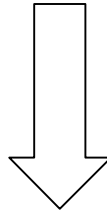


Tonicity is a reflection of serum osmolality

Hyponatraemia (mental confusion)

[Na] \leq 128 mmol/L (136-145) mmol/L



□ Calculated serum osmolality reference range is 275-300 mmol/L.
Or
□ Osmolar gap reference range is 10-15 mmol/L.

Low=hypotonic
(Appropriate \downarrow Na⁺)

Hypovolumic (Na⁺ depletion)

1. Lower GI fluid loss.
 2. Diuretics treatments.
 3. A.R.F. & hypoaldosteronism
 4. Cutaneous; lower intake, skin loss, burn and vomiting.
 5. UNa > 20, FENa > 1%
 6. Renal or pre-renal lost of Na
- **Loss of H₂O plus electrolytes.**

Normovolumic (Excess H₂O)-Euvolemic

1. Inappropriate \uparrow ADH secretion (**SIADH**); excess H₂O retention will block aldosterone function on tubules so \uparrow Na⁺ in urine. **Urine Osmolality > 100**
2. Adrenal insufficiency (Addison's disease with \downarrow cortisol).
3. Thyroid insufficiency (hypothyroidism).
4. A.R.F. or excess water intake.

Hypervolumic (Excess H₂O and Na⁺) or true Hyponatraemia and Water intoxication

1. Oedema (Saline infusion into the tissues).
2. Congestive heart failure. (UNa < 10) & *Chronic renal failure (UNa > 20)*
3. Cirrhosis due to excess alcohol intake. (Hepatic failure). So no albumin is produced. (UNa < 10)
4. Nephrotic syndrome. (Loss of protein with low oncotic pressure or hypoalbuminaemia). (UNa < 10)
5. GI protein loss e.g. in Somalia.

Normal=isotonic
R.R. is 275-295 mmol/L

- Due to pseudohyponatraemia. (Lab artifact)
- E.g. lipaemia/hyperproteinaemia.
- \uparrow lipid or \uparrow total protein.

High=hypertonic
(Due to others)

- Due to presence of:
1. Methanol
 2. Ethanol
 3. Mannitol
 4. Lactic acid
 5. Glucose
 6. Glycine
- Due to presence of osmotically active solutes.