Biomimetic Nanotechnology: A Powerful Means to address Global Challenges

Ille C. Gebeshuber[1,2,3,*]

[1] Universiti Kebangsaan Malaysia, Malaysia
[2] Institut of Applied Physics & TU BIONIK Center of Excellence, Vienna University of Technology
[3] Austrian Center of Competence for Tribology, AC^{2}T research GmbH, Austria

* email: gebeshuber@iap.tuwien.ac.at, URL: http://www.ille.com

Physics and biology used to be fields far apart. In former times, biology was mainly descriptive, and there was little overlap with the hard sciences such as physics and engineering in terms of concepts and joint language. This has changed. The paramount developments in nanoscience and nanotechnology contributed to show us how exquisitely crafted organism are. In terms of materials, structures and functions, biology is still far ahead of technology.

One of the fascinating aspects of nanotechnology is that on the nanometer scale all the natural sciences meet and intertwine. Physics meets life sciences as well as engineering, chemistry, materials science and computational approaches, which altogether communicate and are closely linked. This inherent interdisciplinarity of nanotechnology offers enormous potential for fruitful cross-fertilisation in specialist areas.

A prominent research areas at the meeting place of life sciences with engineering and physics is biomimetics. Biomimetic nanotechnology is a continuously growing field that deals with knowledge transfer from biology to nanotechnology. Investigations of animated nature on the nanoscale have wide-ranging implications for the understanding of processes in healthy and health impaired living beings and ecosystems and yield novel approaches in engineering and medicine. Biomimetic nanotechnology is a field that has the potential to drive major technical advances. It might substantially support successful mastering of major global challenges.

The Millennium Project was commissioned by the United Nations Secretary-General in 2002 to develop a concrete action plan for the world to reverse the grinding poverty, hunger and disease affecting billions of people. The Millennium Projects states 15 Global Challenges: sustainable development, water, population and resources, democratisation, long-term perspectives, information technology, the rich-poor gap, health, capacity to decide, peace and conflict, status of women, transnational crime, energy, science and technology and global ethics. For some of the 15 global challenges, biomimetic nanotechnology might provide relevant contributions that will be presented in more detail in the lecture.

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