



THE HEALTH QUARTERS QUARTERLY NEWSLETTER

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Esco Healthcare launches the first issue of its quarterly newspaper, The Health Quarters (The HQ), featuring its esteemed project highlight, informative behind-the-product technological principles and know-hows, as well as its latest innovative product advancements.

In this issue, The HQ focuses on the continuously emerging COVID-19 variants. As mutations continue to arise and the spread of the virus is still prevalent, vaccine roll-outs with desired herd immunity to end the pandemic is still far from sight. Esco anticipates the need for scaled-up solutions in providing leading-edge technologies to support stakeholders in producing top-of-the-line quality vaccines.

Inside this Issue



HQ Breakthrough

Esco Pharma USA Successfully Commissions a Filling Line Isolator Project

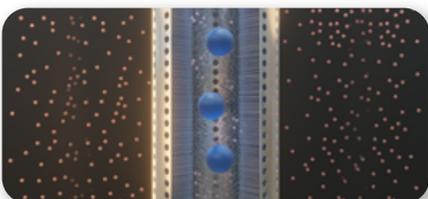
The manufacture of sterile pharmaceuticals requires advanced technologies like filling line machines to ensure compliance with stringent manufacturing guidelines.



Insight Scoop

From Race for the First, To Race against the Variants

In early 2020, several companies have worked round-the-clock to commercialize the first COVID-19 vaccine.



Project Genesis

Get in the Zone with AsterFlow™

Expanding from its line of bioreactors, Esco VacciXcell presents its first filtration platform. The AsterFlow™ is an intuitive, flexible crossflow system for process development.



Take A Minute!

Brain Teasers That'll Stretch Your Brain In A Minute!

Have what it takes to solve the puzzle and find the missing links? Stretch your brain in these inviting teasers on our entertainment page.

HQ Breakthrough

Esco Pharma USA Successfully Commissions a Filling Line Isolator Project

The manufacture of sterile pharmaceuticals requires advanced technologies like filling line machines to ensure compliance with stringent manufacturing guidelines.

Pharmaceutical filling line streamlines the manufacturing process of medicines. It is capable of expediting the filling of hundreds of vials, ampules, or pre-filled syringes per minute of production while preventing product loss and ensuring consistent volume of product. It can also facilitate continuous operation in meeting the output demands of production. A filling line equipment can be a fully automated or semi-automated system that offers sterility control for critical operations. This is now becoming the standard of sterile pharmaceutical manufacturing.

Esco Pharma designs and manufactures isolation containment systems that are built around the design of the filling line equipment and customizes it to meet individual client requirements. Filling line isolators commonly enclose the filling, stoppering, and capping processes of a filling line machine. The system provides an ISO Class 5/Grade A environment and integrated hydrogen

peroxide decontamination to ensure the sterility of the area and to meet the stringent demands of sterile production. Filling line system projects usually have a duration of 8 to 14 months depending on the complexity of the design and the customizations that are needed to be done.

The Project

This month, Esco Technologies Inc. (Esco Pharma USA) finished the commissioning of its project for filling line isolators and open restricted access barrier system (oRABS) for a pharmaceutical manufacturing company in the USA.

The complete equipment contains the following components:

- an oRABS for the automatic bag opening process,
- a 2-glove Isolator for the automatic tub opening process,
- a 4-glove Isolator for the automated robotic filling and closing, and
- an oRABS for the vial sealing module.



The filling line system was designed with an entry oRABS for bag removal, connected to an isolator for tub opening, and then an isolator for the automated filling and closing of the vials. Lastly, it connects to an exit oRABS where the capping process is carried out.

The isolators and oRABS systems were designed to create a continuous environment that will achieve the required operating parameters of the filling line machine. It is designed to operate in a positive pressure relative to the ambient environment, with a suitable pressure cascade between different modules. It also operates in Grade A/ISO Class 5 laminar airflow conditions.

