InSyTe FLECT/CT Application Spotlight

Liver disease – Exosome imaging

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Title: Exosomal miR-199a-5p promotes hepatic lipid accumulation by modulating MST1 expression and fatty acid metabolism
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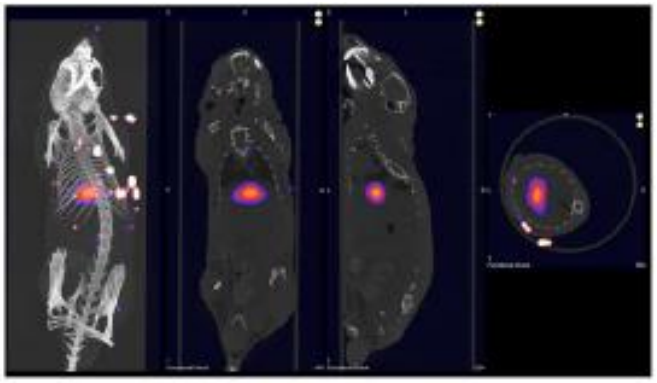
Summary: Non-alcoholic fatty liver disorder (NAFLD) is a chronic liver metabolic disorder characterized by high levels of fat storage in the liver and is a significant health issue, affecting roughly 30% of adults. microRNA sequences (miRNA) are non-coding RNA sequences known to regulate cellular function. Specifically, the miRNA sequence miR-199a-5p has been studied in breast, prostate, gastric, and liver cancer progression, but its role in liver steatosis is not well understood. MST1 is a serine/threonine kinase involved in the Hippo signaling pathway, which is known for its role in regulating cell proliferation and other cellular processes, as well as regulating liver metabolism. Previous work has suggested that MST1 plays a role in adipogenesis (formation of fat cells). In this study, the research team investigated the role of miR-199a-5p in regulating hepatic MST1 to determine its role in liver lipid metabolism. The team used exosomes, which are nanoscale vesicles that transport proteins and miRNA, to deliver the miR-199a-5p sequence to the liver and study its effect on MST1 regulation. The grand goal of this research is to assess the potential use of this specific miRNA sequence as a therapeutic for NAFLD.



The authors used the InSyTe FLECT/CT to image the in vivo distribution of injected exosomes used to deliver miRNA sequences for regulation of hepatic lipid metabolism in NAFLD. In this example, a fluorescent targeting probe for exosomes was imaged, showing strong accumulation in the liver.

InSyTe FLECT/CT Spotlight: Using the InSyTe FLECT/CT, the research team obtained in vivo images of the exosome delivered miR-199a-5p in a mouse model of liver steatosis. By using a fluorescently labeled targeting probe specific for exosomes, the research team was able to determine the in vivo distribution of miR-199a-5p and confirm its delivery to the liver. The in vivo images in the paper complement the extensive genetic, biochemical, cellular, and histopathology work performed to confirm the delivery of miR-199a-5p to the liver, as well as assess its effect on MST1 regulation.