Improving implanted glucose sensor performance -Designing the next generation of sensors

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Glucose sensors, which use an enzyme (glucose oxidase) to achieve specificity, are currently not stable or sensitive enough to meet the demands of a closed-loop delivery system. As a result, the application of glucose biosensors has been primarily limited to home glucose test meter, a few implantable sensors, and bench-top blood-gas instruments containing sensors for glucose. There are a number of reasons for this lack of commercial and technical progress. Technically, many proposed biosensors for glucose simply do not have the accuracy and stability (operational or storage) to meet the desired need. Inaccuracy and imprecision in sensor performance are frequently due to inactivation of the sensing by species present in the sensing environment. For implantable glucose sensors to be successful, the issues of reproducibility and instability must be addressed. This presentation will explore reasons behind sensor instability in vivo and potential methods to maximize sensor stability and performance, including sensor redundancy.