Intelligent blood bags

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Blood bags that are not needed during an operation can only be reused if the cold chain has been maintained. In the future, a radio node attached to the blood bag will constantly monitor the temperature. (© Universitätsklinikum Erlangen)

(PhysOrg.com) -- Have the blood supplies got too warm? Do they match the patient?s blood group? In the future, these kinds of questions will be answered by intelligent radio nodes attached to blood bags. These radio units will also greatly facilitate device management in hospitals.

In difficult operations, patients sometimes lose a lot of **blood**. Surgeons therefore keep blood supplies on hand for emergencies. If the blood bags are not needed, they can only be reused if the cold chain has been maintained. Up to now, monitoring this chain has been a tricky process, but, in the future, a radio node attached to the blood bag will constantly monitor the temperature to ensure that most of these blood supplies can be reused.

The radio nodes should also help to improve safety. For example, using the wrong blood by mistake during a blood transfusion could have fatal consequences for the patient. Radio nodes attached to the blood bags and to a patient wristband can exchange information. If the donor blood does not match that of the patient, a warning signal sounds and a red light illuminates.

The intelligent radio nodes were developed by researchers at the Fraunhofer Institute for Integrated Circuits IIS and the Fraunhofer Working Group SCS in collaboration with their partners T-Systems, Vierling, delta T and the University of Erlangen-Nuremberg. The project is funded by the German federal ministry of economics and technology (BMWi).

"In contrast to tags that use RFID - radio frequency identification - we do not expect intelligent radio nodes to interfere with hospital medical devices," explains Jürgen Hupp, head of communication networks department at IIS. "While the transmit power required for RFID tag reading can be as much as two watts, radio nodes only transmit in the milliwatt range." This is because RFID tags only consist of a memory chip and antenna. To read an RFID tag, it must first be activated by the reader. In contrast, an intelligent radio node is an active radio system that is battery-powered and has its own processing unit. Radio nodes can continuously gather information and trigger actions.

The system is built upon a basic platform which the researchers can tailor to different applications. One example involves using radio nodes to optimize the management of medical devices in hospitals. Devices such as syringe pumps and cardiac monitors often move between departments and can be hard to track down when they are needed. This problem could soon be a thing of the past, since attaching radio nodes to the devices enables them to report their position automatically. "Hospitals can get by with fewer devices, eliminate unnecessary time-

wasting and cut costs," states Dr. Alexander Pflaum, department head at SCS. A six-month test phase is set to begin at Erlangen University Hospital in January 2010, and the Opal Health system could be ready for use in around two years.

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