



THE HEALTH QUARTERS QUARTERLY NEWSLETTER

ISSUE 3 | DECEMBER 2021



Year In Review: Healthcare's Year-End Issue

Visit our websites via links below:

Esco Pharma - escopharma.com

Esco TaPestle Rx - escotapestlerx.com

Esco VacciXcell - escovaccixcell.com

Esco Aster - escoaster.com

Indeed, 2021 has enriched the healthcare sector with discoveries and innovations that have improved and reshaped people's way of living. As we head towards the end of the year, Esco Healthcare brings the third issue of its newsletter – The Health Quarters, by running through the events and accomplishments that we all have shared.

Inside this issue, Esco Healthcare relived the different expos, conferences, and seminars that we have attended to showcase our proprietary products, sustainable solutions, and innovative services that can be of great benefit to the healthcare sector, especially on this recent pandemic. Moreover, another milestone in food alternatives using cellular agriculture technologies has been achieved by Esco Aster, relieving the gap in domestic food production worldwide. Esco Aster has successfully created and continuously creating high-quality meat manufactured from cultured animal cells, making the phrase "from lab to table" a reality.

As we move forward, join us once again as we continue to help build a better world for future generations with our cutting-edge platforms and strategic solutions.

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We're feeling extra festive, so we have not only one, but two games to bring the holiday cheer! Stop the grinch from stealing Christmas by finding him in a game of Hidden Pictures. After that, help our scientist crack the code to solve for the Grinch's secret messages.

HQ Breakthrough



What Transpired? We Met You! - An Event Recap of 2021

The year 2021 has probably been one of the most challenging years the world has experienced. On the brighter side, it has brought nations together to work in unity against battling the threat that COVID-19 has imprinted in every country. As the world confronted this pandemic, we celebrate and acknowledge the response of biopharmaceutical industries, acting toward the ultimate goal of putting an end to this pandemic. Contract development and manufacturing organizations (CDMOs) are continuously collaborating with the pharmaceutical and biotechnology industries to develop methods toward the permanent egress of this global threat. The hard work of our scientists, along with all the people in medical and scientific fields, has led to a better knowledge of the virus' genetic, immunological, and epidemiological nature, leading to the development of vaccines and reliable diagnostics that are presently available in different parts of the world. With the advancements in vaccine roll-out, immunizations took place in different regions. The mass vaccination has resulted in several countries going mask-free and loosening their restrictions.

In line with this, Esco Healthcare has attended different expos, conferences, and seminars to showcase its proprietary products, sustainable solutions, and innovative services that can be of benefit to the healthcare sector.

Before the year ends, Esco Healthcare would like to recall the moments and events that we have shared with all of you, in the year 2021.

Esco Aster 2021 Events Recap

This year, Esco Aster was physically and virtually present in different events to showcase its products and solutions for various bioprocessing requirements.

On Oct. 19-21, Esco Aster participated in three events in three days – World Vaccine Congress (WVC) in Europe, Interphex in USA, and Developing Countries Vaccine Manufacturers Network (DCVMN) in South Africa; and in Nov., Arablab took place in Dubai. These events held a series of sessions and exhibitions that covered topics such as groundbreaking progress in vaccines and state-of-the-art solutions to manufacture healthcare quality products.

Esco Aster joined this year's World Vaccine Congress in Europe – the largest meeting where global vaccine industries get together to discuss research to commercial manufacturing and current scientific trends. Esco VacciXcell, the bioprocessing companion of Esco Aster and a division under Esco Healthcare highlighted their product portfolio consisting of a wide range of products from macrocarriers, bench-top bioreactors, and pilot-scale bioreactors that coherently work with the proprietary Tide Motion Principle.



On the other hand, Interphex 2021 was held at Javits Center New York City. This event solely focuses on pharmaceutical, biotechnology, and device development and manufacturing, wherein more than 625 industries joined together to learn and "Experience Science through Commercialization", with a series of exhibits, demonstrations, conferences, and other activities. Esco was present to display the different laboratory, pharma compounding, and bioprocessing tools and equipment that its diverse business units have to offer.

