Biochemical lab #1

Making solutions

Mole

- The mole is the unit of measurement for amount of substance. The mole is defined as the amount of a chemical substance that contains as many atoms or molecules, as there are atoms in 12 grams of carbon-12.
- 1 mole of hydrogen atoms weighs approximately 1 gram, 1 mole of hydrogen gas (H_2) – 2 grams.
- 1 mole of substance contains 6.02×10^{23} molecules of substance (the Avogadro constant)

Molarity of solution.

- *Molarity* (M) is the concentration of a solution expressed as the number of moles of substance per liter of solution.
- 1M solution – 1 mole per liter
- 1mM solution – 0.001 (10^{-3}) mole or 1 millimole per liter
- 1μM solution – 10^{-6} mole or 1 micromole per liter
- 1nM solution – 10^{-9} mole or 1 nanomole per liter

Quantity of substance in different volumes

- In order to determine a quantity of substance in a certain volume of solution one needs to multiply the volume(measured in liters) by the molarity of solution
- 1 milliliter (1 ml, or 0.001 l, or 10^{-3} l) of 1M solution contains 1 millilmole or 10^{-3} mole of dissolved substance.
- 1 liter of 1mM solution also contains 1 millilmole of dissolved substance.

Dilution of concentrated solutions

- Let's assume that we need to make 1 liter of 1mM solution. We have 1M stock solution.
- 1 liter of the final solution should contain 1 millimole of the substance. Therefore, we should take 1 ml of 1M solution and dilute it with 999 ml of water.
- Thus, in order to obtain 1mM solution we are diluting 1M solution 1000 times.