



# Newsletter

## Al Borg Medical Laboratories 3<sup>rd</sup> Newsletter

### OSMOLALITY at a glance

Osmolality of body fluid is a measure of its solute/water ratio. The osmolality of serum, urine, or other body fluids depends on the number of osmotically active ions and molecules dissolved in a kilogram of body water. Sodium, potassium, chloride, bicarbonate, glucose and urea are the osmotically important body fluid solutes. The osmolality of a body fluid increases as the ratio of solute to water molecules increases.

Water balance in the body is a dynamic process that is regulated by controlling the amount of water excreted in the urine and by increasing or decreasing water drinking by regulating "thirst. Osmoreceptors perceive and react to increases and decreases in the amount of water and particles in the bloodstream. When blood osmolality increases, indicating either a decrease in the amount of water in the blood or an increase in the number of particles, the hypothalamus secretes antidiuretic hormone (ADH), the kidneys will conserve water. This results in a more concentrated urine with a higher urine osmolality and a more dilute blood with lower osmolality. As blood osmolality decreases, ADH secretion is suppressed, the kidneys excrete increased amounts of dilute urine, the amount of water in the body decreases, and blood osmolality returns to normal.

Osmolality is expressed as "so many" milliosmoles per kilogram of water (mOsm/kg water).

**Serum osmolality:** Osmolality be measured by an osmometer. It can also be calculated by adding the values of its constituent solutes.

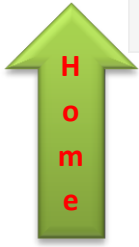
**Osmolal gap** is the difference between the calculated value and measured value

**Urine osmolality:** is a more accurate measurement of urine concentration than specific gravity. In addition urine osmolality can be compared with the serum osmolality to obtain a more accurate picture of a patient's fluid homeostasis.

Patients may get tested for osmolality to evaluate the body's water and electrolyte balance; to investigate hyponatremia and increased or decreased urine production; to detect the ingestion of toxins such as methanol; to monitor the effectiveness of treatment for conditions affecting osmolality.

**Serum osmolality may be increased with:**

- Dehydration
- Diabetes mellitus





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- Hyperglycemia
- Hypernatremia
- Ingestion of ethanol, methanol, or ethylene glycol
- Kidney damage
- Mannitol therapy
- Shock

## Serum osmolality may be decreased with:

- excess hydration
- hyponatremia
- inappropriate ADH secretion

## Urine osmolality may be increased with:

- congestive heart failure
- hypernatremia
- inappropriate ADH secretion
- liver damage
- shock

## Urine osmolality may be decreased with:

- Diabetes insipidus
- Excess fluid intake
- Hypercalcemia
- Hypokalemia



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- Kidney tubular damage

## Osmolality measurement at Alborg laboratories

Al Borg laboratory uses the OSMOMAT 030, which is the standard system for the determination of the total osmolality in aqueous solutions.

This system is very reliable and provides extremely rapid sample handling.

## Osmolality, Urine : 297

**Methodology:** Freezing Point

**Performed:** Daily

**Reported:** Within 24 hours

Collect: Random urine.

Specimen Preparation: 1 mL aliquot from a well-mixed random urine (Min: 0.5 mL)

Unacceptable Conditions: Urine collected with preservatives.

**Specimen Required:** Stability (collection to initiation of testing): Ambient: 24 hours; Refrigerated: 1 week; Frozen: 6 months

### Reference Interval:

0-30 days: 50-645 mOsm/kg

1 month-16 years: 50-1500 mOsm/kg

17 years and older: 50-800 mOsm/kg



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## Osmolality, Serum or Plasma : 284

**Methodology:** Freezing Point

**Performed:** Daily

**Reported:** Within 24 hours

Collect: Serum separator tube or plasma separator tube.

Specimen Preparation: Separate serum or plasma from cells within 2 hours of collection. 0.5 mL serum or plasma (Min: 0.5 mL)

**Specimen Required:** Stability (collection to initiation of testing): After separation from cells: Ambient: 24 hours; Refrigerated: 1 week; Frozen: 6 months

**Reference Interval:**

0-16 years: 271-296 mOsm/kg

17 years and older: 280-303 mOsm/kg