

# **Artificial Intelligence based Analysis of Postprandial Triglyceride Response using Genetic and Clinical Data**

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Clinical studies indicate that exaggerated Postprandial Lipemia (PL) is linked to the progression of atherosclerosis, leading cause of cardiovascular disease (CVD), either directly via the deposition of postprandial lipoprotein remnants onto artery surfaces or indirectly by contributing to a predominance of small, dense LDL particles and HDL<sub>3</sub> cholesterol. PL is related to elevated fasting or postprandial triglyceride (TG) levels, which can be used as CVD predictor. A High Fat Meal (HFM) has been used in several studies to examine the acute postprandial TG response which can be measured through the total or incremental area under curve of TG response (AUC and iAUC, respectively) or its postprandial peak.

Aim of the current study is to discriminate healthy subjects based on their TG response after they underwent a two meal postprandial protocol. A total of 213 subjects were used for the design and testing of an artificial Neural-Network (NN) model which was used to discriminate subjects into two classes corresponding to low and high iAUC values of TG response. For each subject, a total of 30 input features corresponding to genetic variations, sex, age and fasting levels of clinical measurements were acquired and fed to the NN. The NN was trained using a hybrid algorithm based on Genetic Algorithm (GA) and back-propagation algorithm with adaptive learning rate and momentum. The training algorithm is able to select the most informative features, automatically adjust the NN architecture and provide the optimal classification accuracy. Initial results show a classification accuracy of subjects in a testing set in the order of 80%.