

The Challenge of Injectable Biomedical Sensors

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Technical Abstract:

Ever since the first artificial pacemaker was implanted in a patient approximately 50 years ago, active implantable medical devices have gotten smaller and a dizzying number of functions and features have been added. The improvements in these therapy-providing devices were made possible by the significant advancements in electronics and power sources. More recently, there have been numerous reports of implanted biomedical sensors that monitor the health of the patient in order to diagnose medical conditions or prevent catastrophic events. Although these devices have attractive features, their size generally requires a surgical procedure which is not acceptable to many potential patients. One solution that has been proposed by many investigators is to integrate the necessary functionality into a sensor package that can be injected under the skin using a tool similar to a hypodermic needle. How feasible are these Grain-of-Rice sensors? What functions will they be able to perform? This presentation will address a number of the capabilities and limitations of implanted sensors, power sources, communication, and packaging technologies.