BIO NEWS
No. 57 – 2022

eppendorf

Fit for Cell Culture: Expand Your Know-How

> Data digitalization increases the efficiency of your research
> Smart sample separation to streamline your workflow
> Sustainable: pipettes with the ACT® Label


Production of Recombinant Human Phosphoserine Phosphatase Using the Innova® 544R Shaker and the Centrifuge Harvesting Bundle 4 x 1.5 L

Application Notes

Standardized thawing of stem cells using the Eppendorf ThermoMixer® C ·
Production of recombinant human phosphoserine phosphatase · etc.

A Warm Welcome

to the latest issue of Eppendorf BioNews with its colorful mix of reports on products and applications.

In our leading article on pages 4–5, you will find out how you can expand your cell culture know-how with Eppendorf. Various educational formats are geared towards beginners and advanced learners alike. Whether you choose live training webinars, White Papers, video tutorials, or online articles – we invite you to dive into our continuously growing pool of expert knowledge! Best to subscribe right away to our "Inside Cell Culture" newsletter, wherein we will keep you updated every month on valuable content.

Education and training are important to us. With the Eppendorf Lab Channel, we offer you live and on-demand webinars as well as product and application demonstrations on a wide variety of topics. Registration is free and straightforward (p. 13).

Sample separation is one of the most common and also one of the most time-consuming applications in the laboratory. Our Centrifuge CR30NX, a high-speed centrifuge, in combination with innovative vessels such as the triangular 1.5 liter centrifuge bottle, is capable of reducing sample processing times by up to 32 %. More on page 8 and in Application Note 1–2.

Documentation of experiments and processes is vital when it comes to ensuring reproducible results – and thus for the efficiency and success of your laboratory. On pages 6 and 7, you will find tips and more in-depth links on the topic of data digitalization and smart sample identification.

Since sustainability is one of our core themes, we are especially pleased that – as the first laboratory pipettes ever – the Eppendorf Research® plus single-channel pipettes with variable volume have been certified with the "ACT®" Environmental Impact Factor Label by the non-profit organization "My Green Lab®" (p. 9).

Last, but not least, our popular prize contest awaits you. This time, the top prize is an electronic Eppendorf Xplorer® plus 8-channel pipette. Have fun!

Your Eppendorf BioNews Team

PS: Would you like to share your thoughts with us about BioNews? Do you have ideas or requests? If so, please send us an e-mail to bionews@eppendorf.de. We look forward to your feedback!

Imprint

Publisher
Eppendorf SE, Barkhausenweg 1,
22339 Hamburg, Germany
Telephone: +49 40-53801-0
Fax: +49 40-53801-556
E-mail: bionews@eppendorf.de
www.eppendorf.com/bionews

Editorial team
Berrit Hoff (Editor-in-Chief),
Dr. Jan-Hendrik Bebermeier,
Dr. Tanja Musiol, Natascha Weiß

Design
Holger Paulsen Grafik-Design,
Hamburg, Germany

Printed by
MOD Offsetdruck GmbH, Dassow,
Germany

Image references
All images Eppendorf SE. Exception: p. 14, Neil Grant for MRC Laboratory of Molecular Biology, Cambridge, United Kingdom

Important notes
We welcome all readers' articles for this publication. However, no responsibility is accepted for unsolicited manuscripts. The new products described may be launched at different times in various countries. Please contact your local Eppendorf organization or distributor for details.

Technical specifications subject to change. Errors and omissions excepted.

Eppendorf worldwide
www.eppendorf.com/contact

Eppendorf BioNews Application Notes

Production of Recombinant Human Phosphoserine Phosphatase Using the Innova® S44i Shaker and the Centrifuge Harvesting Bundle 4 x 1.5 L

CHRISTIAN HABERLANDT & JESSICA WAGENER, EPPENDORF SE

Fit for Cell Culture: Expand Your Know-How

Reliable, high-performance instruments contribute hugely to the success of any modern laboratory. For valid, reproducible experimental data, however, it is not sufficient to simply own the right tools. A tool can only be as good as the skills of the person using it! As an experienced manufacturer, Eppendorf therefore offers a continually growing pool of expert knowledge to novices and advanced cell culture users alike – through various formats, and together with strong partners in the field of cell culture, like Promega®.

Solid basics

Particularly in the area of cell culture, the required knowledge, along with practical skills, is frequently imparted by more experienced colleagues to those just starting out. This important method of knowledge transfer has a long history and is used to quickly train new aspiring scientists in the laboratory. After all, experimental data should be generated, and new methods established, without delay, and as independently as possible. After a while, the lab will fall into a routine, which often brings with it a certain level of complacency when it comes to cell handling.

Very soon, data generation takes absolute priority, and the interpretation of experimental results becomes the centerpiece of the work.

"We've always done it this way"

In contrast, the improvement of techniques, in particular those geared towards contamination prevention or the perfection of data reproducibility, are increasingly put on the back burner. Very quickly, when training a novice in the laboratory, one may hear oneself say: "We've always done it this way." Publications from recent years, however, bring home the fact that urgent action needs to be taken, specifically with respect to the unsatisfactory reproducibility of data. It will help us to pause for a moment and question supposedly well-established routines in order to correct

and improve processes. It is exactly here that the formats introduced in this article come into play – for cell culture beginners and experts alike.

Training webinars with live Q&A session

Eppendorf regularly holds training and troubleshooting webinars – live with participants from all over the world. Webinars with a cell culture focus include topics such as contamination prevention, enhancement of the reproducibility of cell-based assays (in collaboration with Promega), or the correct use of different pipetting techniques and instruments.

The webinars include anonymous participant surveys on specific topics. The results of these surveys allow the participants to take a good look at the position of their own laboratory. At the end of each webinar, our cell culture experts are available live to answer questions. Our monthly newsletter "Inside Cell Culture" (see box on the right) will keep you updated on all cell culture events.