Last among the three-day event, Esco Aster virtually participated in the Developing Countries Vaccine Manufacturers Network (DCVMN). The DCVMN was an interactive online event that allowed visitors to navigate through different activities and exhibitions at the comfort of their homes. The Esco Aster virtual booth displayed its services along with the latest Tide Motion technology of Esco VacciXcell, CelCradle X®, shedding on its low-cost, high yield, and linearly scalable bioreactor.

On Nov. 15-17, Esco Aster joined Arablab at the Dubai World Trade Center. Arablab is a major event and a platform for the global laboratory and analytical industry. Esco Aster is glad to have taken the opportunity to showcase its products and services.

Through all the occasions, Esco Aster was able to showcase its latest product innovation, CelCradle X®, an automated single-use bioreactor that runs on the Tide Motion platform. It is manufactured with cGMP requirements in compliance with 21 CFR Part 11. This high-performing bioreactor in the early phase of culture production simplifies

manufacturing by helping streamline bioprocessing and reduce the challenges that can be encountered upon scaling up. In terms of service, Esco Aster featured its product and customization service of Single-Use Bioprocess Assemblies, which focuses its capabilities in supporting customers' bioprocess to design their production line and provide optimal solutions to meet their process requirements.

Esco Aster would also like to celebrate a milestone in the food processing of cultured meat. As a vertically-integrated contract research (CRO), contract development and manufacturing organization (CDMO), we have been granted by the Singaporean Food Agency (SFA) for the manufacturing of animal cell cultivated meat that has gone through SFA's safety assessment review on 28th of July 2021. Esco Aster is dedicated to aligning with the broader agriculture sector, forward-thinking policymakers, and passionate entrepreneurs, and dedicate ESG strategies toward the reduction of footprints and environmental impacts of food production. We aim to continuously expand our footprint in various key markets and industries to serve our core customers.



Esco Pharma 2021 Events Recap

In the year 2021, Esco Pharma had the chance to participate in three of the most awaited world expos. The ongoing pandemic did not stop us from showcasing our products, and we were able to do it both physically and virtually.

The world expos were held in the 3rd and 4th quarter of the year to provide platforms for world leaders and innovators to showcase solutions and technologies developed for various applications and industries including pharmaceutical, hospital pharmacy, electronics, research and development, and other regulated industries.

First, on Sept. 27-29, Esco Pharma participated in a three-day Healthcare Packaging Expo that was held in the Entertainment Capital of the World, Las Vegas Convention Center in Nevada, USA. The said expo is considered this year as one of the world's most wide-ranging packaging and processing events with over 17,000 participants. The event exhibits different products and solutions for biological/biopharmaceutical, contract manufacturing, medical devices, medical/dental instruments or supplies, nutraceutical, vitamin, dietary supplement, over-the-counter products, and pharmaceuticals.

At the start of the 4th quarter, Esco Pharma is also enthralled to join Esco Aster in the annual three-day Interphex 2021 event held at Javits Center in New York, USA on Oct. 19-21. In the said event there were 625 industries joined together to exhibit, where Esco Pharma booth highlights its advanced Filling Line Isolators that are fully customizable based on process needs. The unit's full mechanical assembly, instrumentations, and electrical controls can be designed to be suitable from formulation down to fill and finish manufacturing processes.

Lastly, Esco Pharma also exhibited at the CPhI Worldwide a four-day event held at Fiera Milano, Milan, Italy with over 800 exhibitors joined across the globe. The event intends to educate professionals and give updates on the latest trends in the fast-paced and ever-changing pharmaceutical industry. The said event was divided into six (6) sub-events and Esco Pharma was part of the Pharmaceutical Machinery and Equipment Convention (P-MEC), a leading platform for pharmaceutical machinery, equipment, and technology professionals. At the said event, Esco Pharma featured their different advanced equipment for pharmaceutical industries.

Esco Pharma continues to deliver its promise of providing enabling technologies through unceasing developments and technological advancements.

Esco Healthcare would like to thank everyone who joined and visited our booths both virtually and physically in this year's events amidst the pandemic. We hope to continue providing and guiding you in biotechnology and pharmaceutical processing using advanced and reliable technology.

