IMPLANTABLE DEVICE FOR HEMOLYSIS OPTICAL DETECTION

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Invention

Implantable device for the hemolysis early diagnosis of heart aid implanted patients (VAD, Ventricular Assistive Device). The absorbance parameter variation is measured through a sensorized system and related to the percentage of red blood cells breach in the plasma.

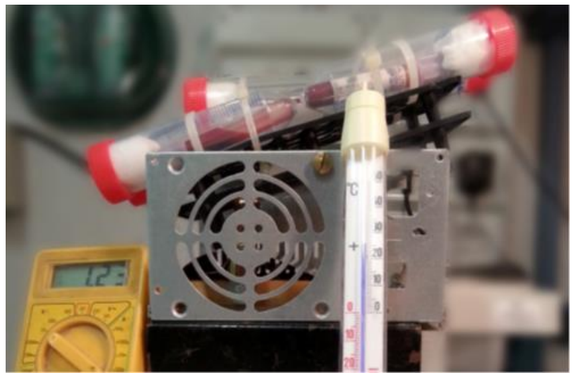
The system is made of a mechanical structure and a microfiltration system at the end of the VAD, allowing the separation of erithrocytes from the other blood components. The cross-flow filtration has the flat adequate porosity membrane positioned in parallel to the blood flux. After filtration, the plasm, having an hemoglobin directly related to the sample hemolysis amount, is collected in a chamber to make the optical analysis. The system is composed by an electronic module with a Led emitting in the maximum absorbing range of the hemoglobin (500-600nm) and a photodetector outside of the chamber. Such optoelectronic components are connected to a power supply circuit and the signal imple close to the catheter. detection-characterization, that can be inserted a bit far from the optical analysis chamber, so that the structure is more s

The advantages of the invention are:

- Minimally invasive in-vivo monitoring;
- Reduced disturbance of the blood characteristics and blood flux;
- Use of optical principle and a low number of electronic components;
- Real-time hemolysis detection;
- Reduced risks for late diagnosis of the patient

Drawings & pictures

Erythrocyte breach



Customized blood mixing tool

Industrial applications

- Miniaturized and integrated device inside VAD and/or further sensorization in heart pumps;
- Monitoring of many biomechatronic in vivo systems (extra blood circulation devices, dialysis devices …);
- Point-of-care, in vitro analysis of blood samples

Possible developments

In the phase of increasing the TRL and strengthening of potential industrial collaborations to lead to industrial development and proceed with parallel validation.

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