

A physicochemical approach to design bioactive scaffolds for tissue engineering

Citation for published version (APA):

Chen, H. (2017). *A physicochemical approach to design bioactive scaffolds for tissue engineering*. [Doctoral Thesis, Maastricht University]. Maastricht University. <https://doi.org/10.26481/dis.20170406hc>

Document status and date:

Published: 01/01/2017

DOI:

[10.26481/dis.20170406hc](https://doi.org/10.26481/dis.20170406hc)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

STATEMENTS

With the thesis

A Physicochemical Approach to Design Bioactive Scaffolds for Tissue Engineering

Honglin Chen

Maastricht, March 2017

1. Many animals regenerate new parts of their bodies to replace those that have been damaged. For example, sharks continually replace lost teeth in their lifetimes; spiders can regrow missing legs or parts of legs; and most lizards will have regrown their tail within nine months. Can humans regrow or repair their damaged tissues or organs like these amazing creatures? Yes, the discipline of tissue engineering and regenerative medicine will make this come true. This thesis.
2. Scaffolds are one of the essential elements in tissue engineering and regenerative medicine. An ideal scaffold for tissue engineering should be a smart one, which is capable to offer bioactive cues to direct cell differentiation and stimulate tissue regeneration. This thesis.
3. The properties of scaffolds, including scaffold chemistry, surface topography, and structural feature should be taken into consideration in terms of designing bioactive scaffolds for tissue engineering. This thesis.
4. As we know, zirconia ceramic materials are stiff and bioinert. However, zirconia ceramics would turn to be flexible and bioactive if they had a nanofibrous structure. This thesis.
5. Traditional electrospinning, a simple technique to produce continuously fiber, has a major limitation in patterning complex structure. Direct-writing electrospinning offers an attractive approach to produce ultrathin fibrous scaffolds with desirable pattern.
6. Fingerprints, which are made by friction ridges and furrows, are unique patterns. Similarly, cellular behaviors, including differentiation, proliferation, and migration are sensitive to the surface pattern of scaffolds.
7. Albert Einstein quote: "Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution."