

Quantity of interest	Symbol	Rule of thumb
<i>E. coli</i>		
Cell volume	$V_{E.coli}$	$\approx 1 \mu\text{m}^3$
Cell mass	$m_{E.coli}$	$\approx 1\text{pg}$
Cell cycle	$t_{E.coli}$	$\approx 3000 \text{ sec}$
Cell area	$A_{E.coli}$	$\approx 5 \mu\text{m}^2$
Genome Length	$N_{bp}^{E.coli}$	$\approx 5 \times 10^6 \text{ bp}$
Swimming speed	$v_{E.coli}$	$\approx 20 \mu\text{m}/\text{sec}$
Yeast		
volume of cell	V_{yeast}	$\approx 60\mu\text{m}^3$
Mass of cell	m_{yeast}	$\approx 60 \text{ pg}$
diameter of cell	d_{yeast}	$\approx 5 \mu\text{m}$
Cell cycle time	t_{yeast}	$\approx 200 \text{ min}$
Genome Length	N_{bp}^{yeast}	$\approx 10^7 \text{ bp}$
Organelles		
Diameter of nucleus	$d_{nucleus}$	$\approx 5 \mu\text{m}$
Length of mitochondrion	l_{mito}	$\approx 2 \mu\text{m}$
Diameter of transport vesicles	$d_{vesicle}$	$\approx 50 \text{ nm}$
Water		
Volume of molecule	V_{H_2O}	$\approx 10^{-2} \text{ nm}^3$
Density of water	ρ	$1 \text{ g}/\text{cm}^3$
Viscosity of water	η	$\approx 1 \text{ centipoise } (10^{-2} \text{ g}/\text{cm sec})$
Hydrophobic embedding energy	$\approx E_{hydr}$	$25 \text{ cal}/\text{mol A}^2$
DNA		
Length per base pair	l_{bp}	$\approx 1/3 \text{ nm}$
Volume per base pair	V_{bp}	$\approx 1 \text{ nm}^3$
charge density	λ_{DNA}	$2 \text{ e}/0.34 \text{ nm}$
Persistence length	ξ_P	50 nm
Amino acids and Proteins		
Radius of "Average" Protein	$r_{protein}$	$\approx 2 \text{ nm}$
Volume of "Average" Protein	$V_{protein}$	$\approx 25 \text{ nm}^3$
Mass of "Average" Amino Acid	M_{aa}	$\approx 100 \text{ Da}$
Mass of "Average" Protein	$M_{protein}$	$\approx 30,000 \text{ Da}$
Protein concentration in cytoplasm	$c_{protein}$	$\approx 200 \text{ mg}/\text{ml}$
Characteristic force of protein motor	F_{motor}	$\approx 5 \text{ pN}$
Characteristic speed of protein motor	v_{motor}	$\approx 200 \text{ nm} / \text{sec}$
Diffusion constant of "Average" Protein	$D_{protein}$	$\approx 100 \mu\text{m}^2/\text{sec}$
Lipid Bilayers		
Thickness of lipid bilayer	d	$\approx 5 \text{ nm}$
Area per molecule	A_{lipid}	$\approx \frac{1}{2} \text{ nm}^2$
Mass of lipid molecule	m_{lipid}	$\approx 800 \text{ Da}$