THE HEALTH QUARTERS
QUARTERLY NEWSLETTER
ISSUE 5 | JUNE 2022

ESCO Healthcare "Discovery to Delivery"

The Next Shift: Moving Forward in Leaps and Bounds with Esco Healthcare's Technologies

Biopharma, a complex and dynamic industry, is continuously evolving and developing to create a cure for a wide range of diseases. In the 5th issue of The Esco Health Quarters (The HQ) newsletter, emphasis is given on how much have changed in biopharmaceutical processing, especially with the hit of the notorious COVID-19 pandemic. More details involving the "hows" of preparing for the future disease X along with the next phase of manufacturing is detailed in this newsletter. It's all about keeping the momentum alive for biopharmaceutical industries to ensure the world will never again be at a stalemate with viruses.

Take A Minute!

Guess the Gibber-Jabber

Still in search of meanings? How about you take a guess this time around, detaching strings of nonsensical terms. Have a minute of fun!

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Visit our websites via links below:

Esco Pharma - www.escopharma.com
Esco TaPestle Rx - www.escotapestlerx.com
Esco VacciXcell - www.escovaccixcell.com
Esco Aster - www.escoaster.com

Scan to access The HQ's Newsletter Issues

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HQ Breakthrough

Esco Aster Takes the WVC Spotlight!

Esco Aster has finally and physically made a come-back during the most awaited event of the year: The World Vaccine Congress (WVC). It was recently held at Mariott Marquis last Apr. 12-22. WVC is the world's largest vaccine conference, bringing together delegates from all around the world.

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Insight Scoop

COVID-19: The New Phase of Vaccine Manufacturing

COVID-19 vaccine manufacturing sky-rocketed at a very fast rate to quench the demands of the public. But of course, the presence of the deadly virus is not an excuse to compromise quality production. Connect with Esco Pharma and start your journey of modernized aseptic manufacturing with an established industrial partner.

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Project Genesis

Esco Designs and Manufactures Sterile Syringe Fill-Finish Isolator for US Biopharma Company

As the world advances, Esco moves forward along the growing industries with an automated closed-system technology. It possesses a reliable, flexible, and workable selection of configurations to meet the most demanding sterile/aseptic processing with optimal efficiency and integrity.

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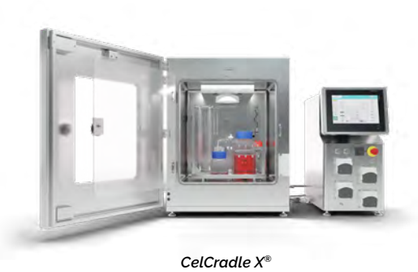
HQ Breakthrough

Esco Aster Takes the WVC Spotlight!

Esco Aster took the spotlight of the World Vaccine Congress (WVC) with its core technology: Tide Motion bioreactors and pushed it up further with its promising Contract Development and Manufacturing Organization (CDMO)/ Contract Research Organization (CRO) services in the vaccine industry. One of the best head-turners at the congress was Esco Aster's latest version of **CelCradle®** and **CelCradle X®** systems. The new and improved CelCradle® design comes with a standalone 21 CFR part 11-compliant control tower, gathering crowds into the booth. Also, the macroporous carriers have advanced to the next level. As with the bottles that can be pre-packed with either BioNOC II®, BioMESH®, or BioNOC D™. Another feature of the CelCradle® system is that it comes with the updated version of the Celfeeder® which allows automated perfusion strategy and eliminates the manual checking of parameters such as pH.

CelCradle®



CelCradle X®

During the exhibition, a newly improved model of the CelCradle X® system was also highlighted. CelCradle X® is a standalone, closed automated bioreactor specializing on adherent cell culture applications such as autologous cell therapy. It comes with an incubator system that has a low-temperature control feature which is one of the critical requirements in the production of aquaculture vaccines.

With the combined efforts of Esco VXL's core technology and Esco Aster's services, the goal to provide optimal bioprocessing solution in formulating and manufacturing adjuvants, mRNA platforms, virus-like particles (VLPs), and viral vectors, up to technology transfer and constant vaccine manufacturing is being developed continuously.