More on webinars at
https://eppendorf.group/utrwhz

White Papers on cell culture topics

A series of White Papers in the English language highlights a variety of cell culture topics, provides tips for the daily routine, and can serve as a source of information when it comes to purchasing laboratory equipment. Here is a small selection, including download links:

> Cell Thawing Protocol Standardization – Guide for More Reproducible Cryopreservation Results
https://eppendorf.group/25cz08

> CAR-T Cell Research – Current Clinical Challenges & Outlook
https://eppendorf.group/w4ritk

> CO_2 Incubators – Making the Best Choice for Your Lab
https://eppendorf.group/iwfxsr

> CO_2 Incubator Maintenance – Guide for Set-up and Care
https://eppendorf.group/t9kdif

> CO_2 Incubators with Segmented Doors: Benefits and Buying Considerations
https://eppendorf.group/s62cfg

> CO_2 Incubator with Copper Interior: How Effective is Copper-Enriched Stainless Steel, and for Which Internal Parts May Copper Be Recommended?
https://eppendorf.group/yxkdla

Video series "Do's/Don'ts' in cell culture

Working in cell culture requires not only knowledge, but also practical skills. These are based on complex sequences of movements that are very difficult to convey using text or static images. A video often says more than a thousand words!

A video says more than a thousand words

Find our YouTube™ videos at
https://eppendorf.group/x9xnrs

Online articles on cell culture

Did you know that the seeding of cells is influenced by air bubbles, the pipetting technique employed, and also by cell density? Why are fibroblasts often used in cell culture? Does the human body really contain more bacteria than human cells? And what to do if a contamination is detected in the laboratory? These and many other questions pertaining to cell culture are regularly addressed in new articles published on the Eppendorf website.

Discover our series of cell culture online articles at
www.eppendorf.com/cell-culture-articles

Tip

Inside Cell Culture Newsletter

You work in cell culture, and you never want to miss another training webinar, interesting White Paper, or novel cell culture product by Eppendorf?

New every month: Inside Cell Culture

With our monthly newsletter Inside Cell Culture, you will receive interesting facts all about the topics of contamination prevention, cell culture techniques, and troubleshooting, as well as:

> Tips and tricks on how to make your daily work easier

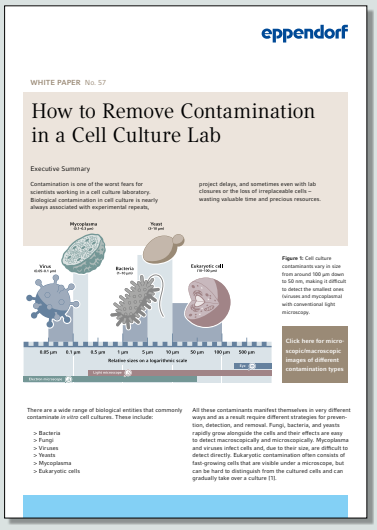
> Videos, downloads, posters, and more

> Training materials

> Information on upcoming events and training sessions

Get your free subscription now

As a thank-you, you will receive our White Paper on the topic "How to Remove Contamination in a Cell Culture Lab". Use it to expand your personal cell culture first aid kit!



Subscribe to our newsletter now at
www.eppendorf.com/icc

ANN-CLAIRE FOETSCH, EPPENDORF SE

How Data Digitalization Increases the Efficiency of Your Research

Who in the laboratory is not consistently confronted with the time-consuming task of documenting laboratory processes? Relying on handwritten protocols on loose-leaf paper, kept in a paper-based lab book, poses a risk to data reproducibility. Complete traceability of the protocols carried out, together with seamless documentation of laboratory workflows, are both of critical importance for an efficient and productive laboratory environment.

There are few things more frustrating to scientists than carrying out a seemingly perfect experiment, only to find that colleagues or other research groups do not achieve similar results. The question of data reproducibility has gained importance over the past years. In light of the concern about a possible "reproducibility crisis" [1] and its impact on the quality and integrity of research data, academia and industry have mounted efforts to address these challenges together and find ways to improve reproducibility.

Repeatability vs. reproducibility

Whereas repeatability of data pertains to the ability to obtain the same results each time an experiment is performed (of course within the limits of a reasonable standard error), reproducibility of data refers to the question whether other scientists, who possibly work halfway across the globe, can repeat the experiment and obtain similar results [2].

Digitalization of data in the paperless laboratory

Today, more and more scientists save their experimental data in the form of an electronic laboratory notebook (ELN) or laboratory information management system (LIMS) instead of using a classic paper-based lab book. The switch to the digital format alone, however, will not solve the "reproducibility crisis". The planning of experiments and data management are critical components of good science, and so are the handling of the data obtained and how we document. The question is whether the complete digitalization of data can contribute to a long-term solution to problems with reproducibility. Internal studies have shown that a structured, clear, and guided data set can contribute to enhanced traceability and transparency of protocols, while at the same time allowing scientists to optimize processes. We at Eppendorf would like to share further insight and design new concepts for data digitalization together with scientists.

Are you interested in collaborating on this vision?
Please contact us at visionize.news@eppendorf.com

Learn more at

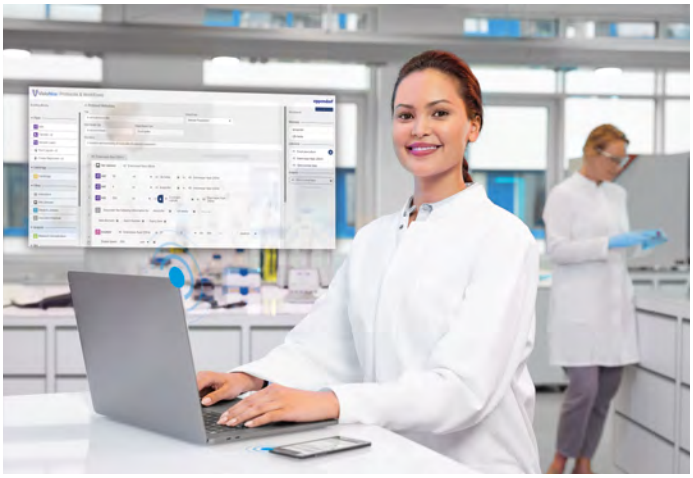
> www.eppendorf.com/experiment-management

> Webinar "Research Documentation in the Digital Age" on the Eppendorf Lab Channel (see also page 13)
https://event.eppendorf.com/labchannel/pastevents

> Tutorial video "Digitalize your protocols and workflows"
https://eppendorf.group/ch4swf

Literature

[1] *Nature* – https://www.nature.com/articles/533452a
[2] *CURE* – https://cure.web.unc.edu/defining-reproducibility/



Our tutorial video "Digitalize your protocols and workflows" shows you step by step how to digitalize your protocols and workflows

JAN-HENDRIK BEBERMEIER, EPPENDORF SE

Identify Your Samples: Eppendorf SafeCode System

The documentation of experiments and processes is becoming ever more important. It is a deciding factor for reliable results, and thus the success of your laboratory. For unambiguous sample identification, as well as process tracking, all samples must be clearly labeled, above all. All laboratories absolutely agree on this point – however, in reality, one continues to come across vessels with very different levels of quality when it comes to identification. A clear case for the SafeCode System!