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER
<p>JULY 28 Cell Cultivated Meat Manufacturing Esco Aster has been granted by the Singaporean Food Agency (SFA) for the manufacturing of animal cell cultivated meat that has gone through SFA's safety assessment</p> 		<p>SEPT 27-29 HEALTHCARE PACKAGING EXPO Las Vegas Convention Center NV, USA</p> 	<p>OCT 19-21 WORLD VACCINE CONGRESS EUROPE New Arts Hotel Barcelona, Spain</p> <p>INTERPHEX Javits Center New York, USA</p> <p>DCVMN Virtual Meeting Capetown, South Africa</p> 	<p>NOV 9-11 CPhI WORLDWIDE Fiera Milano, Milan, Italy</p> 
				<p>NOV 15-17 ARAB-LAB Dubai World Trade Center, Dubai, UAE</p> 

Cultivated Meat – The Future of Food

Due to our growing population, unsurprisingly comes more demand in food production. Meeting this urgency has become a significant challenge to the agricultural industry, especially having the pressure to decrease ruminant livestock production's environmental, ethical, and human health impacts. A pressing need for a solution was raised, and cellular agriculture was seen as a great approach.

Cellular agriculture is an emergent field involving tissue engineering, stem cell biology, and genetic engineering that aims to produce animal products that are typically obtained from live animals. Even though it is still in its infancy, this biotechnology holds the possibility of producing a variety of cultured products from meat, milk, egg whites, and even leather.

Cellular agriculture is typically divided into two types: tissue engineering-based and fermentation-based cellular agriculture. The former makes use of cells or cell lines taken from living or recently deceased animals and are cultured to control cell proliferation and differentiation. The latter, on the other hand, does not use any tissue from a living animal. Instead, the process is done through the fermentation of bacteria, algae, or yeast that have typically been genetically modified by adding recombinant DNA. With this, they produce organic molecules like gelatin, casein, and even collagen that will later be used to manufacture products such as milk and leather.

The significance of this is to manufacture products that scientists refer to as "biologically equivalent" to those produced by living animals. In cellular agriculture, it is advantageous to study the molecular and genetic levels of materials to provide the same eating or usage experiences as one would compare with the livestock versions. This bioequivalence goal has distinctively separated cellular agriculture from the existing trend of plant-based protein products that also aim to seek meat resemblance but fails to have a biological equivalence.

One of the main products currently being extensively studied is cultivated meat. According to a life-cycle assessment by Tuomisto et al., the cultivated meat has the potential of reducing water usage by 82-96%, greenhouse gas emissions by

78-96%, reduced land usage by 99%, and 7-45% less energy use compared to the conventional production of beef, pork, lamb, and other types of meat. Its manufacturing will also help lessen unethical and unsustainable farming practices. Another key advantage of cultivated meat is the reduced biological risk and disease through its meticulously tailored production method that could also improve nutrition.

Producing cultivated meat has some reported challenges. When planning a large-scale production, factors including cell source, scaffold, culture media, and bioprocessing must be pondered thoroughly. In line with the efforts being done to create a muscle, suitable type of adherent cells, an effective scaffold, and bioreactor should be used. These materials and equipment should be able to mimic the *in vivo* environment and 3D culture to allow successful cell attachment, proliferation, and tissue development.



Esco Aster, contract development and manufacturing organization (CDMO) providing bioprocessing platforms and services, has been granted a license by the Singapore Food Agency (SFA) for the manufacturing of animal cell cultivated meat that has gone



through SFA's safety assessment review on 28th of July 2021. This was the first in the world to achieve this feat. Leveraging its capability on bioprocessing technologies, Esco Aster was able to have the green light from government regulators to produce cultivated meat for commercial sale.

Utilizing its wide range of solutions, from its proprietary bioreactors to its CDMO services, Esco Aster can now help cultured meat start-ups to elevate their small-scale phase to pilot and manufacturing scale for a soft launch and commercial distribution. Start-ups can be at ease knowing that Esco Aster's facility, process, and technology are compliant with Singapore's food administration.

Presently, Esco Aster aims to cater to the demand for cultivated meat as its recognition expands globally. With this, foods that have long been enjoyed and loved by many can be provided sustainably, in an environmentally friendly way.