Esco Aster will continue to up the pace this year, so stay tuned and we hope to see you in one of our many international events!

2022 CALENDAR OF EVENTS

AUGUST 17-19	Esco Healthcare	ISPE.	Suntec, Singapore
OCTOBER 10-13	Esco VacciXcell Esco Aster	WORLDVACCINE CONGRESS	Palau De Congressos De Catalunya, Barcelona
NOVEMBER 1-3	Esco Pharma	CPHI Frankfurt	Messe Frankfurt, Frankfurt, Germany
NOVEMBER 1-3	Esco Pharma	LAB Innovations	National Exhibition Centre (NEC), Birmingham, UK
NOVEMBER 28-29	Esco Pharma	Making Pharmaceuticals	Royal Dublin Society, Dublin, Ireland

Esco Healthcare Calendar of Events 2022

Insight Scoop

COVID-19: The New Phase of Vaccine Manufacturing

More than 700 days have passed since news about a horrifying outbreak — severe cases of pneumonia-like illness — in Wuhan, China spread like wildfire. Later on, the whole world got acquainted with said illness which was named: severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or COVID-19 for short.

2020 & 2021: It seemed like the world was cloaked beneath a thick veil of darkness called 'pandemic.' Around 7.9 billion people bore witness to the fact that 'pandemic' is not a term that must be taken lightly. The said word has had enough ammunition as it forced countries into community quarantine and nationwide lockdowns for months.

A little more about the virus...

The COVID-19 virus is caused by the novel strain of coronavirus (SARS-CoV-2) that has been identified as being responsible for over 90% of pandemic COVID cases. And so, it is not an entirely huge surprise that such virus has easily spread across the world and left almost 500,000 people dead in its wake. The COVID-19 virus is a newly emerged strain of coronavirus, which cannot be fought with current vaccines or antivirals. Therefore, billions of people watched with bated breath as world-renowned pharmaceutical companies raced to formulate the COVID-19 vaccine last 2020 to 2021.

However, the nature of the COVID-19 virus plus the world's current standing with its vaccine also means that if a new strain emerges, the global population will, once again, not have any way to fight against it. So as early as now, the world needs to keep this pandemic under full control!

Presently, immunizing the world's rising population and at the same time, considering the mutating COVID-19 strains like omicron and deltacron, are both critical factors in bringing the pandemic under control. Moreover, there is a global competition for a limited supply of vaccines partnered with popular skepticism.

As a result of these challenges, vaccinations may take-up an average of eight to 15 years (Fig. 1) before they are turned over from the laboratory to the hands of healthcare personnel.

Fortunately, following the emergence of COVID-19, vaccine development process has accelerated around the globe; even researchers are now open to new vaccine technologies that can simultaneously address the bottlenecks of this battle.

All medications, including vaccines, involve a complex pharmaceutical manufacturing process that must undergo rigid validation tests along with quality control tests. Such tests provide a documented assurance that all quality processing is reproducible at every manufacturing cycle. This is critical because it assures that the final products are safe, efficient, and of high quality.

Different manufacturing guidelines are created per drug dosage form (i.e., creams, ointments, tablets, capsules, parenterals); and the guidelines for intravenous preparations are comprised of stricter protocols to guarantee a completely aseptic/sterile final product.

