

THE LAB CYCLE



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SCIENCE SPEAKS

Alleviating Allergic Rhinitis Through Air Purifiers

Various health concerns arise from exposure to indoor air pollutants. The effects may be immediate or may show up years after exposure. Due to the ongoing pandemic, a lot of people spend most of their time indoors, thus making indoor air quality more important. Air pollutants can enter and accumulate inside rooms without adequate ventilation. When left unaddressed, these pollutants can build up and become a problem, causing allergic reactions such as runny nose and sneezing. *Continue at page 2.*

IN THE BLUELIGHT

Esco Lifesciences CSR: Giving Back to the Community

Corporate Social Responsibility (CSR) programs actualize a company's commitment to extend its resources to where it is needed. The CSR initiatives reflect how compassionate the company is in treating its employees and customers well and giving back to the community, environment, and society in which it operates. *Continue at page 4.*



UP AND ABOUT

How Effective are the Biosafety Cabinet's HEPA and ULPA Filters Against the SARS-CoV-2?

Ultra-Low Particulate Air (ULPA) filter captures microscopic particle size between 0.1 to 0.2 microns and has a typical efficiency of 99.999% per American IEST-RP-CC001.3 guidelines. It is comprised of filaments and fibers that carry a static charge which traps microorganisms, dusts, and particulate matters to produce clean air. While High-Efficiency Particulate Air (HEPA) filter is 99.99% efficient at particle size of 0.3 microns. When combined with a cabinet airflow system and design, HEPA filter provides ISO class 5 work-zone cleanliness and ISO class 3 for ULPA filter.

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Alleviating Allergic Rhinitis Through Air Purifiers

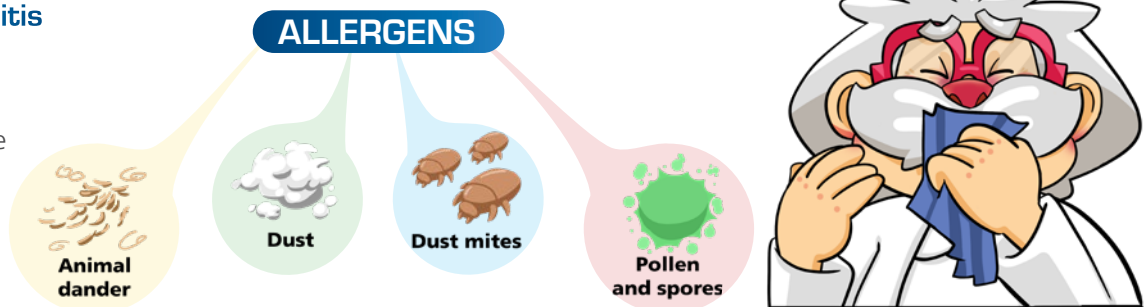
Various health concerns arise from exposure to indoor air pollutants. The effects may be immediate or may show up years after exposure. Due to the ongoing pandemic, a lot of people spend most of their time indoors, thus making indoor air quality more important. Air pollutants can enter and accumulate inside rooms without adequate ventilation. When left unaddressed, these pollutants can build up and become a problem, causing allergic reactions such as runny nose and sneezing. Considering the possible problems caused by the increased time we spend indoors, it is high time for us to ponder upon the importance of indoor air quality.

What are allergies?

Allergies are the immune system's response towards foreign substances to your body. These foreign substances are called allergens and are not necessarily harmful but can be very irritating. There are different types of allergies caused by various allergens such as particulate matter, pollen, and spores that can be found in the air. These can irritate your skin and nose, possibly causing itchiness and allergic rhinitis.

Symptoms of Rhinitis

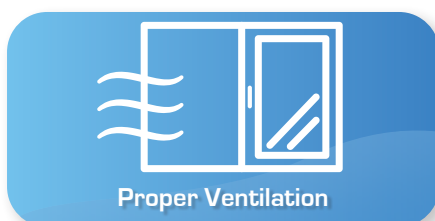
- Eyes and nose itchiness
- Stuffy or runny nose
- Sneezing
- Phlegm in throat



Allergic rhinitis is an allergic reaction to airborne allergens and affects 10 to 30 percent of children and adults in the United States and other industrialized countries. It is triggered when dust, pollen, and animal dander are inhaled. Dust mites can also cause an allergic response from the chemicals they excrete. These allergens cause the body to produce histamine, which increases the blood flow in the affected area. It then causes inflammation and allows the immune system to respond accordingly. As a defense mechanism, mucus and phlegm are produced to trap and prevent foreign substances from entering the respiratory system. This results in a runny or stuffy nose and sneezing. Depending on the severity of the allergy, these symptoms can be tolerable and nothing to worry about or can be very irritating and distracting. Long-term exposure can cause headaches and fatigue making it difficult to work and focus.

