Implantable Antennas

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Technology description

Invention Summary

The proposed technology seeks to fundamentally change the design of implantable antennas by tattooing (nearly invisible) conductive nanoparticles in the skin and adjacent fat layer at the body surface. This will allow the antenna to use as much surface area as needed, and dramatically reduce the transmission lost in the body tissues. This is particularly important for next-generation wireless devices, which anticipate much smaller battery packs on which today' s antennas cannot readily be deployed.

Figure 1: Tattoo Antenna for a medical implant.The battery pack mounted in the chest cavity holds the feed system, which transmits signals to the tattooed feed pickup in the skin/fat. This feed then drives the tattoo antenna, which is made up of conductive (eg. gold) nanoparticles tattooed under the skin. The fat, which is a relatively good insulator, reduces the short circuiting effect that the antenna would normally experience in body tissues/fluids. The muscle, which is a moderate conductor, provides a reasonable ground plane for the antenna. The antenna is now on/near the surface of the body, thus reducing the body transmission loss normally seen with conventional implantable antennas. (There is still loss at the feed, but it is small compared to the whole antenna.) And the antenna size is no longer constrained by the battery pack size/shape/location.

Value Proposition

The external or near external antenna will radiate better than a strictly internal antenna where much of the power is absorbed in the body. This improves the electrical efficiency of the system and also potentially the medical safety/desirability of the device.

This technology represents an improvement over existing technology for the following reasons:

1)It reduces the amount of RF signal lost in the body, thus providing greater communication range.

2)It reduces the power used by the implanted device, increasing battery life.

3)Enables communication with (much smaller) next generation medical implants.

Market Opportunity

US demand for implantable medical devices will increase 7.7 percent annually to $52 billion in 2015.

The global market for cardiac pacemakers is forecasted to reach the market value of $5.1 billion at the compounded annual growth rate of 11% during the period 2012-2018.

TechNavio's analysts forecast the Global Cochlear Implants market to grow at a CAGR of 13.6 percent over the period 2011-2015.

Institution

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