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Quantitative and molecular similarity analyses of the metabolites of cold- and hot-natured Chinese herbs

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Background. According to the theory of traditional Chinese medicine, Chinese herbs possess the following four different medicinal properties: hot, warm, cold, and cool. These properties serve as a reference guide for these herbal medicines. However, there is no clear knowledge on the molecular mechanisms supporting their relevance.

Methods. We conducted a metabolomics analysis based on capillary electrophoresis–time-of-flight mass spectrometry (CE–TOF/MS) and multivariate data analysis for the structural identification of the compounds of cold- and hot-natured Chinese herbs.

Results. A total of 30 selected herbs were analyzed by CE–TOF/MS, which identified a total of 416 metabolites, of which 193 compounds were detected in the majority of herbs. The observed profiles enabled the understanding of the mechanism of association between the compounds and nature of Chinese herbs. Comparison of similarity in terms of chemical and molecular structures and content showed that hot-natured herbs contained more nucleotides. However, principal component analysis revealed the presence of more amino acid compounds in cold-natured herbs.

Conclusion. Comparison of the structural similarities between the samples using the Tanimoto coefficient revealed the existence of a general nonspecific structure between cold- and hot-natured herbs; however, the distribution of the molecular groups appeared to contribute more toward the energy properties.

Thesis accepted

1. Jing Guo, Kiyotoshi Satoh, Sho Tabata, Masaru Mori, Masaru Tomita and Tomoyoshi Soga. Reprogramming of glutamine metabolism via glutamine synthetase silencing induces cisplatin resistance in A2780 ovarian cancer cells. Accepted 4 February 2021. BMC Cancer.

2. Jing Guo, Jiaxiao Wang, Keiko Iino, Masaru Tomita, and Tomoyoshi Soga. Quantitative and molecular similarity analyses of the metabolites of cold- and hot-natured Chinese herbs. Accepted 8 February 2021. Evidence-Based Complementary and Alternative Medicine.

International conference

Jing Guo, Kiyotoshi Satoh, Sho Tabata, Masaru Mori, Tomoyoshi Soga, Masaru Tomita. Metabolomic approaches reveal glutamine synthase increases cisplatin sensitivity in ovarian cancer cell line. Metabolomics 2020 online. 27-29 Oct 2020.