How to manage allergic rhinitis?

Upon experiencing symptoms of allergic rhinitis, the usual response is to take antihistamine medicines or use nasal sprays to relieve the irritation and stuffy nose. Although these treatments are effective for mild conditions, the best way to manage allergies is through prevention. Keeping your environment free of allergens is the most ideal solution.



Since these allergens can easily travel through the air and build up in an environment with enclosed spaces such as bedrooms and offices, proper ventilation and airflow are essential factors to improve indoor air quality. Having a good ventilation system stops allergens from accumulating in rooms.



Another effective solution to improve air quality is the addition of plants indoors. Plants are natural air purifiers that can increase the O₂ levels and remove toxins in rooms.



At present, thanks to scientific innovations, we can now use air purifier devices to clean air. They employ filtration technology to remove indoor pollutants and even sterilize air to improve air quality a step higher.

Introducing Esco Lifesciences Air Purification Technologies

Filtration System:

- HEPA filter captures particles of 0.3 microns at 99.99% efficiency.
- Carbon filter removes VOCs, fumes, and other unwanted odors.



Esco Ceiling Air Purifier
PS-501T1



Airstream® PURE Air Purifier
AP-1300

Esco Lifesciences offers solutions for air purification with the Esco Ceiling Air Purifier and Airstream® PURE Air Purifier. These air purifiers are designed to remove indoor pollutants that can trigger allergic rhinitis. Both devices are equipped with an effective filtration system utilizing HEPA filters and carbon filters. According to the research of Jia-ying et al. (2018) and Park et al. (2020), HEPA filters greatly reduce the particulate matter concentrations of indoor air and significantly increases the overall air quality. In addition to filtering the air, Esco Lifesciences' purifiers also disinfect and sterilize to produce cleaner air. They also provide airflow, preventing the build-up of pollutants and as a result, allergen concentration in the air is reduced.



Airflow illustration inside an office with Esco Ceiling Air Purifier and Airstream® PURE Air Purifier

Esco Lifesciences Air Purification Technologies are intuitive and engineered to provide better quality air for a healthier environment.



Ceiling Air Purifiers



Airstream® PURE Air Purifiers



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Esco Lifesciences CSR: Giving Back to the Community

Corporate Social Responsibility (CSR) programs actualize a company's commitment to extend its resources to where it is needed. The CSR initiatives reflect how compassionate the company is in treating its employees and customers well and giving back to the community, environment, and society in which it operates.

Esco Lifesciences embraces innovation, utilizes effective operations, builds a leading life science ecosystem, and ensures to benefit the communities it operates in. We are dedicated to the highest standards which do not solely reflect on the quality of our products and services but also our corporate social responsibility and reputation.

Environment-Friendly Operations and Technology

Esco Lifesciences has been a green company since 1978. It has been manufacturing environmentally-friendly products and continues to improve them using energy-efficient technology. We are committed to preserving the environment and making it healthier, safer, and cleaner through a strategy of continuous advancement of our compliance to all the applicable legal and societal requirements of the countries where Esco companies operate. Included in these initiatives are waste recycling projects, annual tree-planting activities, developing green products, and reducing the environmental impact of our operations.



Hydroponic gardening and aquaponics farm-fishing



*Annual tree planting in
Bintan Island, Indonesia*



Esco provides lands for plant cultivation



*Waste bins are properly
labeled and segregated*



Esco Lifesciences green products

Serving the Customers and the Community

Esco Lifesciences cares for the people's safety and comfort. We conduct free safety-related seminars for distributors and end-users globally to promote safe laboratory work practices. Aside from that, Esco provides free English classes for the underprivileged children in Bintan Island, Indonesia and workshops on the re-purposing of driftwood and seashell to promote the handicraft industry and open more job opportunities for the locals.



Free English class for children in Bintan Island, Indonesia



Seminars to promote laboratory safety and awareness



Re-purposing of driftwood and seashell

Commitment to Employees

Esco Lifesciences looks after the well-being of its employees. We have a therapeutic garden to positively impact the staff's mental wellness. The company also conducts an annual Family Day and team-building activities to improve communication, encourage teamwork, and boost the confidence of employees. Besides the games, the employees and their family members showcase their talents through competitions like singing, dancing, and poster making.



