1. **BASE EXCESS (BE) = MEASURE OF METABOLIC ACID-BASE STATUS**

- **BE** = amount of strong univalent acid (HCl) or base (NaOH) required to titrate 1 L of blood back to pH 7.40, 1 mmol/L = 1 meq/L.
- No metabolic base-excess changes are expected with acute respiratory changes. Normal value = -3 to +3 mmol/L.
- More negative values = metabolic acidosis and More positive values = metabolic alkalosis.
- Corrected = approximately 0.4 mmol/L for every 1mmHg chronic change in carbon dioxide partial pressure (1mmHg = 0.13kPa).

2. **KEY METABOLIC FACTOR = PLASMA STRONG-ION DIFFERENCE**

- **SID** is the sum of (sodium, potassium, calcium, and magnesium) minus (chloride and lactate).
- A reduced SID suggests a lower bicarbonate level and the presence of an acidosis.
- If the SID is increased = increased bicarbonate level = alkalosis
- **SODIUM, CHLORIDE & LACTATE** are the most important in SID.

3. **WEAK ACIDS ARE ALSO IMPORTANT FOR METABOLIC ACID-BASE CHANGES**

- Albumin (mostly) and Phosphate. Albumin in plasma has an overall negative charge.
- Weak acids are partly dissociated acids & not strong ions.
- The SID does not influence the total weak acid concentration.
- The total weak acid concentration does not influence the SID.

4. **CHANGE IN B.E. = CHANGES IN SID AND THE AMOUNT OF WEAK ACID**

5. **ALBUMIN IS THE PRINCIPAL WEAK ACID**

6. **THE DIFFERENCE BETWEEN Na+ AND Cl- ION CONC = PREDOMINANT SID**

7. **LACTATE = THE OTHER CLINICALLY IMPORTANT PLASMA STRONG ION**

8. **CONSIDER OTHER CHANGES IN STRONG IONS AND WEAK ACIDS**

**OTHER IONS (OI)** = potassium, calcium, and magnesium.
**OTHER (UNMEASURED) IONS** = proteins, lithium, or aluminum.

**BASE-EXCESS = [Na - Cl - 35] + [1 - lactate] + [0.25 × (42 - albumin)] + OI.**

**SUMMARY**

- **Base-excess** = Na-Cl effect + lactate effect + albumin effect + OI effect.