



**NON-INVASIVE  
& CONTINUOUS  
CEREBRAL  
HEMODYNAMIC  
MONITORING**

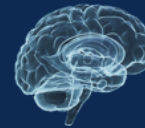
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**Mespere LifeSciences** is a high tech medical company located in Waterloo, Ontario, Canada. Mespere is devoted to developing non-invasive solutions to reduce invasive clinical procedures. The company has successfully developed a number of breakthrough products in the field of cardiac and cerebral hemodynamic monitoring such as, the world's first non-invasive and continuous central venous pressure (VENUS 2000 CVP), jugular venous oximetry (VO 100), and cerebral oximetry with blood volume (NeurOs Cerebral Oximetry) monitoring systems. Currently, these measurements can only be obtained through highly invasive catheters. Other products that Mespere has developed include cardiac output, stroke volume, cerebral perfusion, muscle oxygenation, brain imaging etc.

Mespere's products have significant advantages over the traditional invasive methods in that they are; non-invasive, infection free, easy to use, lower cost etc. Mespere LifeSciences products have a wide range of clinical applications in hospital and at-home settings. The products can be applied to patients with chronic diseases such as congestive heart failure and early stage renal failure to help improve the quality of life and reduce the cost of medical care.

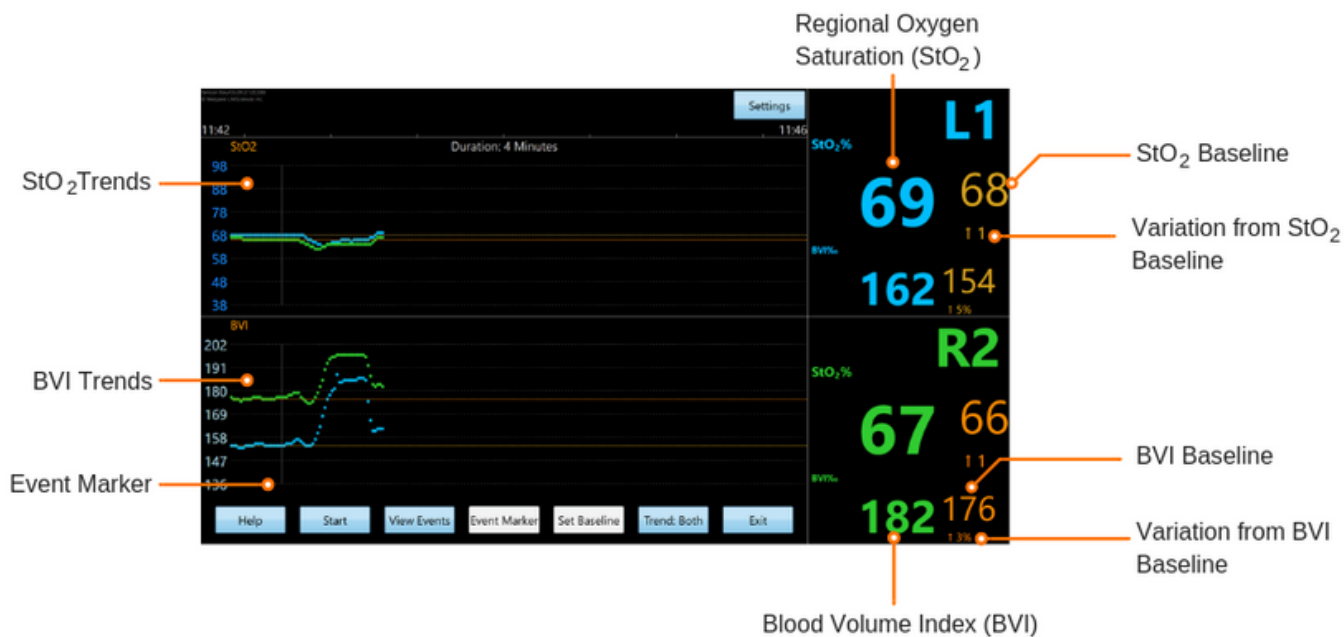
Mespere is ISO 13485 certified, with more than 30 US and international patents. The products have obtained CE mark, FDA, and Health Canada approval. The company is at the early stage of market development and has established distribution and clinical partnerships in over 20 countries. Mespere's key team consists of entrepreneurs with successful track records, world renowned doctors and research scientists.



