多孔性生醫玻璃陶瓷材料之研製 = Investigations of porous bioglass-ceramic materials

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摘 要

本實驗以MgO-CaO-Al2O3-SiO2-P2O5之成分系統的玻璃為材料，用硬酯酸為成孔劑，經模壓成形再進行燒結，研製了多孔性生醫玻璃陶瓷，期能作為組織工程支架材料用途。 本實驗之玻璃主要化學成分為：MgO 3.0%、CaO 35.0%、Al2O3 8.6%、SiO2 41.4%、P2O5 12.0%。實驗結果顯示，玻璃分別經過960℃、1小時及1060℃、1小時的結晶熱處理後，主要晶相種類以XRD測定結果為:磷灰石、鈣長石兩種結晶相。 在添加三種不同含量及粒徑大小的硬酯酸經由960℃、1小時燒結後，分別用SEM、阿基米德原理量測孔隙大小、開放型孔隙度。以添加50vol%的硬酯酸發泡劑，其大孔隙分別為448±67μm、251±42μm、59±12μm，而開放型孔隙度則為29.94±1.14%、27.67±0.94%、 18.67±0.97%。 所有樣品的孔隙度範圍從26.96±1.03%至45.89±0.17%，而孔隙度為26.96±1.03%之樣品，其彈性模數與彎曲強度接近於人類的皮質骨。其餘的樣品之機械性質只介於皮質骨與海綿骨之間。 浸泡人工體液30天後，樣品表面大量形成新的晶體，而且細胞活性評估的結果顯示，以SA50P1所形成的多孔性生醫玻璃陶瓷具有極佳之生物適應性。綜合上述實驗之結果顯示，此多孔性生醫玻璃陶瓷可作為組織工程之支架材料。

關鍵詞 : 支架材料;多孔性生醫玻璃陶瓷;硬酯酸;燒結;孔隙大小;機械性質

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