EXTRACTING ELECTRIC POWER FROM HUMAN BODY FOR SUPPLYING NEURAL RECORDING SYSTEM

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Abstract - A powerful approach to the characterization of cellular electrical activity is electrical recording from cells or living tissues. The human central and / or peripheral nervous system has been a subject of study and fascination of the neuroscience and biomedical engineering communities for many decades. In this paper, we propose a new approach to feed implantable neural recording system, which based on extracting electrical power from human tissue warmth in order to supply a biomedical neural recording system. The major issue to overcome, in the design of a system that is aimed at being implant into the human body, is having a low power consumption, low noise circuit and small dimension to minimize tissue damage.

Index terms*:* Neural recording system, thermoelectric power generation, low power, neural amplifier.

I. INTRODUCTION

One of the crucial aspects is supplying energy to the implantable neural recording system. There are three different approaches; the first one is total implantable battery [1] [2], the second one is percutaneous transfer, the third one is transcutaneous transfer [3].

Batteries, in the first approach, are not the optimal choice for implantable devices, because their lifetime is limited, and they are usually large and leaks can pose a hazard to tissues. This would require periodically replacing the battery and require additional surgeries, and is not a viable solution. The second approach, has the disadvantage that wires cause a permanent breach of the skin's natural barrier to infection. Bacterial infection is therefore a common complication of such implants. For most of these long-term implantable devices, an external transcutaneous wireless