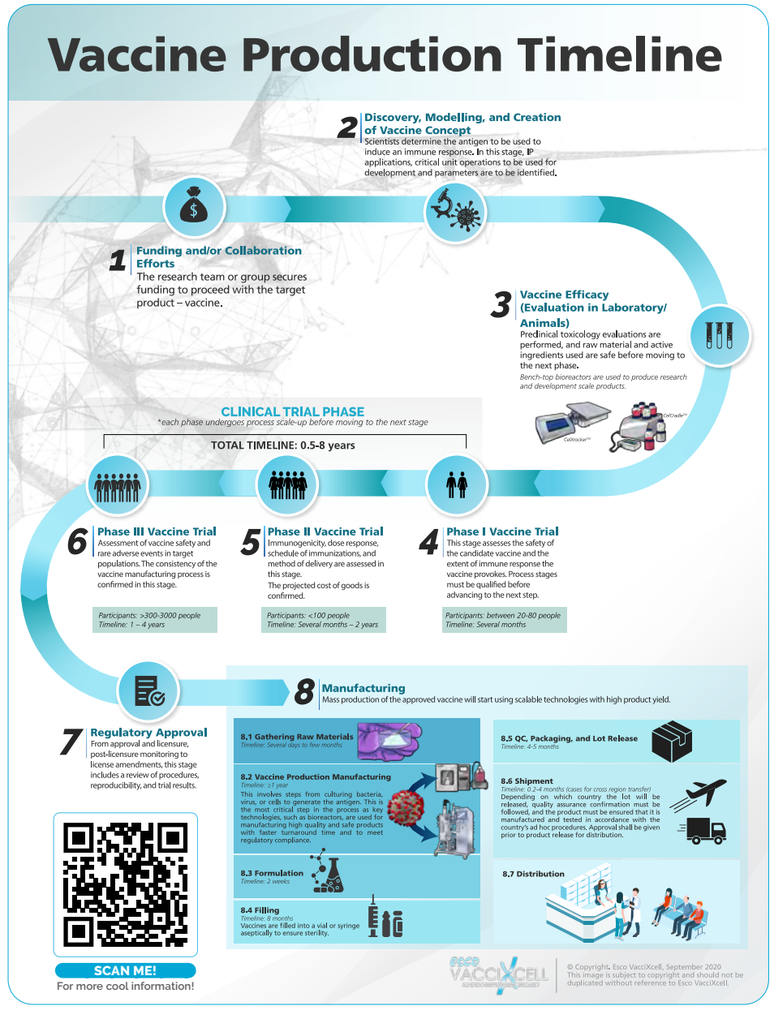


Figure 1. Usual timeline and critical events during vaccine production.

