

## Numbers in Microbiology

NOTE: see references provided for original citations for each of these numbers.

I. (Moat and Foster “Microbial Physiology”, 3<sup>rd</sup> ed., 1995 pg 11.)

- *E. coli* reproduces once every 40 minutes
- Dry weight of an average cell is  $2.5 \times 10^{-13}$  g
- Total weight of an average cell is  $9.5 \times 10^{-13}$  g

Of dry weight:

- Protein = 55%
- rRNA = 16.7%
- tRNA = 3%
- mRNA = 0.9%
- DNA = 3.1 %
- Lipid = 9.1 %
- Lipopolysaccharide = 3.4%
- Peptidoglycan = 2.5%
- Vitamins = 2.9%
- Inorganic ions = 1.0%
- Total cell volume =  $9 \times 10^{-13}$  mL
- Periplasmic space = 30% of cell volume

II. (Paul and Clark “ Soil Microbiology and Biochemistry”, 2<sup>nd</sup> ed., 1996, pg 50-54)

In *E. coli*:

- 20% of dry weight = RNA
- 3% of dry weight = DNA
- 81% of RNA in prokaryotes is in ribosomes with equal molecular amounts of 23S, 16S, and 5S rRNA
- mean bacterial volume =  $0.196 \mu\text{m}^3$
- bacterial specific gravity = 1.07
- dry matter in cell = 30%
- C in dry cell matter = 44%
- DNA bacterial content per cell =  $4 \times 10^{-15}$  g DNA  
per cell in lab puppies;  $2 \times 10^{-15}$  g per cell in soil organisms

III. (Microbiology for Environmental Engineers, Gaudy & Gaudy, 1980. McGraw Hill, p. 59)

Empirical formula for cells:  $\text{C}_5\text{H}_7\text{NO}_2$