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News

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Decisional tool could influence future investment in cell therapy

Researchers develop a tool that predicts innovative advances necessary for cell therapy commercialization

In a recently published article, a group of researchers from University College London (London, UK) and Cell Processing Technologies (MD, USA) present a 'decisional tool' – to assess the most cost-effective technologies for upscaling production of cell therapies.

Allogeneic stem cell therapy is defined as the administration of genetically non-identical stem cells to a recipient. Due to the nature of this therapeutic (derived from one universal donor) they are suitable for administration to large patient groups, and have already shown promise in graft versus host disease and osteoarthritis; with implications in a large number of diseases.

A major problem faced in the production of stem cells is scaling up the manufacturing process to allow the production of commercially relevant lot sizes, especially in a cost-effective manner. In their article, the authors investigated what technological advances would be necessary to overcome this hurdle.

The researchers used both economic and optimization approaches in their 'decisional tool'. This tool allowed them to compare current commercially available cell expansion technologies (including predicting the most suitable technology according to production scale), identify gaps in these technologies, and make suggestions on where future research should be headed to meet future commercial demands.

Planar technology versus microcarrier-based bioreactors were compared, and the team presented the scale at which planar technology no longer becomes commercially viable. In addition, the researchers looked at what percentage increase in performance would be required in these technologies to meet future demand.

Their data are presented in technology S-curves and windows of operation. The authors explain that their tool will facilitate decisions at various levels – from early decisions in the production process, to decisions on where future investment should be made.

The team explains in their conclusion that future work: "will include the extension of the tool to include downstream operations and the development of case studies to address different types of allogeneic and autologous cell therapies."

– Written by Alice O'Hare

/// A major problem faced in the production of stem cells is scaling up the manufacturing process to allow the production of commercially relevant lot sizes, especially in a cost-effective manner. ///

Source: Simaria AS, Hassan S, Varadaraju H *et al.* Allogeneic cell therapy bioprocess economics and optimization: single-use cell expansion technologies. *Biotechnol. Bioeng.* doi:10.1002/bit.25008 (2013) (Epub ahead of print).

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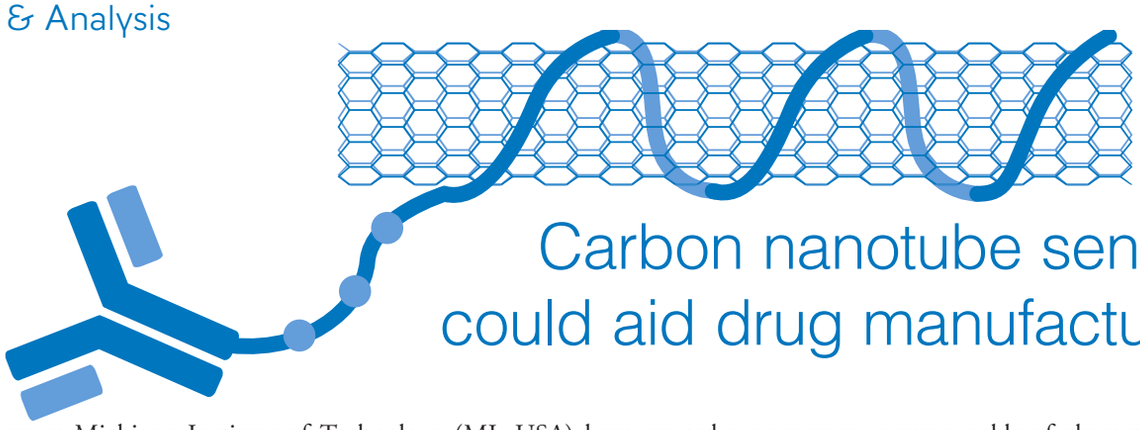


Carbon nanotube sensors could aid drug manufacturing

Researchers at Michigan Institute of Technology (MI, USA) have created a nanosensor array capable of characterizing the variations in the binding strengths of antibody drugs, a tool that could be useful in investigating the efficacy of future drug formulations.

The team also demonstrated the ability of the nanosensor to determine which cells in a population of genetically engineered, drug-producing cells are the most productive or desirable. According to Michael Strano, MIT Professor of Chemical Engineering and research group leader, "This could help pharmaceutical companies figure out why certain formulations work better than others, and may help improve their effectiveness."

/// Strano and his team discovered that uniform arrays are capable of measuring the distribution in binding strength of antibodies and other complex proteins. ///

Previously, the group had demonstrated that carbon nanotube-based sensors are capable of specific target recognition – binding to proteins and producing a detectable, fluorescent signal change. Through the exploitation of large arrays of such sensors, Strano and his team discovered that uniform arrays are capable of measuring the distribution in binding strength of antibodies and other complex proteins.

