MARESUS - negative per-oral contrast agent for magnetic resonance imaging

Development status

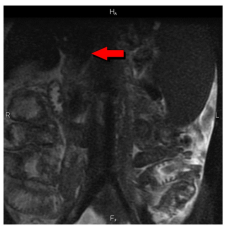
Preclinical trials

IP protection status

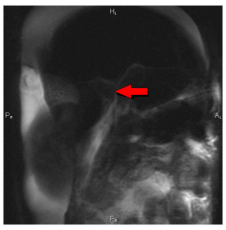
Know-how

Partnering strategy

Co-development, Collaboration, investment, licensing



MRCP without MARESUS: 52y woman before liver transplantation (OLTx) having liver cirrhosis, due to hepatitis C. Presence of advanced ascites and edema of bowel wall; arrow depicts a roughly delineation of extrahepatic biliary ducts.



MRCP with MARESUS contrast agent (same patient): in cirrhotic liver transformation there is visible improvement of extrahepatic biliary duct delineation after SPIO per-oral application.

Institution

Palacký University Olomouc

Palacký University Olomouc

Challenge

Magnetic Resonance Imaging (MRI) is nowadays one of the most powerful diagnostic tools in medicine and medical science. Lack of ionizing radiation, multiplanar imaging, static and dynamic imaging capabilities and superior soft tissue contrast make MRI a potentially ideal technique for the initial evaluation and follow-up of several bowel diseases (tumors, inflammatory bowel diseases) and for improvement of the quality in diagnoses of bowel adjacent tissues and organs. However, a good distension of the intestine is crucial. Therefore, the use of oral contrast agent is mandatory. Nowadays several per-oral contrast agents are commercially available but still not used routinely due to lack of contrast agents and their high price. The possible way is to use Super Paramagnetic Iron Oxides (SPIO) including nanoparticles of maghemite or magnetite, which are strong proton enhancers in T2-weighted images and cause the negative signal of the whole lumen.

Description

MARESUS, the technology developed by Palacký University in Olomouc, MARESUS is an alternative to the only one commercial contrast agent Lumirem, which was moreover withdrawn from the market. The manufacturing of MARESUS is faster, easier and cheaper compared do Lumirem. MARESUS represents composite material consisting of 20 nm superparamagnetic iron oxide nanoparticles incorporated in bentonite matrix (smectite mineral), which is covered by polyethylenglycol (PEG) and mixed with standardly used compounds such as salts, concentrates, aroma, preservatives etc. This makes MARESUS nontoxic and biocompatible agent with high effective negative contrast in T2-weighted images. MARESUS contrast agent is highly recommended for use in MREg (MR enterography) and primarily in a special type of MR investigation called MRCP (Magnetic resonance cholangiopancreatography), which is often used for imaging of biliary tree. MARESUS is helpful for patients with advanced liver cirrhosis where ascites present diagnostic problems for MRCP mainly before liver transplantation and post operation.

Commercial opportunity

Synthesis of MARESUS is highly reproducible, cost effective, enabling large scale production. Compared contrast effect with commercial Lumirem, which has been recently taken of the market due to its price. As mentioned before, MARESUS represents cheaper and easier to manufacture alternative Moreover, there is potential application of MARESUS for diagnosis of extrahepatic biliary duct and extraluminal pathologies in patients with ascites which has never been tried before due to unavailability of MRI in the past. Today, the spread of MRI and its innovations opens new possibilities of its utilization. We also proved a new protocol for usage of our contrast agent in pre-operative and also post-transplantation diagnosis of liver.