

The applications of magnetic nanoparticles in diagnostic medical imaging

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Magnetic resonance (MR) imaging has widely been used for imaging of human internal organs exactly and non-invasively. Applications of MRI include understanding disease extent and evaluation of treatment response. Traditional MR contrast medium is useful for imaging of lesion vasculature as well as the orientation of the vessels. Recently, iron oxide nanoparticles have been used as contrast medium for liver and lymph node imaging because of its affinity to these organs. It is found that the size and charge of these nanoparticles has impacts on the affinity to different organs. How to construct an ideal contrast medium for different organ targeting becomes an important issue.

On the other hand, the technology for single cell MR imaging is demanding to make early diagnosis. One of the most important techniques is labeling these cells with magnetic nanoparticles. Efficient labeling, increase the paramagnetic character and preventing precipitation of these nanoparticles are the key points in designing this kind of contrast medium. In conclusion, the development of new generation MR contrast medium depends mostly on the progress in nanotechnology.

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