LipoGlucoCEST - Novel Imaging Agents for GlucoCEST

Published date: May 9, 2017

Technology description

Chemical Exchange Saturation Transfer (CEST) is a new emerging type of MRI that enables the detection of low-concentration marker molecules and can be used to track metabolite dynamics and changes in environmental parameters, such as pH (biomarker for pathologies such as stroke or tumours), temperature and ion concentration.

GlucoCEST is the name given to CEST imaging using glucose or glucose analogues as the imaging agent. This enables the uptake of unlabelled glucose to be measured, which can be used for cancer detection through the well-known Warburg effect. The issue with this technique is that the level of glucose administered is high enough to interact with the body' s glucose sensing system, triggering an acute insulin response. This makes reproducibility a major issue. Furthermore, glucose may not be suitable for some populations, such as patients with diabetes.

Researchers at the UCL Institute of Neurology and Department of Chemistry have developed a novel series of imaging agents based on liposome-encapsulated sugar compounds that mitigate the above problems with glycaemic responses. This new invention, LipoGlucoCEST, can not only improve circulation time of the imaging agents, but also aid in shielding the patient from the effects of administering the sugar, and avoid triggering an acute insulin response. This allows for high resolution GlucoCEST imaging of tumours, metabolic imaging and "dose painting" for radiotherapy available to all patients, and mitigates the variability in the imaging caused by the glycaemic response.

The global cancer diagnostics market is estimated to reach $13.1 billion by 2020, growing at a CAGR of 12.9%. This growth is expected to be driven by factors such as an aging population and a growing number of cancer cases. Imaging tests currently occupy the largest segment of this market and is expected to remain as such.

The current standard method for imaging tumours in vivo, [18F]FDG-PET, relies on the administration of [18F]FDG to patients. This is not always available, is expensive and delivers a major radiation dose, which is undesirable for repeated scanning. LipoGlucoCEST has the potential to address all these issues in a growing cancer diagnostics market.

Institution

UCL Business

Inventors

Helen Hailes
Chemistry
Harriet Story
Business Manager
Biopharm
Xavier Golay
Chair of MR Neurophysics
Brain Repair/IoN
Alethea Tabor
Chemistry
Eleni Demetriou
PhD Student
Institute of Neurology
Robin Bofinger