News & Views in .. Pharmaceutical BIOPROCESSING

Highlighting the latest news in pharmaceutical bioprocessing

Refrigeration of vaccines at melting point

Meningitis vaccine A does not require constant refrigeration with use of a controlled temperature chain, with implications for future upstream vaccine development.

In a recent press release, the Meningitis Vaccine Project, which is a PATH-WHO collaboration that aims to eliminate epidemic meningitis in sub-Saharan Africa, announced that the meningitis A vaccine termed MenAfriVac[®] can stay at ambient temperatures (approximately 40°C) for up to 4 days.

The study analyzed data from a 10 day meningitis A vaccination mass campaign carried out in Benin (West Africa) in 2012 and assessed the feasibility of using MenAfriVac at ambient temperatures using a controlled temperature chain (CTC). Overall, 155,000 people were vaccinated as part of the program and satisfaction reported by vaccinators and supervisor was reported at 100% and 99%, respectively.

As reported by the WHO, more than 20 million children worldwide do not receive required vaccination for prevention of treatable diseases. Usually vaccines are kept in a 2–8°C cold chain, however, the study demonstrated that MenAfriVac could stay at ambient temperatures for up to 4 days, while still providing the necessary vaccine potency, efficacy and safety. The use of CTC could prove particularly beneficial to provide remote areas with vaccination, such as sub-Saharan Africa where the daily temperature exceeds 30°C.

Michel Zaffran, coordinator of WHO's Expanded Programme on Immunization and former Director of Optimize, the – Written by Jessica Thorne



WHO-PATH collaboration, commented, "Finding solutions to reducing the cost and logistical challenges of reaching people living in remote areas would remove a major constraint to achieving universal coverage with vaccines beyond MenAfriVac. Indeed, a similar approach is being explored with the manufacturers of other vaccines, such as the yellow fever or the oral cholera vaccines."

Furthermore, an additional study that evaluated the economic benefits of keeping meningitis A vaccine at ambient temperatures reported that implementation of CTC could have huge economic benefits.

David Kaslow, Vice President of product development at PATH commented, "Findings from these new studies show that it is possible to deliver vaccines more conveniently and at a lower cost when refrigeration is not needed every step of the way."

Looking to the future, CTCs are inevitably restrained by current vaccine stability and as such, further work to combine CTCs with improved upstream vaccine development is essential.



Sources: Zipursky S, Djingarey MH, Lodjo JC, Olodo L, Tiendrebeogo S, Ronveaux O. Benefits of using vaccines out of the cold chain: delivering Meningitis A vaccine in a controlled temperature chain during the mass immunization campaign in Benin. Vaccine doi:10.1016/j.vaccine.2014.01.038 (2014) (Epub ahead of print); MenAfriVac® breaks the cold chain barrier: www.meningvax.org

MIT and Pfizer collaborate to advance synthetic biology research

MIT's Synthetic Biology Center and Pfizer have recently announced a 3-year collaboration to advance research in synthetic biology to improve drug discovery and developmental technologies for biologic production.

Synthetic biology, which applies engineering principles to biology, is envisaged to improve biopharmaceutical production and lead to more cost-effective manufacturing. Specifically, the collaboration between MIT's Synthetic Biology Center and Pfizer will primarily aim to develop methods for cellular genome engineering to support next-generation protein expression systems.

Doug Lauffenburger, Ford Professor of Bioengineering and Chemical Engineering and head of MIT's Department of Biological Engineering, commented, "This collaboration supports our goal to develop sophisticated synthetic biological systems from standardized, well-characterized modular parts



for useful application in multiple fields, including biopharmaceutical molecular and bioprocess design."

Jose Carlos Gutierrez-Ramos, Senior Vice President and head of Pfizer's BioTherapeutics Research and Development also added, "We are reaching a key inflection point where advances in synthetic biology have the potential to rapidly accelerate and improve biotherapeutics drug discovery and development, from early-stage candidate discovery through product supply, which could bring better, more effective therapies to patients more rapidly."

- Written by Jessica Thorne

Source: MIT's Synthetic Biology Center collaborates with Pfizer to advance synthetic biology research in drug discovery and development: http://web.mit.edu/newsoffice/2014/mits-synthetic-biology-center-collaborates-with-pfizer-to-advance-synthetic-biology-research-in-drug-discovery-and-development-.html

Collaboration announced for therapeutic antibody development

Cytovance Biologics, a contract manufacturer of mammalian and microbial biologics, have announced that they are providing their cGMP manufacturing services to Pamlico Biopharma, a biopharmaceutical company that develops therapeutic antibodies.

"Cytovance's state-of-the-art facilities and experienced staff are prepared to deliver the highest quality of development and manufacturing services for Pamlico Bioparma."

PamLico Biopharma's primary project focuses on finding treatments for severe community acquired pneumonia, which is caused by *Streptococcus pneumonia* and is a major cause of mortality worldwide. Pam-Lico Biopharma have developed three IgG monoclonal antibodies against the infection, which will be manufactured by Cytovanc Biologics. According to the press release, Cytovanc Biologics "will develop a production cell line from the protein's amino acid sequence for GMP manufacture of Phase I clinical material."