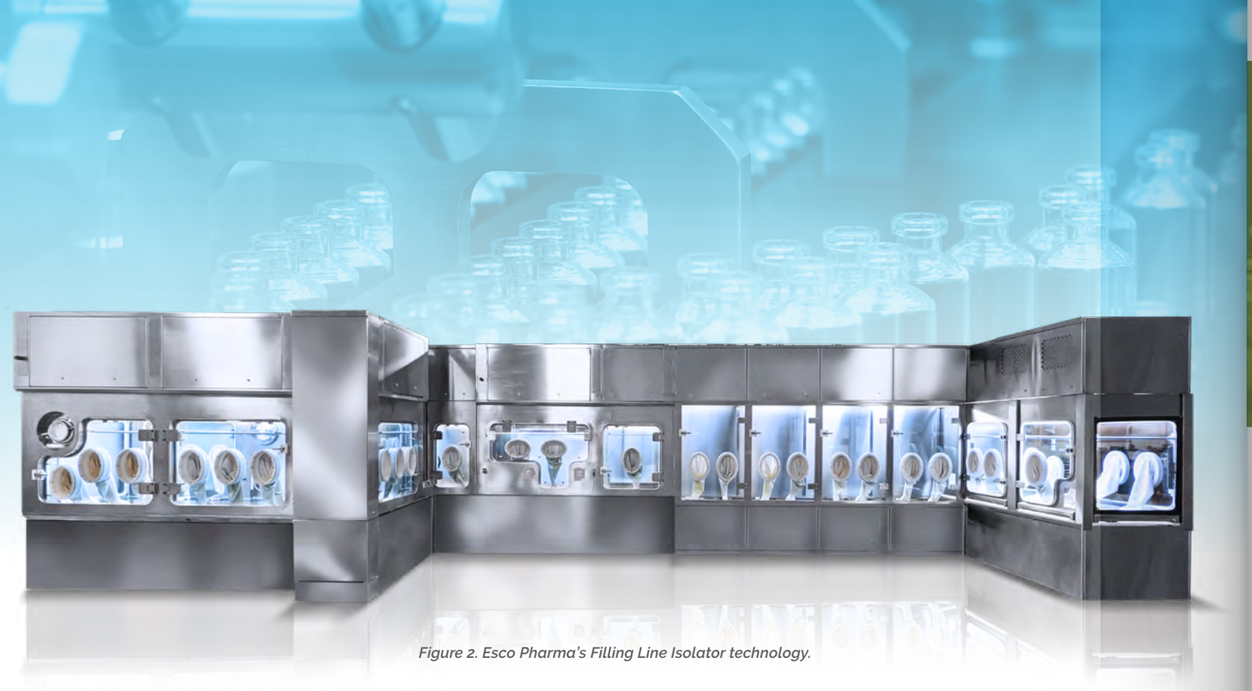


Figure 2. Esco Pharma's Filling Line Isolator technology.

The past two years have shown an increase in the global vaccine manufacturing landscape due to a high demand to counter COVID-19. Statistics show that during the pre-pandemic era, only five billion vaccine doses are produced annually around the globe; however, the International Federation of Pharmaceutical Manufacturers and Associations (IFPMA) estimates that global vaccine output would reach 24 billion by mid-2022.

Vaccine manufacturing sky-rocketed at a very fast rate to quench the demands of the public. But of course, the presence of the deadly virus is not an excuse to compromise quality production.

Filling Good with Esco Pharma!

The Code of Federal Regulations (CFR) Title 21, part 211, section 63 of the US Food and Drug Administration states that the equipment used in the manufacture, processing, packing, or holding of a drug shall be of appropriate design, adequate size, and suitably located to facilitate operations for its intended use along with its cleaning and maintenance.

Vaccine manufacturing involves different equipment in various rooms of the facility with discrete steps. High demands of the product may equate to continuously rigorous manufacturing workdays. In such a high-paced environment where quality is of utmost importance, human error is a huge risk! In a traditional manufacturing setup, this is mostly due to the frequency of manual interference such as the need to manually stop each process and transport processing materials from one facility or equipment to another.

Fortunately, advances in the pharmaceutical field showcased continuous manufacturing with smaller footprints, ultimately decreasing the need for the operators' manual interference.

With continuous manufacturing, critical processes for sterile vaccine manufacture are integrated within a closed system; hence, reducing possible contamination risk by man and the environment. This is made possible as continuous manufacturing utilizes modern technologies with automated environmental and process monitoring so that errors in the process are detected in real-time and resolved in a faster rate, strengthening the machine's integrity and ensuring longevity. Such advancement also prevents any hindrance to the overall vaccine manufacturing processes.

Esco Pharma provides services by industrial experts along with innovative equipment solutions from our core technologies tailored fit to the client's specific process needs.

With our isolation core technology, we guarantee aseptic manufacturing by configuring our system to have specific pressurization (positive or negative), integrated viable and non-viable particle counters (mechanical and/or software), automated pressure hold testing, biodecontamination system, and with automated controls – all dictated by the client's specific protocols.

Esco Filling Line Isolator

As development of vaccines to curb a disease outbreak ramp up, most manufacturers are now moving to the filling phase using ready-to-use technologies with strictly validated automation. Overall, this movement aims to decrease the challenges of sterile manufacturing that may cause unnecessary delays in production lead time.

Aside from our highly customizable isolator models, Esco Pharma provides Formulation and Filling Line Isolator systems whose size can range from a mere six gloves to a staggering 15 glove filling line unit (Fig. 2)! Esco does not manufacture stand-alone filling lines, rather, it partners with filling line machine manufacturers and together provide the complete solution for sterile filling lines.

Esco Pharma can:

- do the front-end engineering design
- ergonomic trials,
- user requirement specifications (URS),
- write-up
- coordinate with its various partners for the provision of a fully integrated system (Isolator + Filling lines + Freeze Drier + Auto-loading/unloading system) or provide a fully integrated system according to client URS.

Esco Pharma also has an option to link the complete system to the client's SCADA/BMS system (PCS7, DeltaV, Wonderware or others) for e-Batch records and signatures in compliance with GAMP 5, 21 CFR Part 11 compliance with computer systems validation.

Connect with us! Choose from Esco Pharma's wide range of innovative core technologies and start your journey of modernized manufacturing with an established industrial partner.