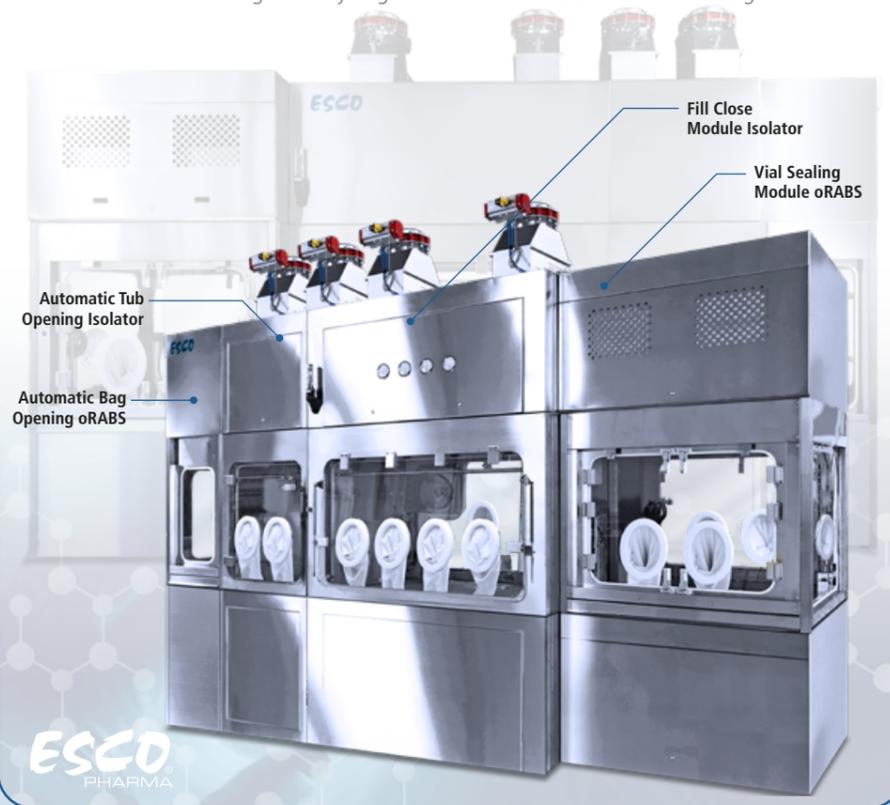
The two units of isolators are double-wall designed with inlet and exhaust ducted out of the room to remote HVAC skids. Both are capable of temperature control with cooling mechanisms. The tub opening isolator is equipped with one rapid transfer port (RTP) for waste removal. While the fill close module isolator is equipped with two RTPs, one is for liquid transfer to the pump and the other is for charging of the stoppers.

These isolators are also equipped with the BioVap™ biodecontamination system with onboard hydrogen peroxide sensors and room sensors. It is designed with remote skids for exhaust with double-stage catalytic converters which enables the system to exhaust air back to the building after the biodecontamination process.

The equipment and its control system were designed and constructed following cGMP and GAMP 5 guidelines in addition to industrial equipment directives.

Filling line isolators are designed to incorporate third-party filling line equipment. To ensure the delivery of quality products, Esco Pharma works hand in hand with partners from leading filling line manufacturers. While the process of building a filling line isolator system requires extensive planning, Esco Pharma, amplified with its experience, is consistent in bringing about solutions for worthwhile challenges.

Click [here](#) for more information or contact us at csis.pharma@escoglobal.com



Insight Scoop

From Race for the First, To Race against the Variants

In early 2020, several companies have worked round-the-clock to commercialize the first COVID-19 vaccine. Pfizer/BioNTech, Sinovac, Moderna, Astrazeneca/Oxford, and Gamaleya emerged as the leading companies to develop the most widely used and distributed COVID-19 vaccines to date. These vaccines have shown promising results in controlled clinical trials, paving the way for their approval and emergency use authorizations. Their performance in the real world, or vaccine effectiveness, remains to be determined as mass vaccination programs kick off in the next few months.

