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Novel Catheter Based Imaging Probe for Detection of Vulnerable Plaque

Researchers at Stanford have developed a dual modality imaging probe to provide improved atherosclerosis detection and evaluation. Atherosclerosis is a disease in which plaque builds up inside arteries. The most common and deadly form is coronary artery diseases (CAD), in which unstable atherosclerotic plaques can rupture leading to substantial morbidity and mortality. The gold standard for detecting CAD is cardiac catheterization angiography. However, this technique does not provide information about plaque extent, content, or biology. It also cannot detect early atherosclerotic plaque. As such improved methods of detecting atherosclerosis would be highly beneficial. To help meet this need the inventor has developed the CRI-PAT probe, a dual-modality, scintillator catheter probe with the ability to conduct catheter radionuclide imaging (CRI) and photoacoustic tomography (PAT). The probe uses 18F-fluorodeoxyglucose (18F-FDG), a marker of vascular inflammation, in detecting and characterizing atherosclerotic plaque. This probe can be used to distinguish vulnerable plaque from stable plaque, outline the location of the plaque and provide information on the plaque constituents. The CRI-PAT system will drive a paradigm shift in the diagnosis and risk stratification of CAD by uniting cellular, molecular and morphological data for a more complete pathologic and prognostic characterization of vulnerable plaque.

Stage of research
The CRI-PAT probe has permitted precise detection and evaluation of human and murine carotid vulnerable plaque pathology with histologic validation.

Applications

- Atherosclerosis detection and evaluation

Advantages

- Unmet medical need- first imaging modality that can detect vulnerable plaque
- Allows early detection of plaque
- Can distinguish vulnerable plaque from stable plaque
- Outlines the vulnerable plaque location and provides information on the plaque constituents, such as lipid and fatty acid consisted of cholesterol ester, cholesterol, phospholipids, triglyceride; calcium, elastin, and collagen
- Detects and characterizes the plaque in real time enabling immediate therapeutic intervention
- As compared to available techniques, this technology provides improved sensitivity and resolution of plaque imaging

Patents

- Published Application: 20170325697
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