References:

1. D'Amore, T. and Yang, Y., 2022. Advances and Challenges in Vaccine Development and Manufacture - BioProcess International. [online] BioProcess International. Available at: <https://bioprocessintl.com/manufacturing/vaccines/advances-and-challenges-in-vaccine-development-and-manufacture/> [Accessed 6 May 2022].
2. FDA Perspective on Continuous Manufacturing. (2019). Retrieved 1 October 2019, from https://www.fda.gov/media/85366/download
3. Guzman, J., Pincombe, M., Yadav, P. and Glassman, A., 2022. Expanding Emergency Vaccine Manufacturing Capacity in Latin America and the Caribbean. [online] Center for Global Development | Ideas to Action. Available at: <https://www.cgdev.org/publication/expanding-emergency-vaccine-manufacturing-capacity-latin-america-and-caribbean> [Accessed 6 May 2022].
4. IFPMA, 2021. As COVID-19 vaccine output estimated to reach over 12 billion by year end and 24 billion by mid-2022, innovative vaccine manufacturers renew commitment to support G20 efforts to address remaining barriers to equitable access - IFPMA. [online] Available at: <https://www.ifpma.org/resource-centre/as-covid-19-vaccine-output-estimated-to-reach-over-12-billion-by-year-end-and-24-billion-by-mid-2022-innovative-vaccine-manufacturers-renew-commitment-to-support-g20-efforts-to-address-remaining-barr/> [Accessed 6 May 2022].
5. IFPMA, 2022. COVID-19 vaccines and treatments output continues apace; as health systems and last mile hurdles remain collective stumbling blocks - IFPMA. [online] Available at: <https://www.ifpma.org/resource-centre/covid-19-vaccines-and-treatments-output-continues-apace-as-health-systems-and-last-mile-hurdles-remain-collective-stumbling-blocks/> [Accessed 6 May 2022].

Project Genesis

Esco Designs and Manufactures Sterile Syringe Fill-Finish Isolator for US Biopharma Company

Esco Technologies, Inc. (ETI) with a core strength on isolation containment technology has worked in collaboration with a third-party filling line company to fulfill an **Aseptic Syringe Filling Line Isolator** for a Biopharmaceutical Company centered in developing cancer treatments.

The 18-glove filling line isolator is expected to be completed by July 2022.

The unit is designed to provide an aseptic environment suitable for the non-hazardous aseptic processing and filling of **ready-to-use and sterile plastic syringes** with a fill size of 1 mL to 60 mL. The entire 18-glove unit is built with all-around access wherein its three (3) sides are equipped with glove ports for ease of movement, which also enables an efficient process flow in the filling line isolator.

An open restricted access barrier system (oRABS) is positioned prior to the isolator system and is equipped with a loading mousehole for the introduction of pre-sterilized components to the unit. The system is also designed with a syringe exit and waste-out mouseholes for minimal disruption during processing.

In addition to the barrier isolation technology to the syringe filler system, a positive operating pressure relative to the ambient environment, and maintained pressure cascade between modules, ensure an ISO Class 5 per ISO 14644-1 (Grade A per EU GMP) clean environment within the filling line isolator. The isolator modules are ducted to the heating, ventilation, and air conditioning (HVAC) system of the client with separate intake and exhaust air pathways to achieve a once-through airflow.

An integrated Esco BioVap™ hydrogen peroxide (H_2O_2) system allows the biodecontamination of the isolator modules ensuring a 6-log reduction in bioburden. Prior to starting a biodecontamination cycle, the unit must be pressure-tested via the automated leakage testing as per ISO 10648-2. The leak-tight enclosure prevents cross-contamination and guarantees operator safety when carrying out the biodecontamination process.

The unit is controlled, monitored, and designed with alarms to verify system integrity on the required internal environmental conditions inside the isolator and the RABS chamber. The equipment and its control system, have been designed and constructed following **cGMP and GAMP 5 guidelines** in addition to other industrial equipment directives. The unit also complies with **21 CFR Part 11** for audit trailing as required by GMP-compliant companies.

