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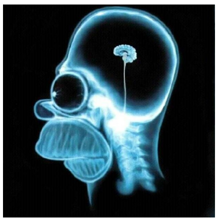
X-ray Imaging Boosted by Nanotube Technology



X-ray Homer
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Scattering ionide enhances X-ray contrast

X-ray imaging techniques are being widely used into hospitals all over the world to put in evidence the contrast between bone and soft tissue. X-ray light penetrates the soft tissue relatively easy, but it is partially absorbed into bone. The problem with X-ray imaging is that X-ray light is too powerful to be absorbed into the soft tissue, thus it passes right through it, disabling in the process the possibility of making a difference between certain types of cells. A much better solution would be the use of X-ray scattering devices, or scattering substances such as iodine, which can dramatically enhance the contrast of the image. However, these can only be used in areas with high blood flow, meaning that the scattering substance would be circulated at high speeds through the body. Furthermore, as in the case of the traditional X-ray imaging machines, iodine has restricted capabilities and can only target specific types of cells. Lon Wilson from the Rice University, Houston, U.S., proposes instead a new scattering substance that implies the help of carbon nanotubes. He argues that carbon nanotubes could be easily filled with iodine solution, coated with special proteins that would enable the X-ray machine to target the desired types of cells. As the scattering substance is circulated rapidly through the body, the protein film covering the carbon nanotube would ensure that they embed in the walls of the targeting cell, meaning that they wouldn't be eliminated from the system immediately, enabling future X-rays as well. When firstly used for X-ray scattering purposes, ionic substances (such as iodine) were mostly corrosive to other substances. Ionic liquids in fact are generally fluids only while kept at low temperatures. As time passed, researchers started creating even less corrosive scattering substances that were extremely stable at the room temperature, unlike the traditional salt-like ionic liquids which were mostly composed of positive and negative ions. Recently, researchers from Boston University have created ionic liquids that have both elastic and viscous properties. These unique rubber-like properties are easily obtained by bonding two ions in the liquid with the help of hydrocarbon chains. Furthermore, the newly developed ion liquid could be used to create batteries in a variety of shapes, or to manufacture self-healing lubricants. However, one of the most used applications would be to detect tinnitus. About 7 million people in the U.S. claim to suffer from this disease, which ultimately can give rise to fraudulent benefits from healthy people. Tinnitus represents a condition in which the subject experiences a sound in the ear, even though there are no external stimuli. The only way to accurately diagnose this disease is by playing various sounds until the patient recognizes the one he is hearing. Jeremy Turner from the Southern Illinois University School of Medicine, Springfield, proposes that the best way to discover fraudulent claims is by playing loud noises in order to measure the triggered reflex. If the sound matches precisely the one heard by the patient, the reflex reaction should be smaller.