Do you remember the last time you labeled 20 vessels manually? The first few tubes looked acceptable, but eventually, cooperation between your handwriting, the pen, and the smooth surface of the tube began to falter. You may have been able to read your artwork – but only you.

The nerd in the lab next door printed all their labels on paper, cut them out with scissors, and affixed them to the tubes with transparent tape. It looked perfect, but it took forever.

Isn't there another – better – way?

Reliable labeling of your high-quality samples is crucial for secure identification and – last, but not least – reliable results. Illegible sample labels have now become a problem of the past. Barcodes allow quick, unambiguous sample identification. Eppendorf offers you prelabeled standard consumables for immediate use. Your samples are turning digital.

Input of the data matrix code via barcode scanner

The SafeCode System

The SafeCode System for Eppendorf consumables is based on multi-level coding for secure sample identification. The pre-defined 2D data matrix code is supplemented with a clear coding of the same information.

The data matrix code is read using a barcode scanner; the corresponding ID is transferred and then saved in your digital laboratory notebook, for example, the eLabNext software.

All saved data are combined with the sample ID and their respective sample description. SafeCode is available for a series of cryostorage vials and for 5 mL, 15 mL, and 50 mL tubes.

What about documentation?

For the purpose of certification and documentation, more and more users must save and retain all information.

SafeCode family of vessels

For vials with SafeCode, we make the information that is relevant to your process documentation available online in a "dataport". Using the respective individual code of the vial, you can retrieve the following information here:

> Lot number
> Order number
> Certificates
> Drawings

This information can be exported manually to local databases, or it can be transferred automatically to sample management software – for example, Eppendorf eLabNext.

More information about the SafeCode system at https://eppendorf.group/qji64c

More information about eLabNext at https://www.elabnext.com/eppendorf

MARC-MANUEL HAHN, EPPENDORF SE

Smart Sample Separation to Streamline Your Workflow

Sample separation is one of the most frequent and time-consuming applications in the laboratory. Sample handling takes up precious time with processing steps like filling, balancing, removing and cleaning of centrifuge vessels. Intelligent, scalable solutions can help you minimize these repetitive steps and thus save time – while retaining highest safety and reliability for the user.

Cell harvesting: a special challenge

If you are working with mammalian or bacterial cultures, you will be familiar with the challenges involved when it comes to harvesting large batch volumes for the purpose of e.g. isolating plasmids or recombinant proteins. Depending on the experiment, sample volumes can be quite variable and range from a few milliliters to several liters of culture.

Intelligent design, fewer working steps

With the new high-speed models Centrifuge CR22N and Centrifuge CR30NX, Eppendorf has introduced a 1.5 liter bottle. Its smart triangular design allows efficient pelleting without the need for a minimum fill volume as is required for conventional centrifuge bottles. In addition, the maximum fill volume of 1.5 L helps reduce the number of steps involved, particularly in the case of large batches – thus potentially saving up to 32 % of time during sample processing.

An example of smart design: the 1.5 L bottle

If even larger batch volumes are to be processed, flow-through rotors may be able to replace centrifuge bottles entirely.

For further downstream processing of isolated samples, including nucleic acids, proteins, protein complexes, vesicles, and viruses, ultracentrifugation is often employed. In order to help users with their ultracentrifugation needs, we have recently expanded our centrifuge portfolio; we now offer centrifugation solutions for an even broader application spectrum, with speeds up to 150,000 rpm (1,050.000 x *g*). These centrifuges deliver maximum quality with optimal performance and persuasive ease of use. Their intuitive operation and high tolerance for imbalance, together with the innovative Rotor Life Management, will enable also less experienced users to safely operate the instruments with minimum training time.

A holistic solution

Naturally, your daily laboratory routine does not consist exclusively of sample separation. Preliminary work steps, for example, cell cultivation in shakers, incubators and/or fermenters, are also immensely important. The selection of the right equipment can always ease your daily routine to a significant degree. The Application Note on the following pages will demonstrate our holistic solution to you via an example which spans the complete processing range, from bacterial cell culture to the functional protein.

More information at **https://eppendorf.group/s0mj2j**

or in our White Paper “Unique 4 x 1.5 L Capacity Rotor for High-Speed Centrifuges CR22N and CR30NX”

Free download at
https://eppendorf.group/2qs98e

Production of Recombinant Human Phosphoserine Phosphatase Using the Innova® S44i Shaker and the Centrifuge Harvesting Bundle 4 x 1.5 L

NATASCHA WEISS, EPPENDORF SE, HAMBURG, GERMANY
VINCENT DUFEY, SILVIA TEJERINA VARGAS, AURÉLIE TACHENY, EPPENDORF APPLICATION TECHNOLOGIES, S.A., NAMUR, BELGIUM

Introduction

The production of recombinant proteins by genetically modified organisms is a fundamental biotechnology technique. The goal is to generate a high yield of functional protein which requires large-scale cell culture with good cell growth and excellent protein expression. Therefore, a robust shaker is necessary that can shake cultures at high speeds on a liter scale. Centrifugation is used to harvest the cells, to clarify the cell lysate and (if necessary) to concentrate the protein solution. Harvesting several liters of culture is time-consuming as a result of numerous manual steps required for each individual vessel [1]. For variable culture volumes and further centrifugation steps additional equipment is needed.

In this Application Note, the production of a recombinant protein is presented using a workflow for culturing and harvesting bacteria and purifying proteins. The aim is to demonstrate that a high yield of functional recombinant protein can be realized by using the Innova S44i shaker and a high-speed centrifuge (as a system solution consisting of Harvesting Bundle combined with the High-Speed Pelleting Kit).

Materials and methods

Materials

Expression system: E. coli BL21 (DE3) transformed with pET28a plasmid containing the gene coding for the His-tagged protein human phosphoserine phosphatase (hPSP).