Darren Head, President and Chief Executive Officer of Cytovance Biologics commented on the collaboration, "Cytovance's state-of-the-art facilities and experienced staff are prepared to deliver the highest quality of development and manufacturing services for Pamlico Bioparma." Head continued, "We are delighted to be working with such an innovative company that uses technologies from the Oklahoma Medical Research Foundation and advance the treatment of *S. pneumoniae* infections that are associated with over 50,000 deaths annually."

Source: Cytovance Biologics, Inc. and Pamlico Biopharma, Inc. Announce Development and cGMP Manufacturing Agreement: www.cytovance.com/NewsEvents/Cytovance_Awarded_Pamlico_BioPharma_Contract.aspx

⁻ Written by Jessica Thorne

Investment announced for biologic manufacturing to Singapore

Abbvie, a global research-based biopharmaceutical company, have recently announced plans to open a manufacturing facility in Singapore. The facility, which is predicted to be operational in 2019, will manufacture small molecule and biologic therapeutics. Abbvie are investing US\$320 million to establish the facility, which will produce active drug substances for their oncology and immunology compounds for global distribution.

Azita Saleki-Gerhardt, Senior Vice President of Operations at AbbVie commented on the investment, "As Asia's fastest-growing bio-cluster, Singapore is an ideal location to expand our manufacturing network while maintaining rigorous standards of quality and delivery for the patients we serve around the world."

Currently, Abbvie has 12 manufacturing facilities, including sites in USA, Europe and Puerto Rico. This facility will be Abbvie's first manufacturing presence in Asia. The Director of the Biomedical Sciences of the Singapore Economic Development Board, Kevin Lai, explained their delight at the prospect of Abbvie

– Written by Jessica Thorne

Source: AbbVie expands manufacturing presence with US\$320 million investment in Singapore: http://abbvie.mediaroom. com/2014-02-05-AbbVie-Expands-Manufacturing-Presencewith-US-320-Million-Investment-in-Singapore expanding manufacturing to Singapore. Additionally, Lai commented that human-resource investment will be made to ensure that there are skilled manufacturers specialized in biologic manufacturing available.

Saleki-Gerhardt continued, "Our presence in Singapore will help assure geographic balance and continuity of product supply as well as increased capacity to deliver on our growing biologics and small molecule product pipeline."



Study reports alternative to protein-A chromatography

A group of researchers from McMaster University (ON, Canada) and the University of Manitoba (MB, Canada) have recently reported an alternative purification approach for IgG monoclonal antibodies for specific purification processes, instead of using traditional protein-A chromatography.

At present protein-A chromatography is widely used for purifying IgG monoclonal antibodies, however, under acidic conditions and low pH this method can cause leaching of protein-A and aggregation respectively. The study demonstrated that hydrophobic interaction membrane chromatography (HIMC), which has previously been studied as an alternative to existing purification methods, can be used as an alternative to protein-A chromatography.

The team compared the efficacy of the novel approach using EG2-hFC, a humanized chimeric heavy chain monoclonal antibody. The team reported high purity of EG2-hFc using HIMC and demonstrated gylcan profiles were the same as EG2-hFC purified by protein-A chromatography. Importantly, as explained in the abstract, using HIMC "was able to resolve aggregates from monomeric form of the EG2-hFc."

– Written by Jessica Thorne

Source: Sadavarte R, Spearman M, Okun N, Butler M, Gosh R. Purification of chimeric heavy chain monoclonal antibody EG2hFc using hydrophobic interaction membrane chromatography: an alternative to protein-A affinity chromatography. Biotechnol. Bioeng. doi:10.1002/bit.25193 (2014) (Epub ahead of print).



US FDA launches secure supply chain pilot program

The US FDA have recently announced the initiation of the Secure Supply Chain Pilot Program, which is aimed to improve the security of imported drugs. Currently, 13 companies are set to participate.

The FDA recently published a report in the Federal Register encouraging companies to voluntarily participate in the study. The enrolled companies, which include Abbvie, Pfizer and GE Heathcare had to meet several participation conditions, such as compliance with the Food, Drug, and Cosmetics Act (FDCA).

Carol Bennett, acting director of the Office of Compliance in the FDA's Center for Drug Evaluation and Research commented on the program, "By creating incentives for manufacturers to adopt best practices for supply chain integrity, we can enhance the quality and safety of imported drugs." Bennett continued, "The program also



allows the FDA to focus resources on the areas with the greatest potential risk to consumers."

The program will be evaluated over a 2-year period. During this time, the FDA will evaluate compliance with FDA regulations and security of drug importation. Depending on the results of the study, further companies may be enrolled on the program permanently.

- Written by Jessica Thorne

Source: FDA initiates the Secure Supply Chain Pilot Program to enhance security of imported drugs: www.fda.gov/NewsEvents/ Newsroom/PressAnnouncements/ucm386275.htm

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