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II/7

Applicability of neural networks in the estimation of brain iron content in the diagnosis of amyotrophic lateral sclerosis

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Artificial Neural Networks, or simply ANN, are mathematical/computational model that are inspired by structure and functional aspects of biological neural networks. ANN, like man, learns by example. In the process of network training, network is supplied with set of data which represents examples of network's proper behaviour. In the research we have done, neural network is created with the task to estimate the iron content in the brain of the Amyotrophic Lateral Sclerosis (ALS) patients. Network is created and trained using Neural Pattern Recognition Tool within the software package Matlab v7.10.0.499 (R2010a). Network is trained with set of data obtained from group of 50 ALS patients. Training set contains: (i) MRI signal of brain iron, (ii) EPR signal of hydroxyl radical from cerebrospinal fluid and (iii) score on ALS Functional Rating Scale (ALSFRS) for each patient individually. The results indicate that neural networks can be successfully used to predict the high content of iron in the brain, which in the perspective opens up the possibility of using this computer model as a standard tool in the diagnosis of ALS.

II/8

Silver/alginate nanocomposites: Biomedical potential of silver/alginate microbeads

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In this study, biomedical potential of Ag/alginate nanocomposites was evaluated by investigation of biomechanical properties under *in vivo*-like conditions in bioreactor with dynamic compression and medium perfusion, antibacterial activity and cytotoxicity by MTT test. Determination of cytotoxic action of Ag/alginate nanocomposites at 0.5 mM dm^{-3} of $AgNO_3$ in the initial solution for synthesis, to immunocompetent PBMC showed decrease in PBMC survival to (74.95 ± 5.36) %, and to stimulated for proliferation by mitogen PHA PBMC to (63.73 ± 7.80) %. Higher concentration of Ag in Ag/alginate nanocomposites (1 mM dm^{-3} of $AgNO_3$) induced decrease in PBMC survival to (59.04 ± 35.45) and to PHA-stimulated PBMC to (57.01 ± 24.63) %. Presence of Ag/alginate nanocomposites that contained higher concentrations of silver induced pronounced decrease in healthy unstimulated and PHA-stimulated PBMC.