Culture system: Innova S44i

Centrifugation system: Harvesting Bundle (high-speed Centrifuge CR30NX plus 6 L Rotor R9A2 and 4 x 1.5 L triangular bottles) and High-Speed Pelleting Kit (Rotor R19A2 and 50 mL conical tubes). Alternatively, the Centrifuge CR22N can be used.

Methods

Bacteria proliferation and induction: 50 µL of *E. coli* (with pET28a) in glycerol were added to 50 mL of medium in a 250 mL flask. The culture was incubated in the Innova S44i (300 rpm, 37 °C) overnight until an OD_{600} of 15–25. 5 mL of starter culture were added to three 2.5 L bottles, each filled with 1 liter of medium. They were incubated in the S44i (250 rpm, 37 °C) until an OD_{600} of approx. 2 (~4 – 5 h). After adding 10 mL of IPTG the incubation was continued (250 rpm, 37 °C) for 3 h. At the end of the induction the suspension was transferred in two 1.5 L triangular bottles and spun down in the Centrifuge CR30NX with Rotor R9A2 (4,000 rpm, 30 min, 4°C). The supernatants were discarded.

Lysis: Per gram bacteria pellet 20 mL of lysis buffer were added and resuspended. After stirring for 30 min the suspension was sonicated. The lysate was clarified by centrifugation in 50 mL conical tubes (Rotor 19A2, 12,500 rpm, 1 h, 4 °C). The supernatant was recovered and filtered through a 0.2 µm filter.

Purification by affinity chromatography: The clarified lysate (400 mL) was applied on a washed and equilibrated HisTrap™ FF crude column. After washing, elution buffer at 20 % Imidazole was used to collect the first 10 fractions. Further 10 fractions were collected using elution buffer at 100 % Imidazole.

Analysis: The absorbance at 280 nm was measured for all protein fractions to determine the amount of total protein. Samples were separated via SDS-PAGE and stained with Coomassie® blue and the enzyme activity was measured using a Malachite green phosphate assay.

Results and discussion

The elution buffer at 20 % Imidazole (first 10 fractions) was intended to remove impurities. Subsequent elution with a buffer at 100 % Imidazole was used to recover the purified protein. To identify the relevant fractions, their absorbance at 280 nm was measured.

Fig. 1 shows the results of the absorbance measurement. The elution buffer based on 100 % Imidazole dissolves a large portion of the proteins from the column with the highest amount in fraction 12.

To determine whether and in which amount the target protein hPSP is present in the individual fractions and whether it is functional, the fractions were separated by SDS PAGE and a Malachite green phosphate assay was performed to measure the enzyme activity.

The SDS gel stained with Coomassie blue confirms that a large amount of protein was solubilized starting from fraction 11 (Fig. 2). The position of the band showing the highest density indicates that it is the target protein hPSP, which has a size of 25 kDa.

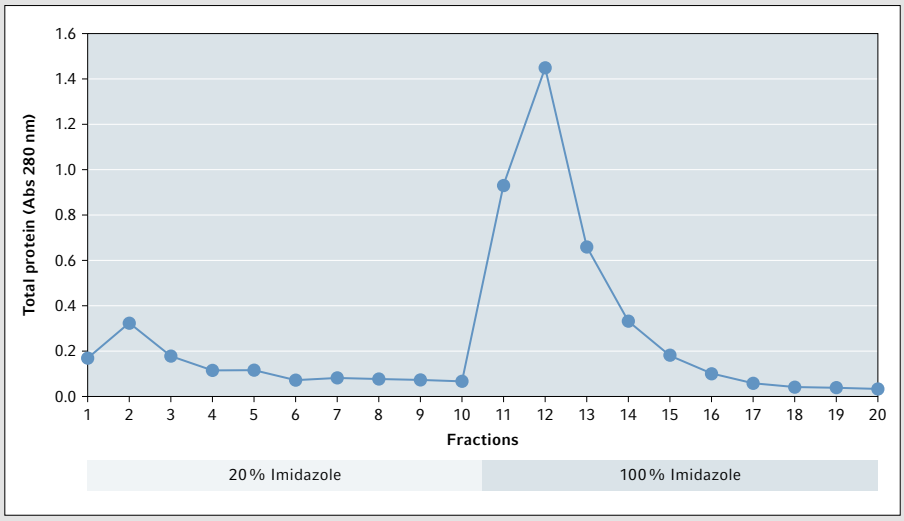


Fig. 1: Absorbance at 280 nm of eluted fractions

Production of Recombinant Human Phosphoserine Phosphatase Using the Innova® S44i Shaker and the Centrifuge Harvesting Bundle 4 x 1.5 L