When antibodies bind to cancer cell proteins the body's immune system is activated to attack the tumor. The current manufacturing method for antibody drugs, which relies on engineered cells, is not capable of generating consistent and uniformly binding batches. "You could use the technology to reject batches, but ideally you would want to use it in your upstream process development to generate a more consistent product", said Nigel Ruel, lead author of the study.

The sensors were also able to measure weak binding interactions as well as map the production of a molecule of interest. According to Ramon Wahl, author of the article and a principal scientist at Novartis (Basel, Switzerland), "Carbon nanotubes coupled to protein-binding entities are interesting for several areas of biomanufacturing as they offer great potential for online monitoring of product levels and quality. Our collaboration has shown that carbon nanotube-based fluorescent sensors are applicable for such purposes, and I am eager to follow the maturation of this technology." The team plan to test a briefcase-sized proto-type of their sensor with Novartis and the National Science Foundation (VA, USA).

– Written by Phoebe Heseltine

Source: Reuel N, Grassbaugh B, Kruss S *et al.* Emergent properties of nanosensor arrays: applications for monitoring IgG affinity distributions, weakly affined hypermannosylation, and colony selection for bio-manufacturing. *ACS Nano* doi:10.1021/nn403215e (2013) (Epub ahead of print).

Gallus and Genzyme sign multi-year agreement

Sanofi-subsidiary Genzyme has recently signed a development and manufacturing supply agreement with contract manufacturing company Gallus Biopharmaceuticals, LLC (MO, USA). The multi-year agreement states that Gallus will provide "process and method development, scale-up, clinical supply and preparation for commercial manufacturing" for an infused protein-based therapy for the treatment of Niemann-Pick type B.

Niemann-Pick type B is a lysosomal storage disease in which sphingomyelin accumulates in lysosomes, leading to enlargement of the liver and spleen, lung disease and low blood cell counts.

Mark Bamforth, Gallus' CEO and President, commented on the agreement: "Gallus is delighted to partner with Genzyme in bringing this therapy to patients in need. We are confident that our deep process development expertise and over ten years of commercial, perfusion-based biomanufacturing for global mar-kets using proprietary, flexible stainless steel bioreactors will result in successful delivery of this therapeutic molecule to advance Genzyme's clinical program."

– Written by Alice O'Hare

Source: Gallus Press Release; Gallus Biopharmaceuticals enters clinical supply agreement with Genzyme for Niemann-Pick type B disease: http://gallusbiopharma.com/docs/Gallus%20Press%20Release72014.pdf

Vivus sign commercial supply agreement with Sanofi Chimie

Vivus Inc. (CA, USA), a biopharmaceutical company specializing in developing therapies in obesity, sleep apnea, diabetes and sexual health, have recently announced an agreement with pharmaceutical giant Sanofi Chimie. The subsidiary of Sanofi is to supply the active pharmaceutical ingredient (API) for Avanafil.

Vivus's Avanafil, trade name SPEDRA™, is approved by both the US FDA and European Medicines Agency for the treatment of erectile dysfunction. The agreement means that Sanofi will be the exclusive supplier in the USA and a semi-exclusive supplier in the European Union and Latin America, for the API for the production of the therapeutic. It follows a technology transfer agreement between the two companies.

Theodore Broman, Vice President, chemistry manufacturing and control, Vivus, Inc., commented on the agreement: "Sanofi was the logical choice for avanafil API manufacturing. Their world-class manufacturing capabilities and facilities are well-suited to undertake the worldwide production of avanafil."

Vivus are currently supplied by Mitsubishi Tanabe Pharma Corporation. The company expect that the necessary approval from regulatory authorities will be completed in mid 2015, allowing Sanofi to take over this role.

– Written by Alice O'Hare

Source: Vivus Press Release; VIVUS announces commercial supply agreement with Sanofi to produce ava-nafil: http://ir.vivus.com/releasedetail.cfm?ReleaseID=781997

Location announced for new UK biological manufacturing center

The Centre for Process Innovation (CPI), the "process industry element of the UK government's national manufacturing strategy", has recently announced that their new manufacturing center will be located in Darlington (UK). The CPI is a network of seven technology and innovation centers with the aim to "stimulate growth within manufacturing sectors throughout the UK."

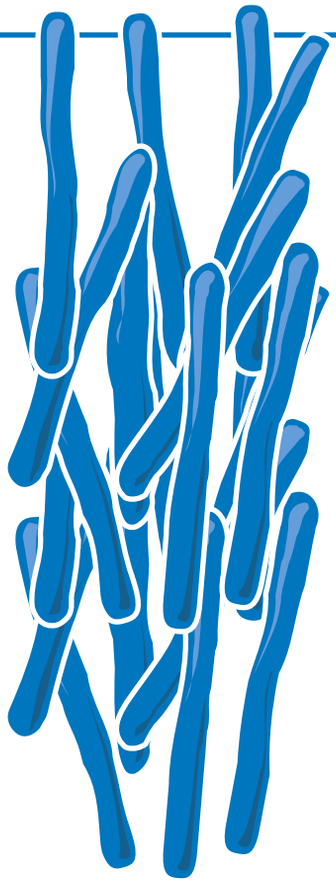
In their press release, the CPI explain the importance of biologics, and therefore biotechnology, in "revolutionizing the research and development of new medicines allowing better product targeting and personalized treatments for specific diseases and patient groups." Medicines of this type currently account for approximately 10–15% of the pharmaceutical market.

