

What makes up a cell – exercises

How many proteins are there per μm^3 ?

- Protein mass per volume: 0.2 g/ml
- Molecular mass of a protein: 30000 g/mol
- Avogadro number: 6×10^{23} 1/mol
- 1 mL = $10^{12} \mu\text{m}^3$

How many proteins are there per cell?

- Cell volumes:
 - E. coli: $1 \mu\text{m}^3$
 - S. cerevisiae: $60 \mu\text{m}^3$
 - Mammalian cell: $3000 \mu\text{m}^3$

What is the buoyant density of a typical bacteria?

	density of component (g/mL)	mass fraction per cell
water	1	0.7
proteins	1.3	0.18
nucleic acids	1.7	0.08
lipids	1	0.03
carbohydrates	1.5	0.01