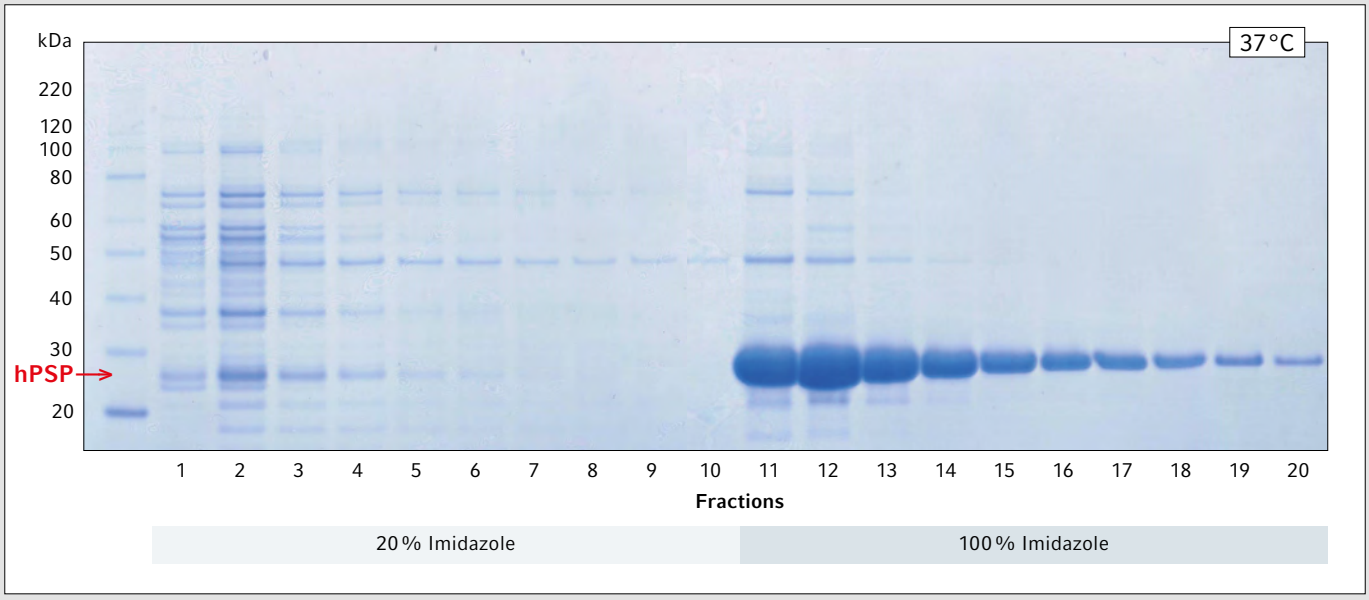


Fig. 2: Coomassie blue staining of SDS PAGE showing the total protein elution profile

The result of the assay shows that a large amount of functional hPSP was leached out by the elution buffer based on 100 % Imidazole, with a maximum in fraction 12 which correlates with the absorbance measurement (Fig. 3).

The results demonstrate that the Innova S44i and Centrifuge CR30NX, together with the appropriate accessories, can be successfully used for the production and purification of a recombinant protein. In addition to a high yield and the proven functionality of the product, the process steps could be carried out efficiently.

With its robust design and high vessel capacity, the S44i enables the culture of microorganisms at high speeds and heavy loads [2]. The Harvesting Bundle of the high-speed Centrifuge, consisting of the 4 x 1.5 L Rotor and corresponding 1.5 L bottles represents a matching system for harvesting cells. The innovative triangular format of the bottles makes handling very easy. In addition, processing 1.5 liters of culture volume per bottle, saves time during each handling step (up to 32 % of the process time compared to handling 6 bottles of 1 L volume each [1]). The bundle only needs to be completed with the High-Speed Pelleting Kit for conical tubes to cover all centrifugation steps for the production of a recombinant protein from harvest to concentration.

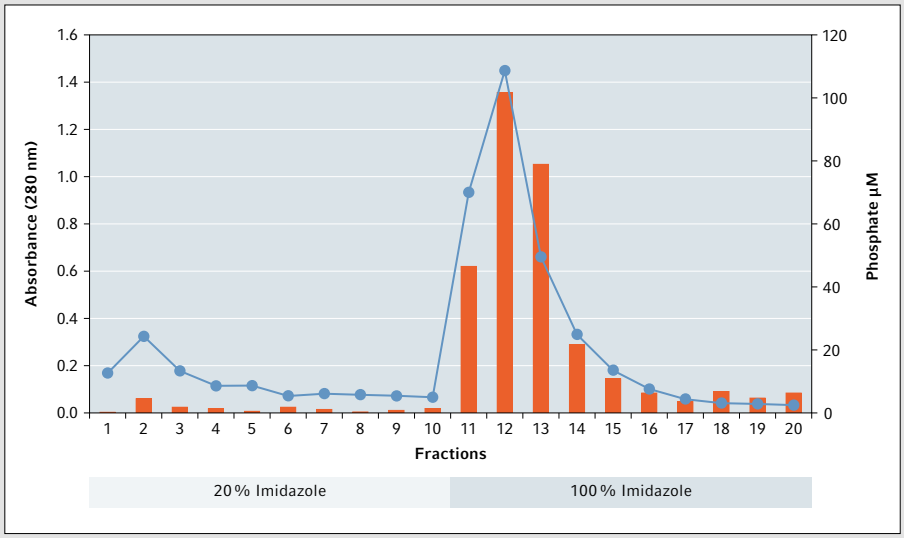


Fig. 3: Plot of absorbance measurement at 280 nm (blue dots/line) in combination of enzyme activity (orange bars) per eluted fraction

*Download of full Application Note 451 at
https://eppendorf.group/s0c8t8

Literature

[1] Tacheny A. *Eppendorf White Paper* No. 64
https://eppendorf.group/0xu3ne

[2] Hartmann I., Jarvis J. *Eppendorf White Paper* No. 47 https://eppendorf.group/u9vk3w

Fast and Safe Sample Handling with Eppendorf Conical Tubes SnapTec® 50

RAFAL GRZESKOWIAK, EPPENDORF SE, HAMBURG, GERMANY
SANDRINE HAMELS, BLANDINE VANBELLINGHEN, EPPENDORF APPLICATION TECHNOLOGIES, S.A., NAMUR, BELGIUM

Abstract

Conventional 50 mL Conical Tubes with screw cap pose a major handling drawback: they require complex two-hand operation and are prone to mix-up and contamination of the screw caps. The alternative is SnapTec 50 offering easy, one-hand operation and as much safety as regular screw caps.

Here we demonstrate that Eppendorf Conical Tubes SnapTec 50 compared to standard screw cap conical tubes provide a considerable advantage, reducing handling time by almost 40 %, minimizing contamination risk, and improving comfort for the user. This makes the Eppendorf Conical Tubes SnapTec 50 ideal tubes for a wide spectrum of demanding laboratory applications, where safety as well as quick and comfortable handling are required.

Introduction

Conventional 50 mL conical tubes with screw cap are one of the most widespread tube formats and are used in a variety of molecular biology, microbiology, and biochemistry workflows. Typical applications include handling, storage, and transport of samples or reagents as well as centrifugation, mixing, incubations, and cell culture. In this large range of applications, conical tubes must typically withstand conditions regarded as extreme: temperatures between –86 °C and 100 °C, high centrifugal forces (in the range of 20,000 x *g*), aggressive chemicals or solvents and many others.

While providing good safety, the screw caps used in the conical tubes typically pose a major handling drawback: they require time-intensive two-hand operation and are prone to be mixed up and contaminated. The newly introduced alternative is SnapTec – a snap cap offering easy one-hand operation known from smaller tube formats and equal safety and integrity as a regular screw cap.

In this Application Note, handling times in a standard cell culture workflow were investigated to assess speed and comfort of SnapTec usage under application-relevant conditions.

The results demonstrate that Eppendorf Conical Tubes SnapTec 50 compared to standard screw cap conical tubes offer considerable advantages by reducing handling time by almost 40 %, minimizing contamination risk, and improving comfort for the user.

