

Cell Biology by the Numbers - Exercise 3

Overall macromolecular composition of an average E. coli

- 1) Read "[Order-of-Magnitude Biology Toolkit](#)" and suggest one value you would like to see added to the list.
- 2) Read "[Key Numbers in Biology](#)", Cell, 2010. Suggest one number you would like to see added to the list. A bonus if you find one that is new to BioNumbers and add it to the website with reference to primary literature.
- 3) Solve the following Cell Sudoku (Cell-duko!). Write as comments any assumptions and calculations you made that you are not sure of:

<i>Macromolecule</i>	<i>Percentage of total dry weight</i>	<i>Weight per cell (fg)</i>	<i>Characteristic molecular weight of one molecule (Da)</i>	<i>Number of molecules per cell</i>	<i>Concentration in the cell</i>
Protein	?	?	?	?	?
RNA (total)	?	60			
- 23S rRNA		32	1×10^6	?	?
- 16S rRNA		16	5×10^5	?	?
- 5S rRNA		1	4×10^4	?	?
- transfer		9	2×10^4	?	?
- messenger		?	1×10^6	?	?
DNA	?	9	3×10^9	?	?
Lipid	?	27	800	?	?
Lipopolysaccharide	?	9	8000	?	?
Peptidoglycan	?	9		1	
Glycogen	?	9	1×10^6	?	?
Metabolites and cofactors pool	3	?			
Inorganic ions	?	3			
Total dry weight	100	?			
Water (70% of cell)		?			
Total wet weight of one cell		1000			

*In balanced growth at 37°C in glucose minimal medium, mass doubling time, g, of 40 minutes.

Based on classic table from Neidhardt et al