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Data Article

Biphasic calcium phosphates (BCP) of hydroxyapatite (HA) and tricalcium phosphate (TCP) as bone substitutes: Importance of physicochemical characterizations in biomaterials studies

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ABSTRACT

The data presented in this article are related to the research article entitled "Biphasic calcium phosphates bioceramics (HA/TCP): Concept, physicochemical properties and the impact of standardization of study protocols in biomaterials research" [1]. This article provides in depth study of BCP bone substitutes as valuable option in the field of tissue engineering. However, there are discrepancies in the literature regarding the ideal physicochemical properties of BCP and the ideal balance between different phase compositions for enhanced bone tissue engineering (M. Ebrahimi, M.G. Botelho, S.V. Dorozhkin, 2016; M. Ebrahimi, P. Pripatnanont, S. Suttapreyasri, N. Monmaturapoj, 2014) [1,2]. This is found to be mainly because of improper characterization of BCP bioceramics in basic studies and lack of standard study protocols in *in vitro* and *in vivo* research. This data article along with original article provide the basic data required for ideal characterization of BCP and other bioceramics in an attempt to provide basic standardized protocols for future studies.

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Specifications Table

Subject area	Bone tissue engineering
More specific subject area	Biphasic calcium phosphates bone substitutes
Type of data	Figures, graph, X-ray images and table
How data was acquired	Electronic data base (PubMed), systematic literature review
Data format	Analyzed
Experimental factors	N/A
Experimental features	Description of BCP; synthesis/characterizations.
Data source location	Prince Philip Dental Hospital, Faculty of Dentistry, The university of Hong Kong, Hong Kong
Data accessibility	Data are available with this article

Value of the data:

- To provide basic standard data for proper characterization of BCP and other bone substitutes.
- To encourage researchers to standardize their study protocols.
- To help in reducing the discrepancies among the findings of future studies.

1. Data

This paper presents the required data and examples on proper characterization of BCP. This can be applied to other similar materials in the field of bone tissue engineering [2]. Data on use of XRD (X-ray diffraction), SEM (scanning electron microscope), mechanical testing (MT) and other investigations have been provided.

Fig. 1. XRD showing the crystallographic pattern and corresponding peaks of HA and β-TCP according to ICDD (International Center for Diffraction Data) database.

Fig. 2. XRD pattern of different composition ratios of BCP. The intensity and pattern of corresponding peaks change according to the relative composition ratio of HA/ β-TCP.

Fig. 3. SEM image of HA particles illustrating analysis of morphology and dimension.

Fig. 4. The stress–strain curves for the BCP scaffolds. The scaffold has an initial elastic region where the deformations are reversible (elastic deformation), followed by a plastic region before failure presented by a sudden drop in the cure which indicate irreversible change (fracture).

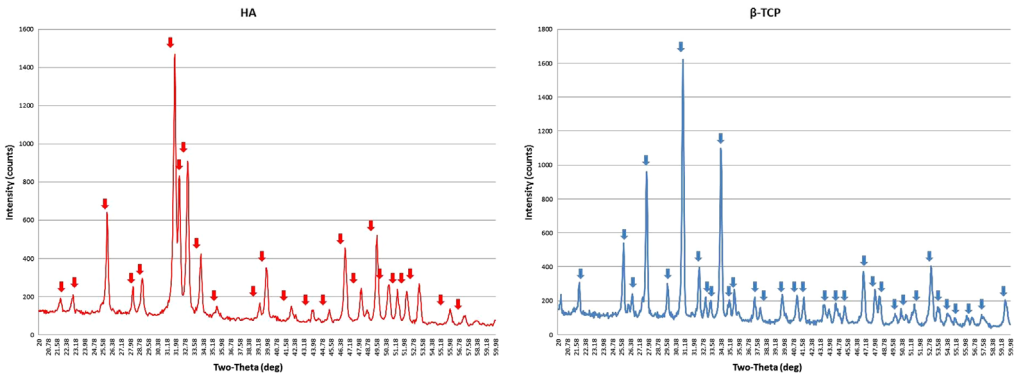

Fig. 1. XRD pattern of pure HA and β-TCP. The main corresponding peaks are marked.