This makes Eppendorf Conical Tubes SnapTec 50 ideal for a wide spectrum of demanding laboratory applications where safety and sample integrity as well as quick and comfortable handling are required.

Materials and methods

28 tubes of each cap type (Eppendorf Conical Tubes SnapTec 50 and Eppendorf Conical Tubes 50 mL with screw caps) were used for a standard cell culture procedure: cell passaging and seeding.

Centrifugation steps were performed with Eppendorf Centrifuge 5810 R with swing-bucket rotor S-4-104. The handling time required for each step as well as ease of use of the cell handling procedure were assessed.

Results and discussion

While providing good safety, the screw caps used in conical tubes pose a significant handling disadvantage: they require complex and time-intensive two-hand operation and are prone to mix-up and contamination.

The alternative is Eppendorf SnapTec – a snap cap with easy one-hand operation, which assures considerable time saving, minimizes contamination risk, and improves comfort for the user – particularly in demanding and contamination-sensitive applications like cell culture.

Here we compared Conical Tubes SnapTec 50 to standard screw cap conical tubes (Eppendorf Conical Tubes 50 mL) in respect to handling times required in a standard cell culture procedure (Fig. 1).

As shown in Table 1, SnapTec allows considerable time saving of 36 % as compared to a standard screw cap – mainly due to numerous cap opening/closing steps in the procedure. Furthermore, the contamination risk has been minimized and overall comfort for the user considerably increased (data not shown, personal experience of the testing user).

Conclusion

In this Application Note, the sample handling in a standard cell culture workflow has been evaluated. The results we have obtained indicate that Eppendorf Conical Tubes SnapTec 50 provide a considerable advantage in comparison to standard screw cap conical tubes. Using Conical Tubes SnapTec 50 reduces the handling time by almost 40 % and minimizes the contamination risk. Additionally, Eppendorf Conical Tubes SnapTec 50 significantly improve user comfort.

Fast and Safe Sample Handling with Eppendorf Conical Tubes SnapTec® 50

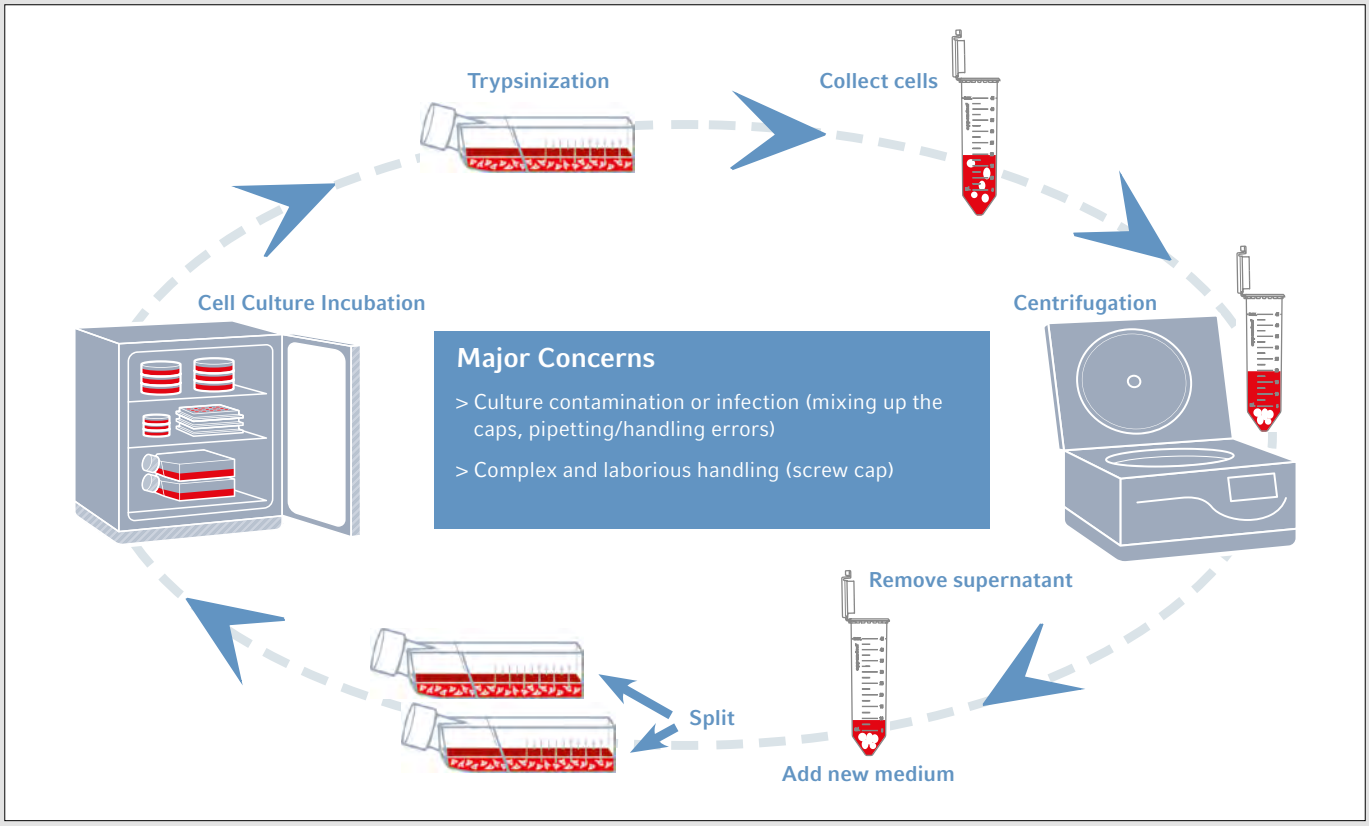


Fig. 1: Generic cell culture workflow used in this Application Note to assess handling speed. Key workflows steps are shown.