## The Most Accurate, Cost Effective, and User Friendly Cerebral Tissue Oximetry System

- High absolute trending accuracy  $\pm 1.5\%$  of tissue oxygenation
- New Blood Volume Index for monitoring tissue vascular filling
- Reusable sensors with the best signal quality at a fraction of the cost compared to the existing one time use sensors
- Operates on either tablet, laptop, computer, or any third-party monitors of the customers choice

### NeurOs Display



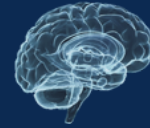
### NeurOs Sensor

Reusable Sensor



Single-Use Adhesive





## Clinical Validation of Mespere Neuros against Invasive Blood Sample Analysis By Co-Oximeter

### Methods

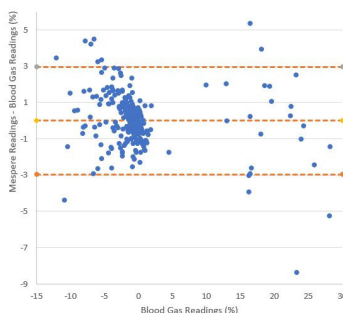
A peripheral IV was placed in the patient's hand or arm vein. An ultrasound-guided small diameter catheter was then inserted in the right upper internal jugular vein. A radial arterial line was inserted into a radial artery on the left arm. Two standard pulse oximeters were attached to the patient's fingers to help guide the hypoxia state plateau levels. The Mespere Cerebral Oximetry sensor was placed on the forehead. Blood gas analysis to determine oxyhemoglobin saturation was performed using a Co-Oximeter. Each subject had control data taken at the beginning of each experiment, with two control blood samples drawn while breathing room air. Hypoxia was induced to different levels of oxyhemoglobin saturation (between 70-100% SpO<sub>2</sub>) by having subjects breathe mixtures of nitrogen, room air, and carbon dioxide. Once a steady state level of hypoxia is achieved, a 1.0ml sample of blood are obtained simultaneously from the jugular line and radial arterial line. A second blood pair of samples, at the same steady-state saturation, is taken 30 seconds later. The VO200 - Neuros Cerebral Oximetry samples were recorded simultaneously to the blood samples. The blood samples were immediately analyzed by the Co-Oximeter. Up to 27 paired samples were obtained on the plateaus across this span for each subject.

### Results

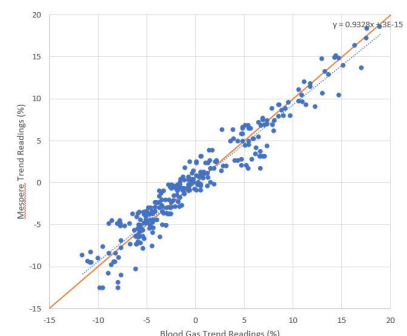
A total of 284 paired venous and arterial blood sample readings, and 284 Mespere VO 200- Neuros Cerebral Oximetry System readings were used to perform the comparison and statistical analysis.

The calculated statistical results from the study are as follows:

Absolute Trending Accuracy	$\pm 1.5\%$
Pearson Coefficient	0.973

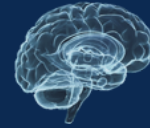


Bland-Altman



Pearson Coefficient





## Mespere Vision

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The adoption for the use of cerebral oximetry is increasing worldwide. However, the cost barrier is restricting and preventing the advancement in use with different clinical applications. Making it more cost effective allows for increased use by hospitals and clinics, and provides access to be used in other settings/applications.

## Clinical Applications

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### **Cerebral and Tissue Hypoxia**

- NeurO Monitoring with Tissue Oxygenation & Blood Flow to maintain healthy cerebral perfusion to prevent cerebral ischemia and other risks associated with cerebral desaturation at a low cost
- OR, ICU, and Rehabilitation



### **Cardiac Surgery - coronary artery bypass surgery and deep hypothermic circulatory arrest**

- Patients undergoing cardiac surgery are at a high risk for adverse perioperative neurological events. Cerebral oximetry monitoring can be used to reduce the chances of these events
- OR, ICU, and Rehabilitation



### **Vascular Surgery - carotid endarterectomy and hyperperfusion syndrome**

- Adequately detect cerebral blood flow during carotid endarterectomy surgery to reduce the chances of severe changes in blood flow which could lead to neurological damage.
- OR, ICU, and Rehabilitation



### **Beach Chair Position Surgery - orthopedic shoulder surgery**

- The sitting upright or 'beachchair' position is commonly used for shoulder arthroscopic surgery. There is concern that anaesthetised patients placed in this posture are at risk of reduced cerebral blood flow (CBF).
- OR, ICU, and Rehabilitation