The aim of the new center is to help companies commercialize new products, by providing support in developing, testing and scaling up their technologies. Director of the National Biologics Manufacturing Center, Chris Dowle, expands on this: "The new facility will support the development of new innovative process technologies and manufacturing routes. We will provide both large and small companies with open access facilities to prove and scale up their process, therefore reducing risk associated with product development." Dowle concludes: "We will build on the UK's competencies in biopharmaceuticals to position ourselves as world leading."

The position of the new center is based on accessibility, in terms of transport links, and the proximity of the site to established pharmaceutical companies and academic institutions. Leader of Darlington City Council, Bill Dixon, expressed the council's delight at the National Biologics Manufacturing Center's new location: "The centre will attract further investment, talent and opportunities into the region and we will play a role in the development and commercialization of pharmaceuticals into the global marketplace."

– Written by Alice O'Hare

Source: National Biologics Manufacturing Center to be located in Darlington: www.uk-cpi.com/news/national-biologics-manufacturing-centre-to-be-located-in-darlington



/// A PSII–KLH conjugate has the potential to be a major infectious disease immunotherapy. ///

Stella biotechnologies acquire exclusive license to develop immunotherapy

Stellar Biotechnologies, Inc. (CA, USA) have acquired an exclusive license to use technology for the development of human immunotherapies against *Clostridium difficile* infection. The agreement allows Stellar to develop vaccines that derive from technology patented by researchers at the University of Guelph (Ontario, Canada). Namely, these patents relate to the cell-wall polysaccharide of *C. difficile* termed PSII.

Stellar produce Keyhole Limpet Hemocyanin (KLH), an immune-stimulating protein. This protein is used both for therapy, as a component in immunotherapies, and for diagnostics, to measure immune status. In a previous collaboration, researchers from Stellar and the University of Guelph have demonstrated the efficacy of conjugate vaccines that combine PSII technology with KLH. In preclinical studies, this conjugate vaccine was shown to protect against both primary and secondary *C. difficile* infection

Mario Monteiro (University of Guelph), who discovered PSII, commented on the agreement: "Stellar's vision has made it possible for our scientific discovery to migrate from the laboratory to the hands of industry. I am confident that in time, this vaccine will prove to have saved many lives."

Guelph Vice-President Research, Kevin Hall, continued to explain the importance of agreements such as this: "One of our goals at the University of Guelph is to move scientific discoveries out of the laboratories and put them to use to improve the quality of people's health and daily lives. There is no better way to do this than using academic expertise to help industry develop promising new applications that can have a positive impact globally."

Herbert Chow, Stellar Chief Technology Officer, looked to the future of this technology, commenting that: "A PSII–KLH conjugate has the potential to be a major infectious disease immunotherapy". He continued to explain that they are currently investigating the use of the LKH technology as a mucosal adjuvant in vaccines; suggestive of "a multitude of new uses for Stellar KLH technology."

– Written by Alice O'Hare

Source: Stella biotechnologies press release; Stellar Biotechnologies acquires exclusive, worldwide license to Clostridium difficile immunotherapy technology: http://stellarbiotechnologies.com/investors/news_releases/index.php?&content_id=144

Pharma Tech to expand production facility

Contract manufacturing and packaging organization Pharma Tech Industries (GA, USA) has announced plans to add approximately 60,000 square feet of manufacturing space to its facility in Union (MO, USA). The expansion will allow the production of ingestible powders at the site and is expected to be completed in March 2014.

The site will be built to ISO Class 8/100,000 cleanroom standards, and follows an upgrade of their facility in Royston (GA, USA); where the company is based. Tee Noland, Chairman of Pharma Tech Industries, commented on these projects: "Our latest expansion and upgrade projects reflect not only an increase in the volume of overall business, but in the variety of manufacturing services that Pharma Tech Industries can offer to customers."

Noland explained how the expansion fits within the company's future plans: "These projects are in line with our goal of responsible, gradual growth that allows Pharma Tech Industries to reach into new areas while continuing to refine and hone existing capabilities."

– Written by Alice O'Hare

Source: Pharma Tech Industries expanding in Union, MO: www.pmp-news.com/news/pharma-tech-industries-expanding-union-mo

The editorial team welcomes suggestions for timely, relevant items for inclusion in the news. If you have newsworthy information, please contact:
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