DIABETES CONGRESS 2019

28th International Conference on
Diabetes and Endocrinology &

Joint Event

DIABETES 2019

3rd International Conference on
Diabetes and Metabolism

November 29-30, 2019 | Frankfurt, Germany

Obesity biomarkers – Merging artificial intelligence with metabolomics

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Obesity—a condition characterized by body mass gain, excess body fat, and risk for development of a number of comorbidities—has become a worldwide epidemic affecting more than 13% of the world population. One important aspect affecting most obese subjects is the development of a chronic, subclinical and systemic inflammation, one of the contributing factors to the development of obesity comorbidities. With advances in artificial intelligence, researchers in the areas of therapeutic and diagnostic targets are working to improve methodologies for more accurate and sensitive identification of specific or set of biomarkers able to predict risk for obesity-associated disorders, such as type II diabetes. Within this context, we analyzed the plasma of eutrophic and obese individuals by mass spectrometry and performed data treatment using random forest-based machine learning algorithms. Five biomarkers related to inflammation in obesity were characterized: metabolites of arachidonic acid, indicating the occurrence of inflammation; molecules associated with dysfunctions in the nitric oxide (NO) cycle and superoxide production; and a diabetes-related species that may be the subject of future studies on the trigger for diabetes in obesity. Calculated accuracy (90.8%) and sensitivity (93.5%) for the model demonstrate that the method is effective in separating groups as a function of differential metabolite profiles given by mass spectrometry. In other words, this work opens a new path for obesity in metabolomics using advanced artificial intelligence strategies for the election and determination of selective targets for diagnostics, prognostics, and therapeutics.

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