References

- Stephens N, Di Silvio L, Dunsford I, Ellis M, Glencross A, Saxton A. Bringing cultured meat to market: Technical, socio-political, and regulatory challenges in cellular agriculture. *Trends Food Sci Technol* 2018;78:155-66. <https://doi.org/10.1016/j.tifs.2018.04.010>
- Stephens N, Ellis M. Cellular agriculture in the UK: a review [version 2; peer review: 4 approved]. *Wellcome Open Res* 2020;5. <https://doi.org/10.12688/wellcomeopenres.15685.2>



TAKE A MINUTE



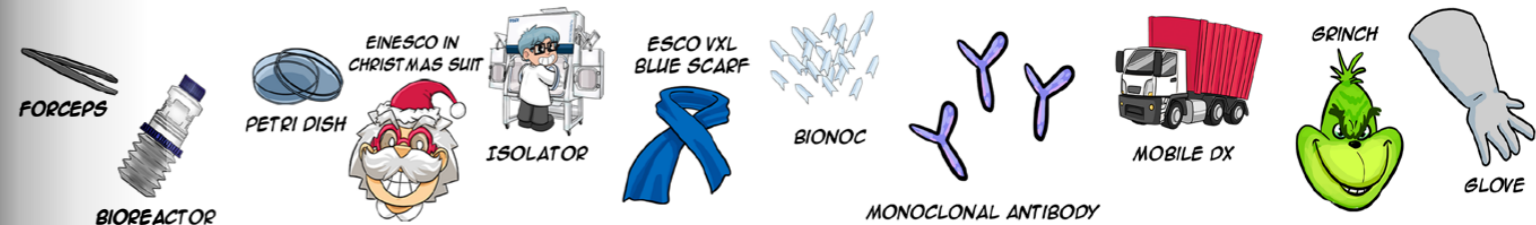
We're feeling extra festive, so we have not only one, but two games to bring the holiday cheer! Stop the grinch from stealing Christmas by finding him in a game of Hidden Pictures. After that, help our scientist crack the code to solve for the Grinch's secret messages.



Scan this QR Code to play the game online!

Hidden Pictures

The grinch is trying to steal Christmas! Help the team find stuff hidden in the Health Quarters and put a stop to his evil schemes. Catch the grinch if you can...



CRACK THE CODE

The Grinch hacked our system and left some secret words! Our scientist was able to crack two letters from each secret phrase, and it's up to you to figure out the rest!

Caution! The rules for each phrase are different, so be careful!

3 5 C C 1 5 C 1 1 2
1 7 1 2 9 3 1 5 C 1 4 1 5 1 2 5

Clues: 5 → E, 15 → U

ANSWER:

2 3 2 4 5 1 5
3 5 1 4 1 4
2 1 1 7 1 4 1 7 7 3 1

Clues: 5 → E, 15 → M

ANSWER:

F X O W X U H G
P H D W

Clues: F → C, P → M

ANSWER:

V G Q Q S C
C P E G P C C T G P E

Clues: T → R, S → U

ANSWER:

M Z M L N V W R X R M V

Clues: L → O, X → C

ANSWER:

B I K D
B C F E K C I M

Clues: K → U, K → V

ANSWER:

1 1 0 0 1 1 1 0 0 1 0 1
1 0 1 1 0 0 1 0 1 0 0 1 0 1 0 0 0 0

Clues: 1 → A, 11 → C, Letters are Scrambled!

ANSWER:

H M G S C A I F S I P
K F M G F L I H C a B

Clues: CaB → TE

ANSWER:

O L G S Q Z G K

Clues: G → A, O → I, Look at your Keyboard!

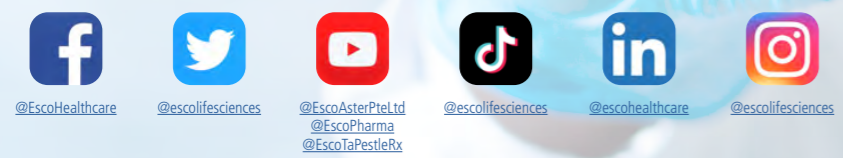
ANSWER:



