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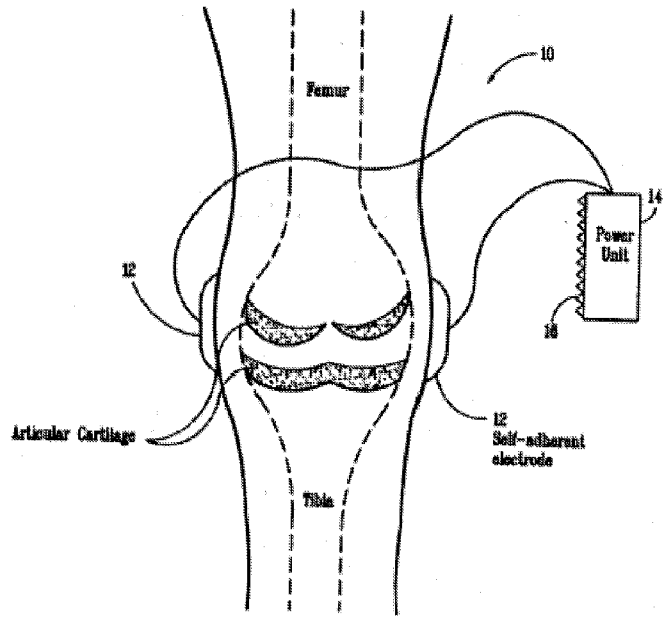
(54) Title: REGULATION OF FIBROBLASTIC GROWTH FACTOR-2 (FGF-2) GENE EXPRESSION IN LIVING CELLS WITH THE APPLICATION OF SPECIFIC AND SELECTIVE ELECTRIC AN ELECTROMAGNETIC FIELDS



(57) Abstract: Methods and devices are described for the regulation of Fibroblastic Growth Factor-2 mRNA and/or FGF-2 protein in bone cells and other tissues via capacitive coupling or inductive coupling of specific and selective electric and/or electromagnetic fields to the bone cells or other tissues, where the specific and selective fields are generated by application of -specific and selective signals to electrodes or one or more coils or other field generating device disposed with respect to the bone cells or other tissues so as to facilitate the treatment of diseased or injured bone and other tissues. By gene expression is meant the up-regulation or down-regulation of the process whereby specific portions (genes) of the human genome (DNA) are transcribed into mRNA and subsequently translated into protein. Methods and devices are provided for the targeted treatment of injured or diseased bone and other tissue that include generating specific and selective signals that generate electric and/or electromagnetic fields in the target tissue optimized for increase of FGF-2 protein gene expression and exposing bone and other tissue to the fields generated by specific and selective signals so as to regulate FGF-2 protein gene expression in such tissue. The resulting methods and devices are useful for the targeted treatment of osteoporosis, osteopenia, osteonecrosis, fresh bone fractures, fractures at risk, nonunion, bone defects, spine fusion, and/or other conditions in which FGF-2 protein has been implicated.

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