Annual family day and team-building activities



Therapeutic garden

Overall, at Esco Lifesciences, we aim to establish and strengthen our Corporate Social Responsibility as part of our commitment to serve our customers and community and preserve the environment.



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Learn more about Esco Lifesciences.



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Watch and subscribe to the **Life in Esco** YouTube channel for our CSR related contents.



CelCulture® CO₂ Incubator with High-Temperature CO₂ Sensor: An Ideal Equipment for your Cell Cultures

Introducing Esco Lifesciences CelCulture® CO₂ Incubator with High-Temperature CO₂ Sensor (CCL-HITEMP), ideal for growing and maintaining your cell culture. This new product offers excellent temperature uniformity throughout the chamber, which is critical to maintain when conducting tissue culture works (figure 1). It is installed with heat-resistant infrared (IR) CO₂ sensor that enables exceptional stability. This new type of IR sensor can withstand high-temperature decontamination procedures without the need to remove any component, thus, saving time and reducing risk of contamination. It is also designed to provide accurate and reliable CO₂ level measurement. Moreover, CCL-HITEMP has a newly improved heater configuration design for precise temperature control, even distribution of heat, rapid temperature recovery within the chamber, and prevention of condensation on the inner glass door (figure 2).

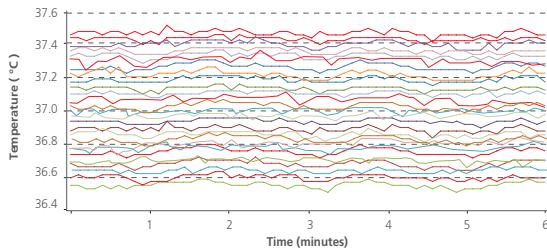


Figure 1. Excellent Temperature Uniformity

CCL-170B-_-HITEMP has uniformity variance of less than $\pm 0.35^{\circ}\text{C}$ which means all the samples are evenly heated.

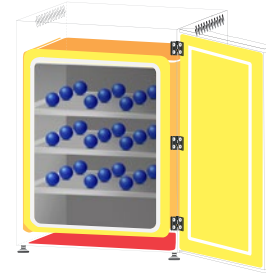


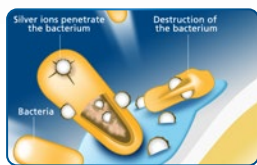
Figure 2. Heater Configuration Design of CCL-HITEMP

- The main heater provides precise temperature control.
- The bottom heater warms the water pan and provides humidity.
- The outer door heater prevents condensation on glass door while the inner door heater facilitates temperature uniformity and temperature recovery.

Other Features of CCL-HITEMP



CCL-170B-_-HITEMP
Available sizes: 50 L, 170L, 240 L



Isocide™ Antimicrobial Powder-coated Exterior
Reduces bioburden to minimize contamination risks.

Heat Resistant Infrared (IR) CO₂ Sensor

Drift-free sensor that enhances CO₂ control and uniformity without being affected by temperature and pressure.

Gas Inlet Filter

Located at the rear part of the unit which removes impurities and contaminants before being injected into the chamber.

ULPA Filter*

Filters chamber air with 99.999% efficiency at 0.2 to 0.1 μm particle size.

*Not available in 50 L

Stainless Steel Shelves

- Perforated shelves for excellent uniformity
- Dismantles without tools for easy cleaning

Stainless Steel Humidity Pan

Precisely heated by base heater to provide high humidity.

Click [here](#) for more product information or scan the code.



How Effective are the Biosafety Cabinet's HEPA and ULPA Filters Against the SARS-CoV-2?

Ultra-Low Particulate Air (ULPA) filter captures microscopic particle size between 0.1 to 0.2 microns and has a typical efficiency of 99.999% per American IEST-RP-CC001.3 guidelines. It is comprised of filaments and fibers that carry a static charge which traps microorganisms, dusts, and particulate matters to produce clean air. On the other hand, **High-Efficiency Particulate Air (HEPA) filter** is 99.99% efficient at particle size of 0.3 microns. When combined with a cabinet airflow system and design, HEPA filter provides ISO class 5 work-zone cleanliness and ISO class 3 for ULPA filter. Therefore, ULPA offers 10x better filtration efficiency than HEPA filter and is used in an advanced biosafety cabinet.