The designs of the leading vaccines in the market today are based on the early circulating strains of the SARS-CoV-2. The spike protein of the virus is a prominent target to design against as it is used for viral entry to the host cells, and is found abundantly on the viral surface which can be easily accessed by antibodies.

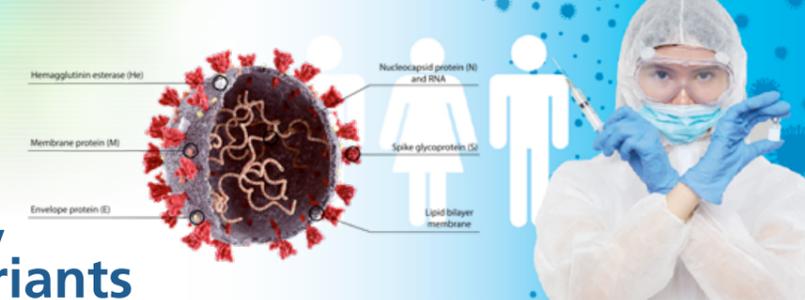
However, variants have emerged and have been detected late 2020 to early 2021, and have shown to reduce vaccine effectiveness, e.g., Oxford/Astrazeneca vaccine offers little to no protection against the South African B.1.351 variant. A study conducted by University of Oxford researchers shows some evidence that one of the mutations of this variant in the spike protein, E484K, may affect the neutralization of generated polyclonal and monoclonal antibodies. Recently, the surge of infection in India is fueled by the B.1.617 double variant (carrying features from California and South African variants). However, a peer-reviewed study by Indian scientists reveals that the most commonly

used vaccine in their country protects against this double mutant variant.

The faulty replication machinery of the SARS-CoV-2 virus generates an estimated (from both theoretical and empirical mutation rate) 3 mutations per month for a specific lineage of virions infecting from host-to-host. Within a single host, the estimated mutation is 0.5 per infection, which can span most single base mutations. Variants today accumulated about 20-30 mutations, the B.1.1.7 UK variant having 40 mutations. This rate of mutation indicates the possibility of new variants to emerge persistently which can be dominant and can infect more people.

On the other hand, it is estimated that the current vaccination efforts would lead to only 10% of the world population being vaccinated by the end of this year. A model shows that to achieve herd immunity, 55% coverage is needed with a 90% vaccine efficiency and some social distancing measures. At the current rate the world is going and how fast variants are emerging, key stakeholders should ramp up monitoring and vaccination.

Low and middle-income countries should also continue to bolster their efforts to provide equitable access to vaccination, as well as efforts to educate vaccination benefits. Leading vaccine providers are also updating their vaccines to protect against emerging variants; some will provide booster shots for a third jab. Open technology sharing is being pressed by various groups to pharmaceutical and biotech companies to provide information for manufacturers to easily manufacture updated vaccines.



Manufacturing platforms such as the Tide Motion technology enable linearly scalable culture of viral and viral vector manufacturing using the most commonly used cell lines. Viral and vector-based vaccine development is shortened through the high yield obtained from bench-top scale (CelCradle™ and CelCradleX®) to pilot scale (TideXcell®). For RNA-based vaccines, plasmid DNA can be grown in large quantities using stirred tank bioreactors (StirCradle™).

Esco Aster, as the sister company, provides PD and CDMO services to bring vaccines and mAb drugs faster to clinic and market. mAb-based drugs may be needed to rapidly treat COVID-19 patients freeing up hospital beds, as there is a shortage of O₂ tanks in some areas. Recovered patients can later be vaccinated.

The need for a fast reaction time requires the availability of technologies such as the Tide Motion system for high product yield to combat viral machinery capable of spewing out variants. In this regard, these bioreactors offer ease of production, higher process control, and fewer cleaning procedures (single-use options) while providing short lead times. In effect, we can win this race against time, and we win by running together.

