Membrane Technology

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Chapter 1
Introduction to Membrane Technology

Chapter Description

- Aims
  - Understand what is membrane, terminology and membrane types.

- Expected Outcomes
  - Understand membrane in general.

- Other related Information

Subtopics

1.1 Membrane Definition

1.2 Membrane Terminology

1.3 Membrane Selectivity

1.4 Driving Force

1.5 Membrane Types

1.1 Membrane Definition

- Membrane – the original word: “membrana “ (Latin, which mean skin)
- Other definition of membrane:
  - A barrier which prevent mass transport but allows restricted and / or regulated passage of one or more species.

1.2 Membrane Terminology

- Feed - the solution to be separated or processed
- Permeate - the filtrate, the liquid or solid or gas that passing through the membrane
- Retentate - the concentrate, the retained solute

1.2 Membrane Terminology

- Flux – the rate of volume or mass or mole permeate per effective membrane area per time (i.e. L/m2.h)
- Permeability- transport flux per unit transmembrane pressure (i.e. L/m2.h.bar)
- Rejection- percent of solute removal
- Separation Factor- composition ratio of the permeate components (i and j) relative to its composition ratio in the retentate side

1.3 Membrane Selectivity

- The membrane's selectivity affected by:
  - Solute Shape
  - Solute Size
  - Electrostatic charge effect
  - Solute Diffusivity
  - Physicochemical interactions
  - Volatility
  - Polarity/solubility

1.4 Driving Force

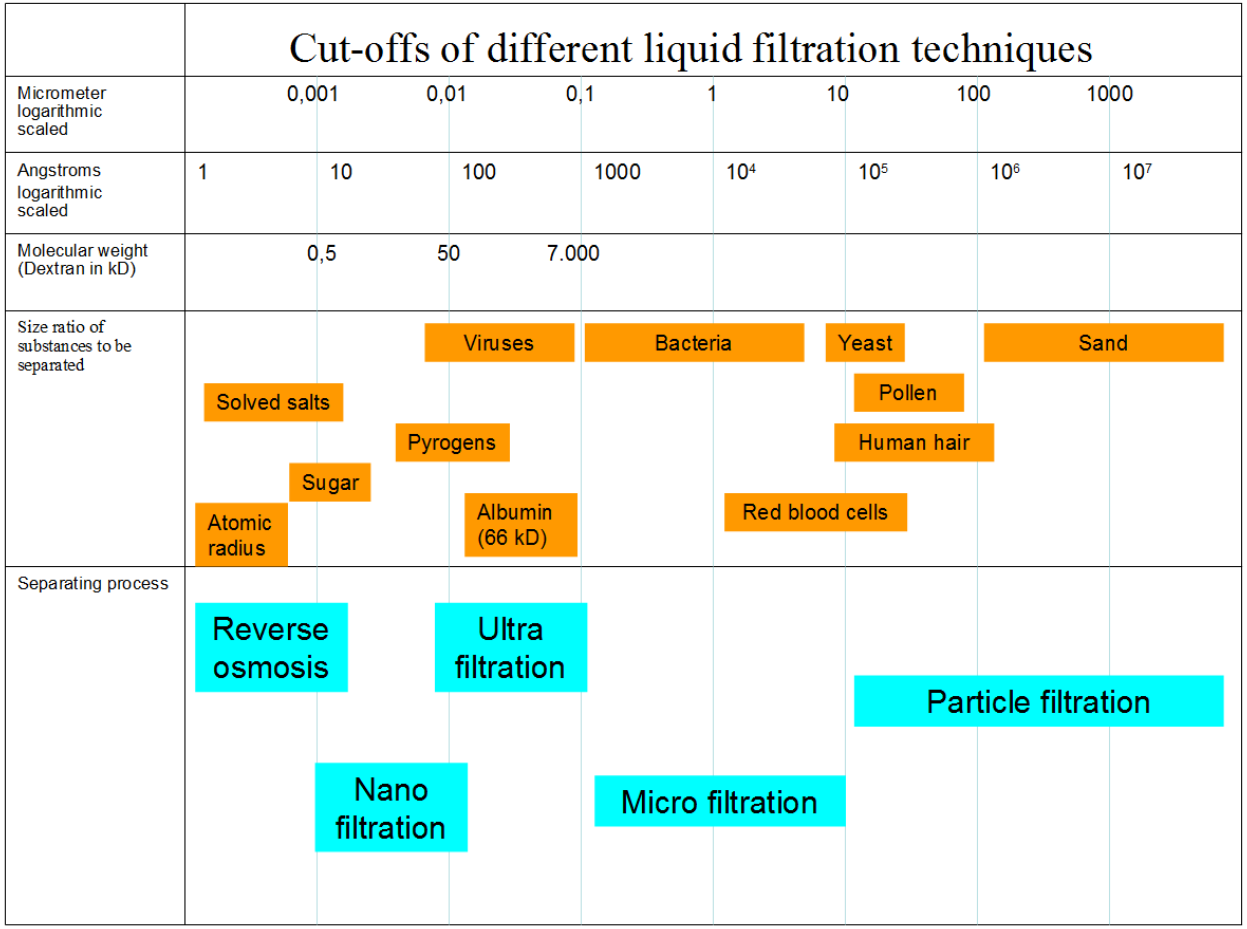
1. Most of the membrane technology is based on Transmembrane pressure (TMP)

2. Concentration gradient- membrane for hemodialysis

3. Other driving forces are including:

- Chemical potential
- Osmotic pressure
- Electric field
- Magnetic field
- Partial pressure
- pH gradient

1.5 Type of Membranes



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By Peter

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