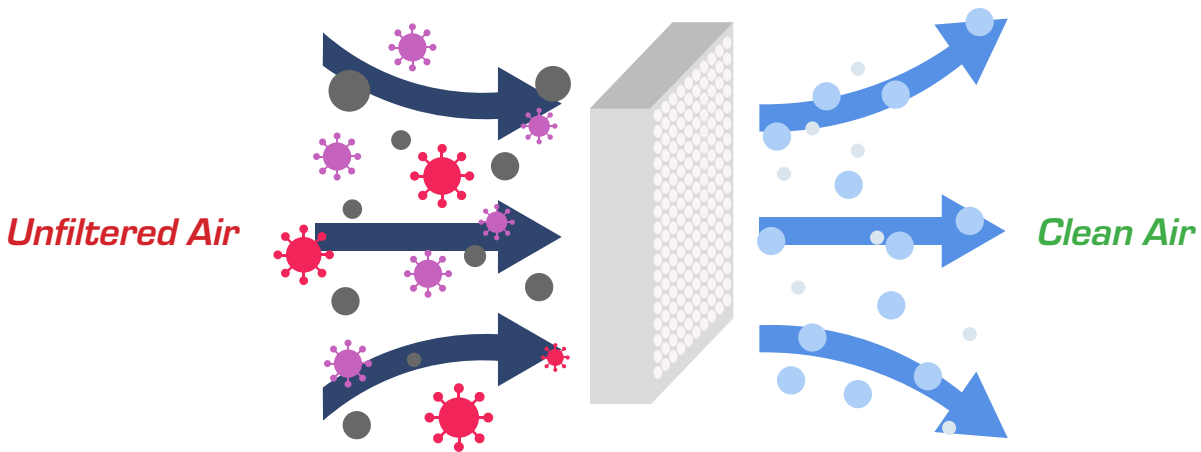


Figure 3. Movement of air with particulates passing through the ULPA filter.

Can it capture the SARS-CoV-2?

The SARS-CoV-2's estimated size is around 0.12 μm , and there are doubts on the filter's efficiency to capture the virus, especially with the HEPA filter. There is a common misconception that HEPA filters only capture particles with the size of 0.3 μm or larger. So here are some facts to prove the filter's efficiency: Particles with a size of more than 0.3 μm travel through the air filtration system and are retained within the filter due to inertia. While particles with less than 0.3 μm in size can be easily visualized to fly through the holes of HEPA filter. However, that is not the case. A fascinating interaction called **Brownian Motion** occurs and traps smaller particles as well.

What is Brownian Motion?

The Brownian Motion causes the particles to bounce around and collide with each other, making them move in a random pattern and eventually hit the filter fibers and become trapped. That's why smaller particles are easier to catch in both HEPA and ULPA filters.

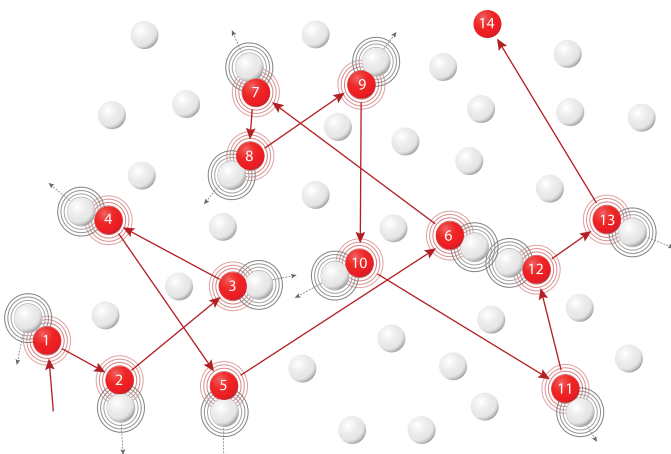


Figure 4. Movement of particles during Brownian Motion.

According to a test conducted by NASA (2016), HEPA-rated media provides superior performance by removing virtually 100% of particulates. Moreover, there is only a slight drop in efficiency for particle size of around 0.3 μm — particles of this size are called Most Penetrating Particle Size (MPPS) in filter standards.

MPPS is the specific particle size that is most difficult to be captured by filter fibers. It is small enough to follow the air stream around the fibers but it has enough mass that the Brownian motion effects minimally. Hence, particles size with less than 0.3 μm is in fact easier to capture in the HEPA and ULPA filters.

