

ABSTRACT

The present disclosure relates to electrodes for tissue electrical stimulation and methods of tissue electrical stimulation and administration of substances to such tissue using the electrode. In particular, it shows an electrode comprising: a first conductive plate; and a second conductive plate surrounding the first conductive plate; where the first conductive plate and the second conductive plate are separated from each other.

A method to induce an electric current with a tissue electrical stimulation electrode, in which an activation signal is applied to a first conductive plate of the electrode to generate an electric field inducing a current in the tissue and applying an electric potential to a second conductive plate of the electrode to obtain an electric potential differential with respect to the first conductive plate; wherein the electric potential of the second conductive plate forces the current induced by the first conductive material plate to penetrate the surface of the tissue in contact with the conductive plates and prevents the induced current from flowing on the surface of the tissue.

In addition, a method for supplying an ionically charged substance with the electrode shown in this document, which comprises placing a substance on the tissue and wherein by applying an electric field with sufficient force and duration the tissue cell walls become temporarily permeable and allow the substance to pass through them without damaging the tissue cells.