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Multiple frequency MR implantable coil system for *in vivo* studies of bioartificial pancreas at 11.1 T N.A. VOLLAND, Dept. of Biomed Eng., C.A. TAYLOR, Dept. of Elect Eng., T.H. MARECI, Depts. of Biochem & Mol-Biol, and Physics, I. CONSTANTINIDIS, Div of Endocrinology, Dept of Medicine, National High Magnetic Field Laboratory, U Florida, Gainesville — Bioartificial pancreatic macroconstructs may deliver insulin secreting cells for blood glucose regulation. Non-invasively monitoring *in vivo* is key to understanding its function and efficacy. Initial NMR imaging & spectroscopy showed great promise with surface coils at 4.7 T. Sensitivity limitations restrict measurements so we developed an inductively-coupled multiple-frequency coil system for 11.1 T. This system contains an implantable loop-gap resonator, inductively coupled to an external coil, resonating at 471 MHz for ^{1}H and optimized for ^{31}P at 191 MHz. This system has a sensitivity gain of $\sim$5.2 ($\pm$2.3) over a surface coil. Images were acquired for both frequencies. Ongoing work focuses on: 1) a receive-only coil system, 2) adding a third resonance (443 MHz for ^{19}F), and 3) developing coating material and embedding the implantable coil in the macroconstruct. This system will be characterized in vitro prior to its use in vivo.

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