References:

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Torjesen I. Covid-19 will become endemic but with decreased potency over time, scientists believe *BMI* 2021; 372 :n494 doi:10.1136/bmj.n494

Project Genesis

Get in the Zone with AsterFlow™

Introducing the new line of filtration systems from Esco VacciXcell, marking an expansion of our comprehensive core Tide Motion technology portfolio.

AsterFlow™ is a single-use, compact, configurable filtration platform tool ideal for downstream processes such as clarification, concentration, diafiltration, purification and recovery for a variety of products. The system is designed to be compliant to

21 CFR Part 11 that is suitable for process development, manufacturing of clinical trial and cGMP material. Especially in the case of vaccine manufacturing, where impurities must be removed, and formulation must be highly safe for human or animal use.

This standalone model is capable of processing batches up to 5 L, across different membrane types from 50 cm² to 0.14 m². It is compatible with a range of filtration modules like hollow



Project Genesis (cont'd)

fiber cartridges, tubular ceramics, and spiral wounds. The stainless steel robust body with platinum-cured silicone flow path assures high-effectiveness and long-term quality.

Applications:

- Concentrate and desalt proteins and peptides
- Concentrate and desalt nucleic acids [DNA/RNA/oligonucleotides]
- Recover and purify antibodies or recombinant proteins from cell culture media
- Recover and purify plasmid DNA from cell lysates or chromosomal DNA from whole blood

- Fractionate dilute protein mixtures
- Clarify cell lysates or tissue homogenates
- Depyrogenate (remove endotoxin from) water, buffers, and media solutions
- Prepare samples prior to column chromatography
- Harvest cells
- Purify viruses
- Filter viruses

High precision pressure sensors located within the feed, retentate, and permeate line allows the user to define process operating controls. Low shear peristaltic membrane pump delivers up to 100 L/h and is well suited for

working with shear-sensitive products. User-friendly, interactive, 21 CFR Part 11-compliant 12" HMI/PLC enables full system viewing and control of in-process parameters supporting operations in both laboratory and production conditions. The software also contains in-built programs for the various modes of operation.

The AsterFlow™ is flexible for customization based on process requirements such as custom holders for cartridge filters, in-line pH, conductivity, and temperature sensors, auxiliary diafiltration or feed pump, gamma-radiated flow paths and reservoirs.

The AsterFlow™ is available to order, so get in the zone with AsterFlow™ for your next filtration process!

Click [here](#), for more information or contact us at mail@escovaccixcell.com.

TAKE A MINUTE

FIND THE MISSING ITEMS:

Can you help these healthcare scientists look for some of their missing items before starting the experiment?

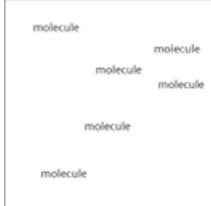
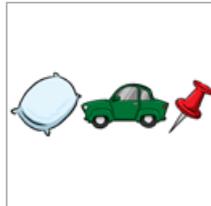
- | | |
|----------------------------------|------------------------------|
| 1. Disposable pipettes | 7. Crystal Violet Dye (CVD) |
| 2. Esco Cell Processing Isolator | 8. Neubauer counting chamber |
| 3. Petri dishes | 9. Cryogenic tank |
| 4. T-flasks | 10. CelCradle™ bioreactor |
| 5. Gloveports | 11. BioNOC™ II macrocarriers |
| 6. Cryogenic vials | |



WORD PICTURE PUZZLE:

Rebus puzzles are pictures often made with letters, numbers or images, which vaguely represents a word, a phrase, or a saying. To help you solve them, make sure to look at word placements, sizes, colors, and quantities. So, can you decipher these rebus puzzles before your 1 minute runs out?

CLUE: SCIENCE & TECHNOLOGY, PHARMACY

 1.	 2.	 3.
 4.	 5.	 6.
 7.	 8.	 9.



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