How to maximize guaranteed protection of a BSC filter?

Proper and timely maintenance. Services such as filter replacement, preventive maintenance, annual certification, and decontamination should be carried out regularly for optimal equipment performance. Thus, maximizes user protection, especially when used in a COVID-19 laboratory.



Figure 5. Filter integrity test conducted by a trained and certified engineer.

Preventive Maintenance

Prevention is key. This service procedure prevents unexpected downtimes and failures through routine maintenance and early detection of problems. The following are the procedures done when performing a preventive maintenance:

- Cleaning the work surfaces and walls with an appropriate disinfectant
- Removing stubborn stains or spots on the worktop
- Testing the audible and visual alarms
- Checking the cabinet's mechanical and electrical functionality for any defect

Annual Certification

Hassle-free operation. The certification of a biosafety cabinet must be done annually to lessen the risk of unanticipated failure and prevent the user from any danger. It is comprised of a series of tests which includes **filter integrity test** to verify continued efficiency of HEPA and ULPA filters. The following tests are performed per the manufacturer's specifications and relevant international standards such as NSF-49 for BSC:

- Inflow velocity test
- Downflow velocity test
- Filter integrity test
- Light intensity test
- Noise level test
- UV intensity test

Decontamination

Ready and safe usage. Filter replacement, unit installation, and relocation require proper decontamination. The following sterilants are used:

- Chlorine Dioxide
- Hydrogen Peroxide Vapour
- Formaldehyde (if requested by the client due to specific circumstances)

IQ/OQ Service

Audit-ready laboratory. Installation Qualification and Operational Qualification services ensure that equipment is installed and running smoothly by performing a series of tests based on international standards. Be prepared and worry less on your next audit. Esco can also train customer employees to perform IQ/OQ.

ESCO SERVICES PROVIDE A ONE-STOP SOLUTION FROM INSTALLATION TO DECOMMISSIONING OF YOUR EQUIPMENT!

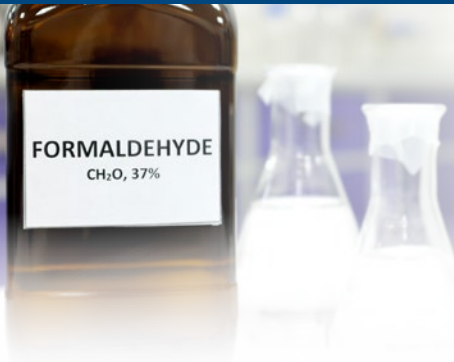


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The Toxic Effects of Formalin and How to Contain it



Formaldehyde is a colorless gas, often used as an aqueous solution called formalin. Formalin solutions contain up to 40% formaldehyde and at least 15% methanol as a stabilizing agent. Both formaldehyde gas and solutions have strong, pungent, and characteristic odors. These compounds are commonly used as a disinfectant, antiseptic, fixative, and a chemical additive. Due to its wide range of applications, it is important to be aware of the health hazards and safety precautions when working with this chemical.

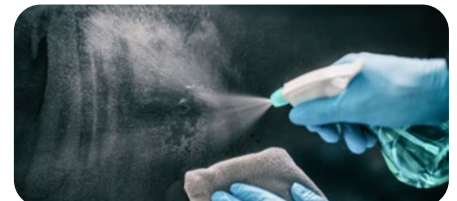
USES OF FORMALDEHYDE / FORMALIN



Preservative in medical laboratories



Chemical additive in household products, glues, coatings, and plywood



Disinfectant



Industrial fungicide and germicide



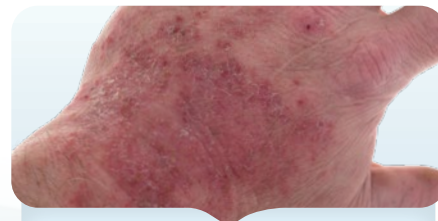
Determining presence of opium-based drugs through color test

HEALTH HAZARDS

If formaldehyde is present in the air at concentrations above 0.1 ppm, it can cause watery eyes, skin irritation, difficulty in breathing, coughing, and some burning sensations in the eyes, nose, and throat.



Eye irritation from fume exposure



Severe allergic reaction



Formaldehyde and formalin are known carcinogens, and chronic exposure may lead to birth defects and severe respiratory problems. These compounds are highly toxic when ingested, inhaled, or absorbed through the skin. Also, these chemicals are highly reactive with oxidizers and at high concentrations; it is considered as a combustible liquid.

