BioSpectrum
the business of Bio & Health Sciences
ASIA EDITION

NTT's conductive fiber to help in biomedical recordings

21 March 2013 | News | By BioSpectrum Bureau

Singapore: Japanese company Nippon Telegraph and Telephone Corporation (NTT) has developed a conductive fiber by coating the surface of silk or synthetic fiber with conductive polymer (PEDOT-PSS) and has used it to fabricate wearable electrodes to obtain biomedical recordings.

Conventional biomedical electrodes use an electrolyte paste or gel, which results in excessive wetting of the skin surface and occasionally causes skin irritation or contact dermatitis. The new bioelectrode made of conductive fiber without any electrolyte paste is flexible, biocompatible, and hydrophilic and so allows stable recording equivalent to that of a conventional electrode.

Experiments on 10 able-bodied human volunteers wearing undershirts equipped with the electrode revealed successful long-term recording of the heartbeat and electrocardiograms. This result shows that the heartbeat and electrocardiograms can be monitored continuously simply by wearing the electrode shirts. A press statement released by the company said the company expects to find various applications in sports, health enhancement and the support of medical diagnosis, as well as scientific research.

The conductive polymer PEDOT-PSS is a promising material for use as a biomedical electrode because of its hydrophilicity and biocompatibility. However, it is fragile when wet, and its water resistance and workability must be improved if its applications are to expand. Scientists at NTT have used PEDOT-PSS to modify the surface of a microelectrode array. The excellent biocompatibility and improved electrical property of this array was confirmed in 2004 by culturing nerve cells on it and embedding it in animals. Recently, NTT has been trying to fabricate a flexible biomedical electrode by combining PEDOT-

PSS and silk fiber.

NTT will investigate the safety and effectiveness of the wearable electrode made of PEDOT-PSS combined with fibers as regards the long-term monitoring of the heartbeat and electrocardiograms by undertaking a substantive experiment on around 100 people. It will consider applications in the medical field such as home medical care and remote medicine through collaboration with, for example, schools of medicine.