

Press release

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Engineering biological solutions for next generation drug therapies

The next decade will see biologically derived therapies dominate the treatment landscape, said Professor Nigel Titchener-Hooker during his delivery of the 27th Danckwerts Memorial Lecture in Atlanta, US, on 17 November.



Professor Titchener-Hooker, Head of Department of Biochemical Engineering at University College London (UCL) and Director of EPSRC Centre for Innovative Manufacturing of Emerging Macromolecular Therapies, also argued that current limitations in downstream processing techniques threaten to obstruct progress and that earlier consideration to bioprocess challenges should be given during drug development.

In 2013, eight of the top ten selling drugs worldwide were 'biologics' products manufactured in a living system such as a microorganism, plant or animal cell. Most biologics, including the top sellers, *Humira*®, *Enbrel*® and *Remicade*® are very large, complex molecules produced using recombinant DNA technology.

"Companies still tend to progress on the basis of clinical promise," said Titchener-Hooker. "They tend to think about ease of manufacture much later, and vital process decisions are all too often isolated from business decisions, with unhelpful consequences."

"Biochemical engineering offers the tools and methods to enable more rapid transition from clinical promise to manufacturing certainty," he continued. "This will enable better business decision making by leveraging a fundamental understanding of ways to improve purification processes quickly, and with confidence. This will deliver affordable, next generation therapies."

Titchener-Hooker drew on examples of his work on process miniaturisation at UCL, which he described as "ultra scale down". Case studies of the bioprocess optimisation of operations, including centrifugation and chromatography, were discussed in the context of the latest computational techniques and decision making tools. The lecture made a compelling case for process optimisation and cost reduction via better equipment sizing in multi product facilities.

Danckwerts' memory was invoked several times during the lecture: "It has been shown that we can make billion dollar drugs. But can we make drugs for billions of patients?" Titchener-Hooker asked. "I believe we can; but this will demand exceptional levels of collaboration between academics and industry backed by supportive funding agencies.

"Danckwerts was a firm advocate of informed and relevant education. His thinking remains relevant to this day and it has been a great privilege to deliver the lecture that bears his name."

The Danckwerts Memorial Lecture, which takes place annually, is co-sponsored by the European Federation of Chemical Engineering (EFCE), the Institution of Chemical Engineers (IChemE) and the American Institute of Chemical Engineers (AIChE), and is supported financially by Elsevier and published in their journal *Chemical Engineering Science*.

The 28th Danckwerts Lecture will be delivered at the tenth European Congress of Chemical Engineering (ECCE 10), which takes place in Nice, France, from 27 September – 1 October 2015.

Ends

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Notes to media:

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Photograph caption (left to right):

Andy Furlong, IChemE director of policy; Nigel Titchener-Hooker, Danckwerts lecturer; and Professor Anton Middleberg, session chair.

About chemical engineers

Chemical, biochemical and process engineering is the application of science, maths and economics to the process of turning raw materials into everyday products. Professional chemical engineers design, construct and manage process operations all over the world. Oil and gas, pharmaceuticals, food and drink, synthetic fibres and clean drinking water are just some of the products where chemical engineering plays a central role.

About EFCE

Founded in 1953, The European Federation of Chemical Engineering (EFCE) is a non-profit-making association, whose object is to promote co-operation in Europe between non-profit-making professional scientific and technical societies in 30 countries for the

general advancement of chemical engineering and as a means of furthering the development of chemical engineering. See www.efce.org

About Danckwerts Memorial Lecture

The PV Danckwerts Memorial Lecture was established in 1985 to honour Prof. Peter V. Danckwerts as a leading European scholar in the field of chemical engineering and for his contributions as an executive editor of *Chemical Engineering Science*, the second Shell professor of chemical engineering at the University of Cambridge and a past president of IChemE.

The selection panel includes, Prof. Anton Middelberg, the current editor-in-chief of *Chemical Engineering Science*, EFCE president, Prof. Rafiqul Gani, the presidents of AIChE and IChemE as well as Prof. Lynn Gladden and Prof. Jinghai Li. See www.elsevier.com/locate/ces