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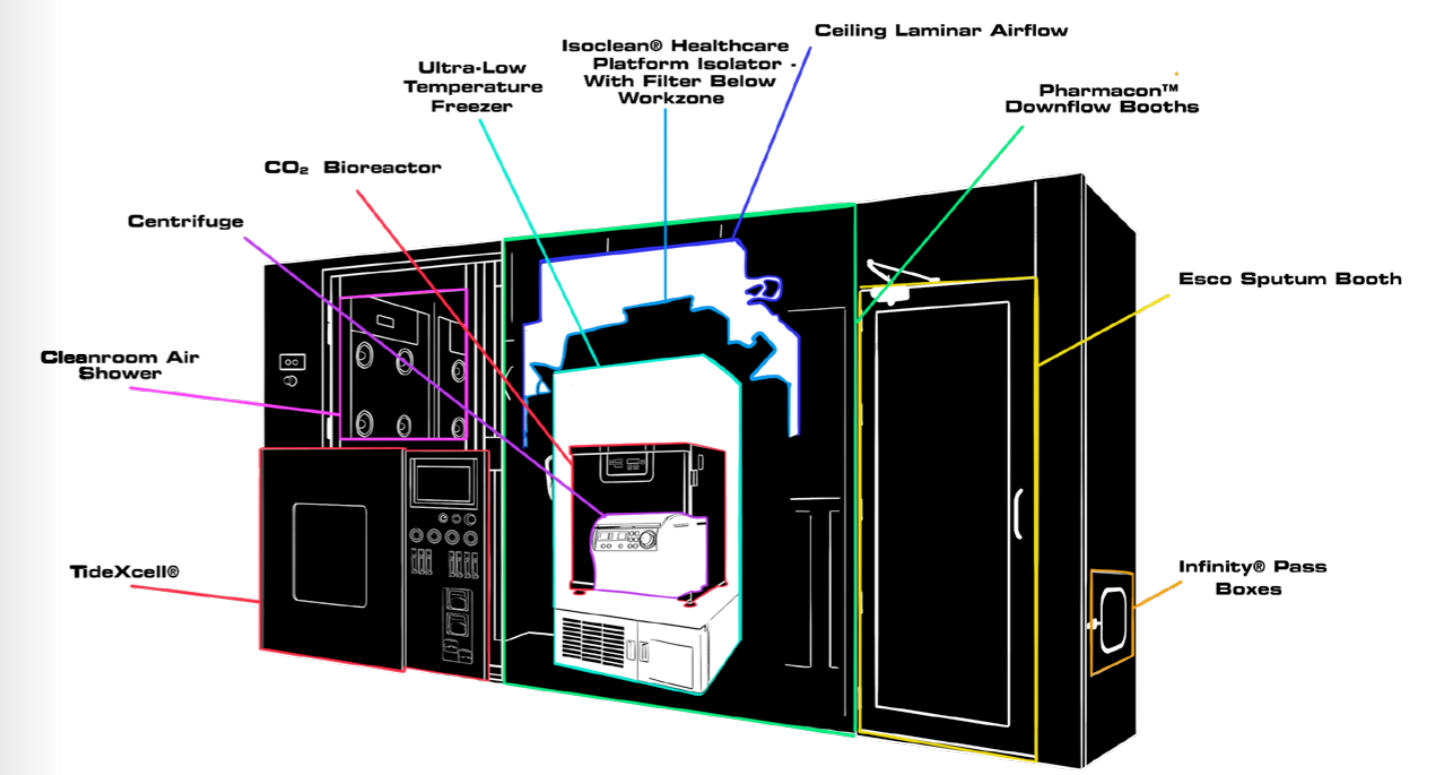
TAKE A MINUTE

Answers from the Previous Issue

OPTICAL ILLUSIONS: A memory game and a puzzle-in-one.

Have you ever wondered if your eyes have deceived you? It's not your eyes but how the brain perceives and interprets an image. As the saying goes, the eyes look, but the brain sees. Unleash your mind's potential by outwitting these illusory images for a minute.

Part 1: In this image, how many Esco Healthcare equipment can you see?



Part 2: Now let's play with some words, what do you see below?

1. VIRUS

2. HERD IMMUNITY

3. SOLUTION

4. MASK

5. VACCINE

6. ESCO HEALTHCARE YOUR PARTNER FROM DISCOVERY TO DELIVERY