As the world advances, Esco Pharma moves forward along with the growing industries with progressive closed-system technologies that are both reliable and flexible! . Such units also have a wide array of possible configurations to meet the most demanding sterile/aseptic processing with optimal efficiency and integrity.

Esco Pharma is proud to have worked hand-in-hand with an esteemed filling line and biopharmaceutical company to advance solutions dedicated to the development of cancer treatments.

Leverage your aseptic/sterile filling processes with Esco's Filling Line Isolator and Isolation Containment Solutions.

Contact and engage with an Esco office near you!

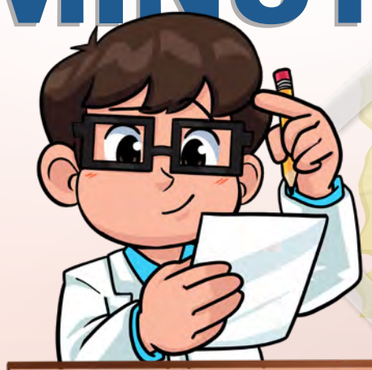
SCAN ME!
Visit escopharma.com for more information!

TAKE A MINUTE

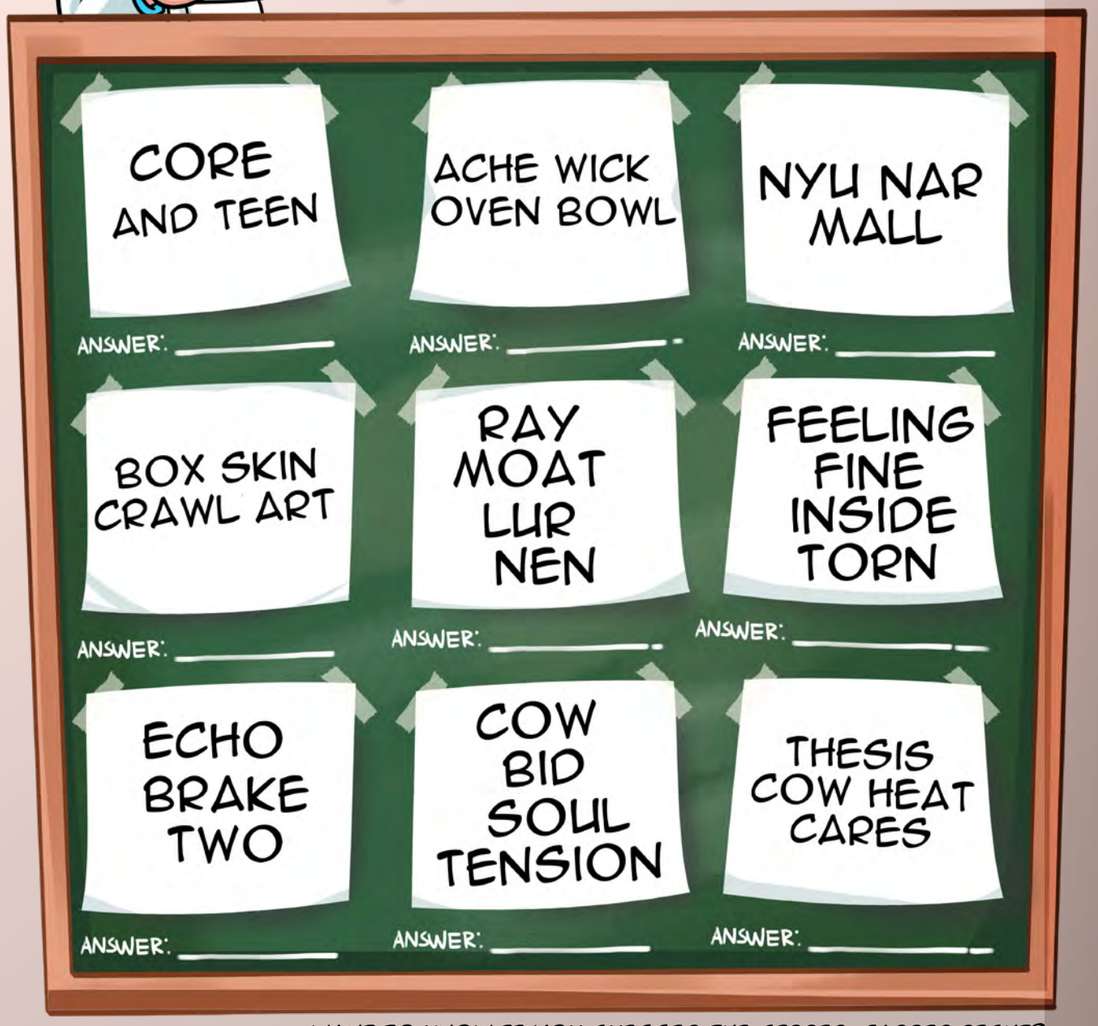
***Gibberish* is a term used to describe language that appears to be meaningless** — this includes nonsensical speech and even technical lingo which may appear unintelligible to others.