Handling steps description	Handling time (s) for 28 tubes	
	Screw cap	SnapTec® 50
Annotate the tubes	60	30
Open the tubes	60	40
Transfer cell solution in tubes	na*	na*
Close the tubes	60	40
Place the tubes in the centrifuge	na*	na*
Centrifuge at 1,000 rpm for 5 min	na*	na*
Remove the tubes from the centrifuge	na*	na*
Open the tubes	60	40
Remove the supernatant, resuspend the cell pellets in culture medium, take an aliquot for cell counting	na*	na*
Close the tubes	60	40
Cell counting	na*	na*
Open the tubes	60	40
Transfer a defined amount of cells in cell culture consumable	na*	na*
Total handling time (s)	**360**	**230**
Difference (%)	**36 %**	

*identical step/time for both tube types (snap and screw cap)

Table 1: Handling times of a standard cell culture procedure using Eppendorf Conical Tubes 50 mL with screw cap and Eppendorf Conical Tubes SnapTec 50

This makes Eppendorf Conical Tubes SnapTec 50 ideal tubes for a wide spectrum of demanding laboratory applications where safety, sample integrity as well as quick and comfortable handling are required.

More information at
https://eppendorf.group/48zrkt

Standardized Thawing of Stem Cells Using the Eppendorf ThermoMixer® C

AURÉLIE TACHENY, SILVIA TEJERINA VARGAS, JEAN-FRANÇOIS HOET, BLANDINE VANBELLINGHEN,
EPPENDORF APPLICATION TECHNOLOGIES, S.A., NAMUR, BELGIUM
INES HARTMANN, EPPENDORF SE, HAMBURG, GERMANY

Introduction

Thawing of stem cells by submerging the cryovial in a water bath is still the most common technique, although the procedure often lacks standardization and the risk of introducing a contamination is well known. The Eppendorf ThermoMixer C in combination with the "SmartBlock cryo thaw" features a program for automated thawing of cells. It allows highly convenient and reproducible thawing procedures in 1.8–2 mL cryovials, optimized for 1 mL fill volume. The absence of water reduces the risk of introducing contaminations during the thawing process. Here we show that the method is well suited for thawing of sensitive stem cells. We compare the results of thawing human induced pluripotent stem cells (hiPSCs) and human bone marrow derived mesenchymal stem cells (hMSC-BM), either in a conventional water bath or in a ThermoMixer C equipped with a SmartBlock cryo thaw. Cell morphology, viability, and the maintenance of respective differentiation efficiencies were analyzed.

Materials and methods

hiPSCs and hMSC-BM were frozen in liquid nitrogen using 2 mL cryovials. hiPSCs were frozen in 1 mL mFreSR™ cryopreservation solution (Stem Cell Technologies, 05854) and hMSC-BM in 1 mL Mesenchymal Stem Cell Basal Medium (Lonza # PT3238) supplemented with 20 % FBS and 10 % DMSO. To compare cell thawing performance, cells where thawed with the Eppendorf ThermoMixer C with the SmartBlock cryo thaw "Thawing cells" program (set thaw time of 3 min) and in parallel by classic water bath immersion. Tests were run in triplicates.

Thawed hiPSCs were cultivated on Matrigel-coated surface in a feeder-free adapted culture medium (Essential 8® Flex Medium kit, A2858501, Thermo Fisher Scientific®) supplemented with RevitaCell (Thermo Fisher Scientific, A2644501) according to supplier's instructions and analyzed for cell morphology, spontaneous differentiation, and cell growth 24 h and 72 h post-thawing. Immunostaining was performed to confirm the maintenance of pluripotency after four successive passages using the Pluripotent Stem Cell 4-Marker Immunocytochemistry Kit (A24881, Thermo Fisher Scientific).

Thawed hMSCs were cultivated in a serum-free adapted culture medium (MSCGM™ Mesenchymal Stem Cell Growth Medium Bulletkit™, PT-3001, Lonza) according to supplier's instructions and checked for cell morphology and viability 24 h and 48 h post-thawing. Osteogenic and adipogenic differentiations have been induced after one successive passage by using the OsteoMax-XFTM Kit (Human) (SCM121, Merck Millipore®) and the hMSC Adipogenic Differentiation Bulletkit (PT-3004, Lonza). Respective differentiation efficiencies have been assessed through Alizarin Red and Oil Red O. For further details please refer to the original Application Note 452*.

Results and discussion

The hiPSCs thawed with the water bath or the Eppendorf ThermoMixer C showed the typical and expected hiPSC morphology 24 h post-thawing forming flat, tightly packed colonies with well-defined borders. No abnormalities in shape or densities were visible. 72 h post-thawing, cells formed a confluent monolayer (figures shown in Application Note 452).

The viable cell count performed 72 h post-thawing confirmed the microscopic observation. The hiPSCs thawed with the Eppendorf ThermoMixer C showed the same proliferation as the cells thawed with the water bath (figures shown in Application Note 452). Cells were passaged until passage four. No spontaneous differentiation or spontaneous detachment was observed during all conditions. Immunostaining after four successive passages confirms the maintenance of pluripotency for the cells thawed with the Eppendorf ThermoMixer C (figures shown in the original Application Note) and the water bath (data not shown).

The hMSC-BM showed their typical and expected morphology after thawing with both methods (Fig. 1).

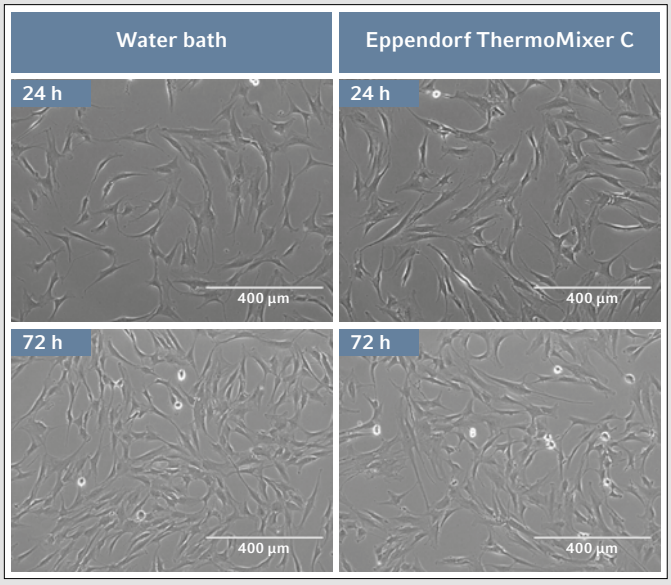


Fig. 1: hMSC-BM 24 h and 48 h post-thawing show the typical and expected morphology and confluences with both thawing methods

No abnormalities in shape or densities were visible. No spontaneous differentiation or spontaneous detachment was observed during all conditions. The viable cell count performed 48 h post-thawing confirmed the microscopic observation (Fig. 2).

