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Calcium sensing receptor (CaSR) a promising biomarker for cancer: Molecular MR imaging studies

Gabriella Baio
IST-National Cancer Institute, Italy

Abstract

The calcium sensing receptor (CaSR) is a class C G-protein-coupled receptor that is crucial for the feedback regulation of extracellular free ionized calcium and it is activated physiologically by a varieties of molecules including polyamines and l-amino acids. The activation of the CaSR by different ligands has the ability to activate many intracellular pathways within the cell and when CaSR expression and function are altered, the association with cancer progression is founded. Interestingly, the CaSR appears to act both as a tumour suppressor and as oncogene, depending on the pathophysiology involved. Human breast and prostate cancer cells, express at different level of CaSR and his activation might facilitate metastasis to bone in both of these tumours. Imaging technique such as magnetic resonance imaging (MRI) by using manganese ion (Mn2+) as a calcium's analog could represent an interesting and promising tool in the understanding of CaSR expression. We developed an imaging molecular method by using manganese enhanced magnetic resonance imaging (MEMRI) to target respectively both human breast and prostate cancer animal models with different level expression of CaSR. Our findings may open new opportunity to better understand the mechanism driving CaSR signaling in different tissues in order to develop novel drugs that target the CaSR or its ligands in cancer.