Moreover, a reaction between formaldehyde and hydrochloric acid (HCl) produces bis(chloroethyl) ether vapor which is a very potent carcinogen.



Health Hazard

EXPOSURE AND PERMISSIBLE LIMITS

Formaldehyde is corrosive and an air concentration of 2 ppm may quickly result in eye irritation while exposure to 20 ppm can cause permanent clouding of the cornea. In addition, formaldehyde is also a sensitizing agent wherein constant exposure can result in more symptoms even at lower concentrations. Symptoms include coughing, eye and skin irritation, vomiting, and diarrhea.

The OSHA formaldehyde standard (29 CFR 1910.1048) intends to protect workers from occupational exposure by setting the following permissible exposure limit (PEL):

- PEL for formaldehyde in a workplace is 0.75 ppm measured in an 8-hour time-weighted average (TWA).
- Short-term exposure limit (STEL) of 2 ppm for a 15-minute period.

PROPER HANDLING AND SAFETY PRECAUTIONS

Due to the health hazards associated when using formaldehyde and formalin, here are some tips for safe handling:



Always wear complete PPE during handling. Chemical goggles are important to minimize vapor exposure to the cornea.



Keep sources of ignition away from formalin solutions.



Properly label containers with the chemical's name, concentration, and hazards.



Store labeled containers in chemically compatible cabinets, away from extreme heat and flame.



Always work or handle formalin in an appropriate fume hood.

ESCO SCIENTIFIC OFFERS THE RIGHT SOLUTION!

Laboratory applications involving this toxic chemical can now be accomplished safely and economically with Esco Ascent™ Opti Formax (SPF). This ductless fume hood is designed to safely dispense formalin solutions while providing superior fume containment. The fume hood's enhanced features to provide the operator with a high level of usability, comfort, and safety.

Sampling Port

- used for determining filter saturation through color detection tubes

Carbon Filter ID Window

- for an easy-viewing of the filter specifications

Double-hinged Sash with Ergonomic Ports

- allows higher sash opening for effortless cabinet loading
- acrylic construction and has a 13° sloping to reduce glares and reflections
- arm ports allow easy access while reducing risk of chemical exposure

Base Cabinet with Caster Wheels

- makes it mobile and can easily be relocated

Waste Container

- collects formalin waste

Nanocarb™ Carbon Filter

- equipped with a specialized carbon filter to adsorb formaldehyde / formalin fumes

Sentinel™ Silver Microprocessor

- displays the airflow and buttons for cabinet's operation

Baffles

- improves airflow and prevents fume accumulation in the work area

Swan-neck Formalin Fixture

- controlled by the foot switch so only the required amount will be dispensed

Fresh Formalin Container

- stores fresh formalin solutions for easy dispensing

Foot Switch

- enables a controlled and hassle-free dispensing



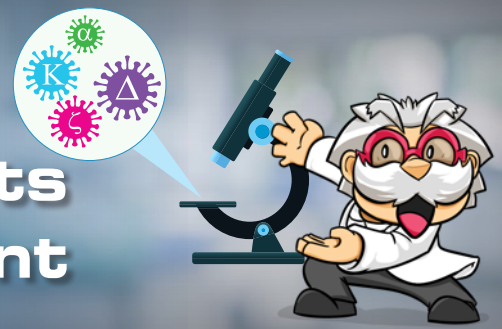
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With Ascent™ Opti Formax, your safety is guaranteed!
Contact us on how we can make it part of your laboratory.
 Click [here](#) for more product information or scan the QR code.

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Match the Greek Alphabets Designated to Each Variant



World Health Organization (WHO) uses Greek alphabets to easily say and remember the labels for SARS-CoV-2 key variants. Adapting these new labels will avoid discrimination coming from calling variants by the places they were first detected at.

CAN YOU MATCH THE GREEK ALPHABETS DESIGNATED TO EACH VARIANT?



Alpha

a) B.1.351



Beta

b) B.1.617.2



Gamma

c) P.1



Delta

d) B.1.1.7



Epsilon

e) B.1.525



Zeta

f) B.1.427/B.1.429



Eta

g) P.2

Answers will be revealed on the next issue.



Here is the solution to last issue's Maze: Help Dr. Einesco Find the Path to the COVID-19 Vaccine!

