ONKOMETER BMT 923

BMT proudly announces the new
ONKOMETER BMT 923
for the next decade of oncometry

Featuring:

- Automatic electronic zeroing by the built-in microprocessor (or manual on demand)
- PUMP - simple semiautomatic emptying and flushing of the sample chamber with built-in electric vaccum pump
- Automatic display hold when steady state has been reached, indicated by a beep tone and flashing lamp - no false peak hold
- Very simple installation of the semipermeable membrane
- Sturdy membrane, service life over one month
- Stable pressure transducer, no user-calibration with uncertain “standard protein solutions” necessary
- No knobs and calibration potentiometers, one pushbutton operation
- Permanently ready for measurement, standby power consumption less than 1 VA
- 12 V operation, no electric hazards

Colloid Osmotic Pressure

The colloid osmotic pressure (COP) is a special case of osmosis. COP appears at semipermeable membranes which are well permeable for water and substances with molecular weights up to several thousands, but are impermeable for colloids, e.g. plasma proteins.
Wilhelm PFEFFER first described osmotic phenomena in plant cells (1877). He measured them with the first osmometer. Jacobus Hendricus VAN'T HOFF described them theoretically (1887). Ernest H. STARLING, the great physiologist, discovered the phenomenon of colloid osmotic pressure and its important role in balancing the capillary transmural fluid exchange (1896). It was Starling who built the first colloid osmometer with a peritoneal membrane, and he used it for the first direct measurement of colloid osmotic pressure in canine serum. Measurement then took three to four days.
COP is indeed the “antagonist” of the intra-capillary hydrostatic pressure, both being equally important for the interstitial fluid balance. But until recently, COP could not be measured in clinical diagnosis because there were no colloid osmometers available, simple and sturdy enough for the routine.
The new ONKOMETER BMT 923 is unsurpassed in simplicity of both measurement and maintenance. Measurement takes less than two minutes, and the device automatically holds the right steady state value of the displayed COP.
The ONKOMETER BMT 923 is sturdy and simple for use in the clinical practice.

Clinical Significance of COP

COP of capillary blood has to be judged in reference to the hydrostatic blood pressure in these capillaries and in the neighbouring venoles, to the hydrostatic pressure in the surrounding interstitial spaces, and to the COP of the interstitial fluid. Both of the latter can hardly be measured.
Nevertheless the knowledge of blood COP, and its trend, gives indications of high clinical significance, e.g.

- how to get aware of pulmonary edema in statu nascendi
- when to start IV infusion of plasma protein solutions
- when to stop it
- when protein infusion is contraindicated
- what happens with high molecular IV solutions after infusion
- how to avoid superfluous infusion of protein solutions
- how to monitor COP in extracorporeal circulation with the heart lung machine
- how to manage colloid balance in peritoneal dialysis
- how to anticipate EPH gestoses and pre-eclampsia in gynecology
- how to anticipate cerebral edema in neuro-surgery

COP is correlated statistically with plasma protein concentration, physiologically and even in intensive care patients. But this correlation needs not necessarily be valid for the individual patient. Correlation may fail totally for the critically ill, e.g. for burn victims. When COP is normal, IV infusion of protein solutions may be the wrong therapy, even if the patient's plasma protein concentration is low. This is true especially when COP cannot be improved by infusion of protein solutions.
In intensive care medicine, albumen therapy should always be accompanied by COP measurement of the patient's blood.
Avoiding superfluous IV infusion of expensive plasma protein solutions, however, can redeem purchase of a colloid osmometer within a short time.
Since routine measurement of COP has become available only recently, it is a true paradox that a basic physiologic parameter can still be investigated by pioneers. The ONKOMETER BMT 923 is the right tool for them.

How to Use the ONKOMETER BMT 923

- You need not wait for warm-up
- Display will be 00.0
- Press PUMP to remove saline from sample chamber
- Fill in the first amount of sample: approx. 100 µl of heparinised plasma or serum (or heparinised whole blood which, however, will need much more time for measurement)
- After about 15 seconds press PUMP again to remove the first amount of sample (do not flush!)
- Fill in second amount of the same sample (approx. 100 µl)
- After about 30 seconds the display will have reached steady state value and automatically will be switched to hold, indicated by a beeping tone and a flashing lamp
- Flush chamber with the small hand-operated saline pump, and the electric vacuum pump built into the ONKOMETER BMT 923

Technical Data

measuring range	99.9 mmHg
semipermeable membrane	cellulose triacetate, cut-off 20 000 dalton (others on request)
sample volume	typical 2 x 200 microlitres (min. 2 x 100)
measuring time	1 - 2 minutes
error of displayed pressure	± 0.2 mm Hg
zeroing of pressure display	automatic, or semiautomatic on demand
flushing of sample chamber	hand-operated saline pump, and built-in electric vacuum pump
storage of measured value	when plateau has been reached
power	12 VAC, from wallmount power supply 230VAC/25VA (others on request)
dimensions (W x H x D)	14 x 9 x 25 cm
weight	1 kg (plus power supply 0.4 kg)