

Construction of a test stand for thermal measurements of a transcutaneous inductive energy transmission path for cardiac support systems

Contactless inductive energy transmission in medical technology is not only used for auditory or visual implants, but also has great potential for systems with higher power requirements, such as heart pumps in the range of 5 to 20 W. As the use of batteries is not possible here, these implants are currently supplied with energy via a driveline through the abdominal wall. The use of transcutaneous energy transmission could reduce the risk of infection for patients here and improve their quality of life.

The energy supply for a fully implantable heart assist device must be designed to be robust and efficient. Among other things, it is important not to exceed guide values with regard to power losses and the resulting increase in temperature. On the one hand, losses can be investigated simulatively, and on the other hand, measurement data should be used for comparison. However, this data acquisition is a challenge due to the planned use on the human body. Measurements can't be done at the place of use and a similar environment must be found as a substitute.

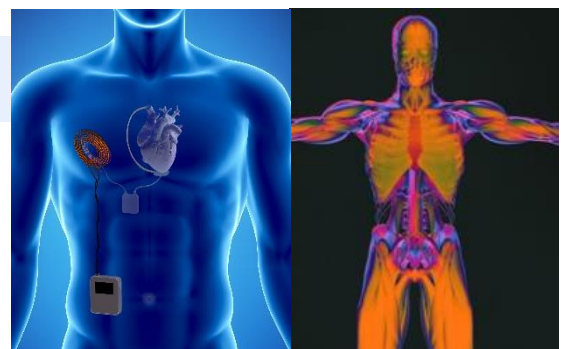
For this reason, an in-vitro model is to be set up in the lab as part of this work, which reproduces the thermal behavior of the human body for transcutaneous energy transfer as well as possible. After a thorough literature research on the subject, various options should be compared with and a selection is to be made on the basis of several decision criteria. A test setup should then be designed and constructed. Measurements with an inductive energy transfer system should be made.

Student-profile:

- Independence, own-initiative and creativity
- Previous knowledge in the field of thermodynamics
- Previous knowledge in the field of human biology desirable
- Interest in and enjoyment of practical work
- Careful way of working and sensitivity

Aufgabe und Zeitplan:

- Familiarization with possibilities for practical models with similarity to the human body
- Analytical description of the relevant thermal processes in the human body
- Selection of suitable materials and design of a test stand for the application
- Construction of the test stand and thermal measurement of an exemplary inductive energy transfer system



<https://medexi.de/Thermoregulation>