Polychaos dubium ("Amoeba" dubia)	670,000,000,000 670Gb	Largest known genome.
Plant	Arabidopsis thaliana	157,000,000 157Mb	First plant genome sequenced, December 2000.
Plant	Genlisea margaretae	63,400,000 63Mb	Smallest recorded flowering plant genome, 2006.
Plant	Fritillaria assyrica	130,000,000,000 130Gb	
Plant	Populus trichocarpa	480,000,000 480Mb	First tree genome sequenced, September 2006 ^l
Plant	Paris japonica (Japanese-native, pale-petal)	150,000,000,000 150Gb	Largest plant genome known
Moss	Physcomitrella patens	480,000,000 480Mb	First genome of a bryophyte sequenced, January 2008.
Yeast	Saccharomyces cerevisiae	12,100,000 12.1Mb	First eukaryotic genome sequenced, 1996
Fungus	Aspergillus nidulans	30,000,000 30Mb	
Nematode	Caenorhabditis elegans	100,300,000 100Mb	First multicellular animal genome sequenced, December 1998
Nematode	Pratylenchus coffeae	20,000,000 20Mb	Smallest animal genome known
Insect	Drosophila melanogaster (fruit fly)	130,000,000 130Mb	
Insect	Bombyx mori (silk moth)	432,000,000 432Mb	14,623 predicted genes
Insect	Apis mellifera (honey bee)	236,000,000 236Mb	
Insect	Solenopsis invicta (fire ant)	480,000,000 480Mb	
Fish	Tetraodon nigroviridis (type of puffer fish)	385,000,000 390Mb	Smallest vertebrate genome known estimated to be 340 Mb 385 Mb
Mammal	Mus musculus	2,700,000,000 2.7Gb	
Mammal	Homo sapiens	3,200,000,000 3.2Gb	<i>Homo sapiens</i> estimated

Organism type	Organism	Genome size (base pairs)	Note
			genome size 3.2 billion bp
Fish	Protopterus aethiopicus (marbled lungfish)	130,000,000,000 130Gb	Initial sequencing and analysis of the human genome Largest vertebrate genome known

A Sample of Species and Genome Size (in base pairs)

Amoeba dubia
670,000,000,000



Amoeba proteus
290,000,000,000



Bufo bufo
6,900,000,000



Homo sapiens
2,900,000,000



Muntiacus muntjak vaginalis
2,521,500,000



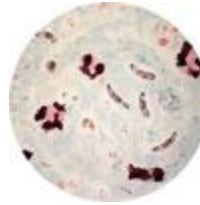
Boa constrictor
2,100,000,000



Rhinolophus ferrumequinum
1,929,400,000



Plasmodium falciparum
25,000,000






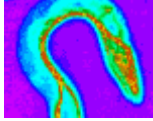
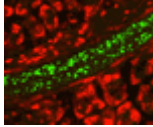

Human immunodeficiency
virus type 1
19,750



Source: [Database of Genome Sizes \(Center for Biological Sequence Analysis\)](#)

Among the organisms whose genomes are sequenced, genome size does not correlate with the number of genes.

Species	Size of genome	Number of genes
Human 	2.9 billion base pairs	30,000
Fruit fly (<i>Drosophila melanogaster</i>) 	120 million base pairs	13,601
Baker's yeast (<i>Saccharomyces cerevisiae</i>) 	12 million base pairs	6,275

<p>Worm (<i>Caenorhabditis elegans</i>)</p> 	<p>97 million base pairs</p>	<p>19,000</p>
<p><i>E. coli</i></p> 	<p>4.1 million base pairs</p>	<p>4,800</p>
<p>Arabidopsis (<i>Arabidopsis thaliana</i>)</p> 	<p>125 million base pairs</p>	<p>25,000</p>