In this game, strings of nonsensical words, letters, and even sentences are provided below!

Have a knack for ciphers? Guess the words and place them in the spaces provided. It can be tricky, but it's a lot of fun!



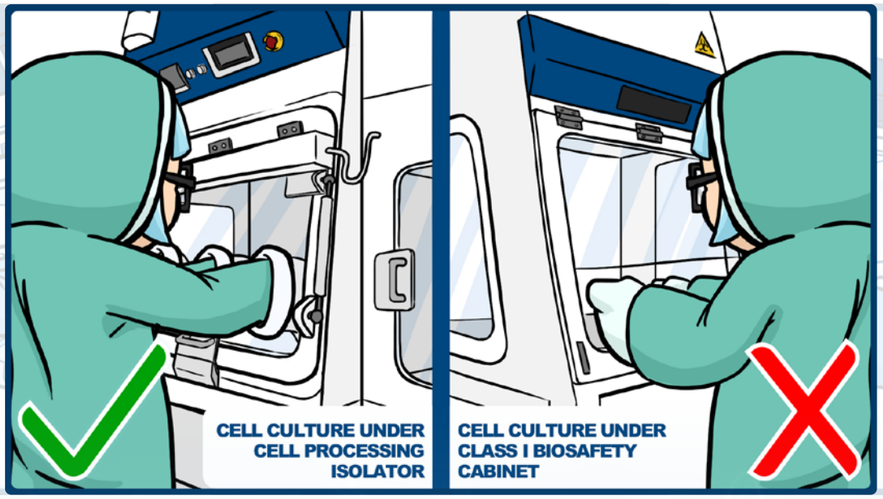
GUESS THE GIBBER-JABBER



WANT TO KNOW IF YOU GUESSED THE GIBBER-JABBER RIGHT? SEE YOU IN THE NEXT ISSUE!

TAKE A MINUTE

Answers from the Previous Issue



A Scientist Contaminated A Stem Cell Culture! Can you help Professor VacciXcell find the culprit?

On the 10th of January 2022, Professor VacciXcell and his peers prepared a stem cell culture, arranged, and set up all the materials, samples, and reagents needed in an aseptic manner. On the 4th day, professor VacciXcell noticed a change in the color of the media. It appeared turbid and had some sort of thin film on the topmost layer. By observation, he knew something was wrong.

Upon a more thorough investigation, it turned out it was contaminated with Mycoplasma bacteria. Now, Professor VacciXcell is scrutinizing who contaminated the cell culture. He then asked his peers, and had their own alibis.

So WHO WAS THE CULPRIT?

Answer:

Ms. VacciXcell contaminated the cell culture! *On Day 3, she changed the culture media of the 2 T75 flasks under the Airstream® Class I Biological Safety Cabinet which is not advisable for cell culture processes. Biological Safety Cabinet Class I protects the user and surrounding environment, but provide no protection for the sample being handled, hence a contamination-free environment for the sample/s cannot be guaranteed.*

Recommendation:

Preparation of cell culture requires the use of multiple sets of equipment. In an adaptable system like the Cell Processing Isolator (CPI), exposure to a non-grade A/ISO Class 5 external environment is limited as all the necessary equipment is fully integrated within the system.

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