

论文

铁碎片与人体活组织之间的长期相互作用

摘要:

一铁碎片被意外植入人体内,并在体内呆了16 a。该碎片经历了显著的形态和化学变化。铁碎片的表面呈现葡萄状或者鲕粒状。碎片转化为铁的氧化物和氢氧化物以及钙的磷酸盐(可能为磷灰石)。在碎片中确认出Fe、O、P、Ca、Cl、Na、K和Mg等元素。从边缘到核心,Fe含量增加,P和Ca含量减少。碎片从人身体内吸附了Ca、P、O、Cl、Na和K。研究表明,磷灰石或者其他钙的磷酸盐能够在人体里保持稳定达16 a。然而,钙的磷酸盐与铁的氧化物或者氢氧化物混合,可能还不足以坚固到与骨头结合。本研究也表明,铁或者含铁合金在人体内不够稳定。

关键词: 铁碎片; 人体活组织; 环境扫描电镜; 能量色散谱; 生物合成材料; 人类健康

LONG TERM INTERACTION OF AN IRON FRAGMENT WITH LIVING HUMAN TISSUE

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Abstract:

An iron fragment was embedded accidentally in a human body and remained inside for nearly 16 years. The fragment underwent significant morphological and chemical changes. The surface of the fragment developed a botryoidal or oolitic form. The fragment was altered to iron oxides and hydroxides and Ca phosphates (likely apatite). Fe, O, P, Ca, Cl, Na, K and Mg were identified in the fragment. From the rim to the core, the Fe content increased and the P and Ca contents decreased. The fragment absorbed Ca, P, O, Cl, Na and K from the body. This study shows that apatite or other Ca phosphates can remain stable for as long as 16 years. However, the Ca phosphate is mixed with Fe oxides or hydroxides, and therefore, it may not be strong enough to bond to bone. This study also shows that Fe or Fe bearing alloys are not stable inside a human body.

Keywords:

iron fragment; living human tissue; ESEM; EDS; biomaterial; human health

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