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ECG ELECTRODES AND THEIR MATERIAL SOLUTIONS

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Cardiovascular diseases, according to data from the World Health Organization (WHO) in 2019, are the leading cause of death globally, accounting for approximately 17.9 million cases annually. Given the scale of this issue, early diagnosis and prevention play a critical role in addressing these conditions. Electrocardiography (ECG) is one of the primary diagnostic methods that allows for the precise recording of the heart's electrical activity through the use of electrodes placed on the patient's skin. However, currently used electrodes may cause complications, such as skin irritation or allergic reactions. The most commonly used electrodes in cardiology consist of polyethylene foam and conductive gel, affixed to the skin with adhesive. Alternatively, suction cup electrodes are also widely employed.

Due to the necessity of minimizing these complications, it is crucial to explore and evaluate new materials for electrode production. The aim of this study was to investigate the properties of polymer materials used in electrodes and to select the most optimal solutions. A series of tests was conducted, including scanning electron microscopy (SEM), Fourier-transform infrared spectroscopy (FTIR), surface wettability tests, tensile strength tests, adhesion testing using porcine skin, and cytotoxicity evaluation. The results of these studies allowed for the characterization of the polymer materials' properties and the identification of the most suitable variant for clinical application.