**Metabolic Phenotyping reveals a Lipid Mediator Response to Ionizing Radiation**

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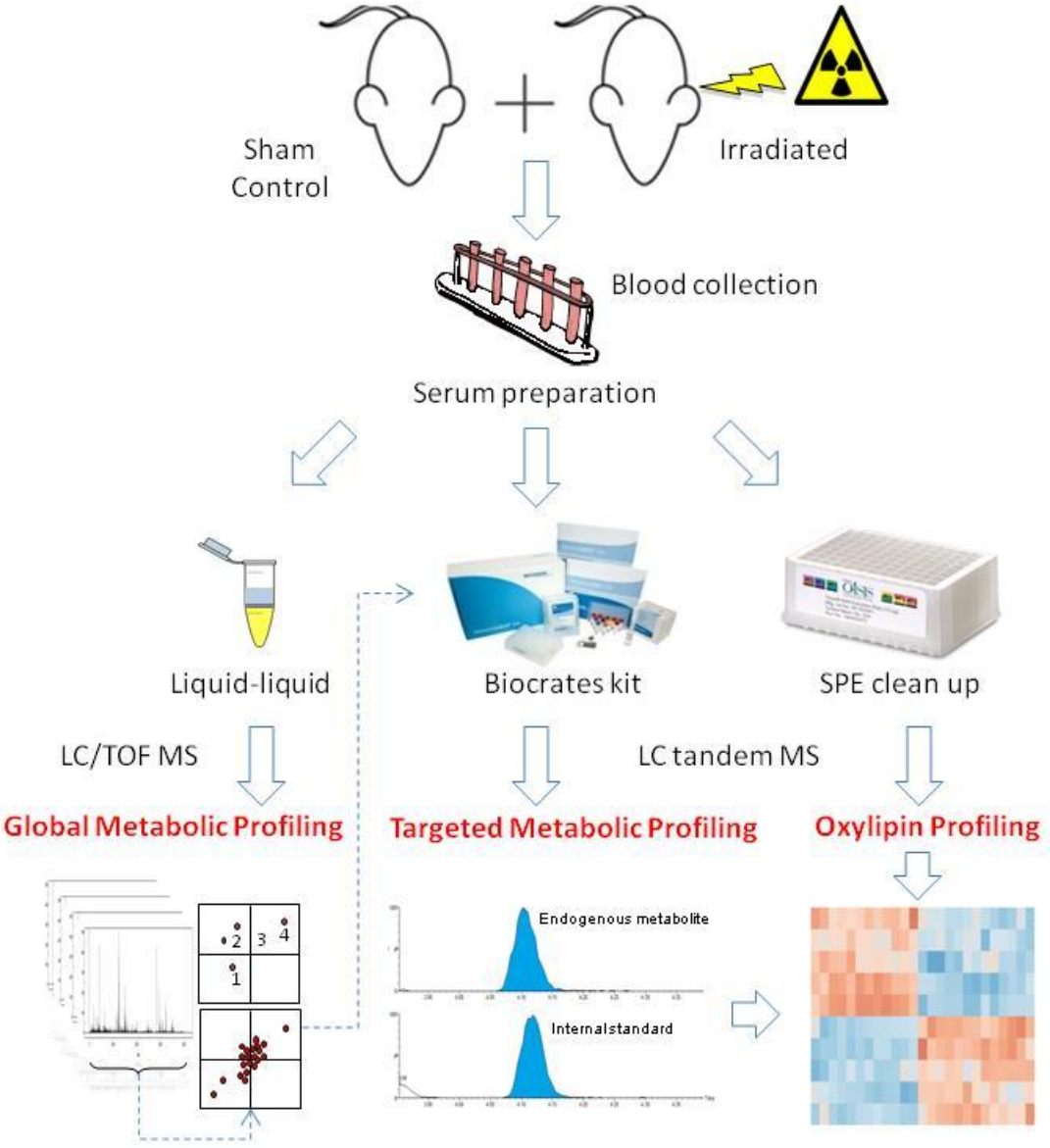
Exposure to ionizing radiation has dramatically increased in modern society, raising serious health concerns. The molecular response to ionizing radiation, however, is still not completely understood. Here we screened mouse serum for metabolic alterations following an acute exposure to gamma radiation using a multi-platform, mass-spectrometry-based strategy. A global, molecular profiling revealed that mouse serum undergoes a series of significant molecular alterations following radiation exposure. We identified and quantified bioactive metabolites belonging to key biochemical pathways and low-abundance, oxygenated, polyunsaturated, fatty acids (PUFAs) in the two groups of animals. Exposure to gamma radiation induced a significant increase in the serum levels of ether phosphatidylcholines (PCs) while decreasing the levels of diacyl PCs carrying PUFAs. In exposed mice, levels of pro-inflammatory, oxygenated metabolites of arachidonic acid increased, whereas levels of anti-inflammatory metabolites of omega-3 PUFAs decreased. Our results indicate a specific serum lipidomic biosignature, which could be utilized as an indicator of radiation exposure and as novel target for therapeutic intervention. Monitoring such a molecular response to radiation exposure might have implications not only for radiation pathology but also for countermeasures and personalized medicine.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Serum preparation
Liquid-liquid
Biocrates kit
SPE clean up
LC/TOF MS
LC tandem MS
Global Metabolic Profiling
Targeted Metabolic Profiling
Oxylipin Profiling
1
2
3
4
Endogenous metabolite
Internalstandard