The cells thawed with the Eppendorf ThermoMixer C showed the same proliferation levels as the cells thawed with the water bath.

Standardized Thawing of Stem Cells Using the Eppendorf ThermoMixer® C

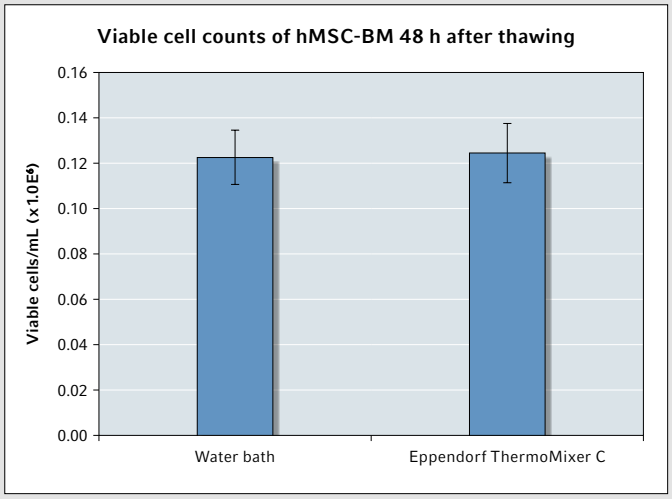


Fig. 2: Viable cell counts of hMSC-BM 48 h after thawing. Results represent a mean of two vials (n=2)

To confirm this multilineage differentiation ability, two lineages – the osteogenic and adipogenic pathways – have been induced and differentiation ability was confirmed by immunostaining (Fig. 3 and 4). At the qualitative level, the differentiation potential is comparable between cells thawed with the Eppendorf ThermoMixer C and the water bath.

Conclusion

In summary, both stem cell types showed similar fast recovery rates, cell viability, and growth patterns when thawed with the Eppendorf ThermoMixer C and a water bath. In addition, we could show that pluripotency for hiPSCs and multipotency for hMSCs were at the same level with both thawing methods. The cell tests clearly show that the automated thawing with the Eppendorf ThermoMixer C in combination with the SmartBlock cryo thaw is well suited also for sensitive stem cells. It offers highly reproducible thawing procedures and can handle multiple vials in parallel. The handling is easy with the pre-set program and the device can be integrated flexibly in workflows with its small footprint and exchangeable SmartBlock system. The contamination risk that is associated with water bath immersion is eliminated, as the method is water-free. The ThermoMixer C with the SmartBlock cryo thaw offers an attractive improvement for general stem cell handling.

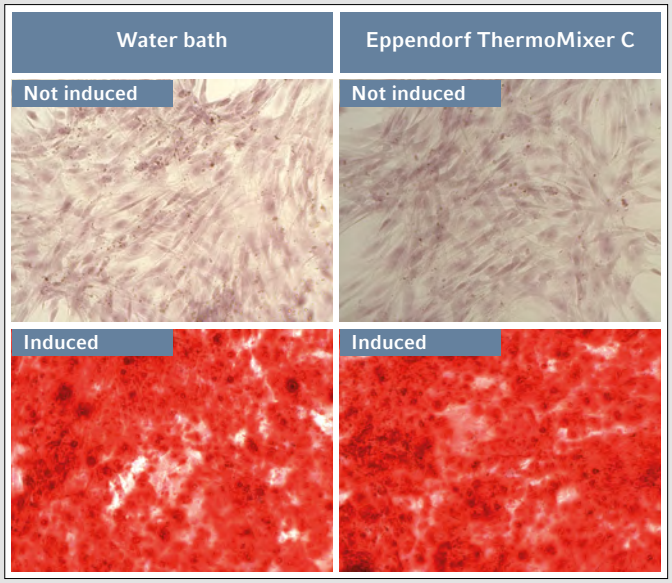


Fig. 3: Alizarin Red staining of hMSC-BM 15 days post-osteogenic induction. Cells thawed with both methods present a high differentiation level in contrast to non-induced cells, as suggested by the intense Alizarin red coloration (magnification 200x)

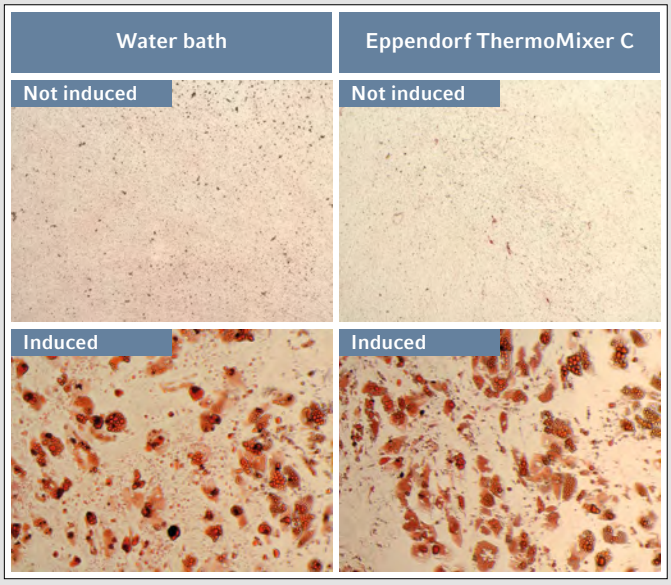


Fig. 4: Oil Red O staining of hMSC-BM 17 days post-adipogenic induction. Cells thawed with both methods present a high differentiation level in contrast to non-induced cells, as suggested by the accumulation of intracellular lipid droplets colored by Oil Red O staining (magnification 200x)

*Download of Application Note 452 at https://eppendorf.group/7duluh

Stem Cell Exosome Production on the SciVario® twin Bioreactor Control System

JORGE L. ESCOBAR IVIRICO AND MA SHA, EPPENDORF, INC., ENFIELD, CT, USA
CONTACT: BIOPROCESS-EXPERTS@EPPENDORF.COM

Abstract

Mesenchymal stem cells (MSCs) are promising tools for new cell therapy applications. They have limitations however, including problems associated with inadequate cell localization and low cell survival rate within the target tissue. MSC-derived exosomes are involved in MSCs' paracrine functions related to cell-to-cell communications and tissue reconstruction. They are an alternative to restore tissues and organs, avoiding the limitations associated with stem cell therapy. The mass production of exosomes is the necessary next step for their use in medical research. In this study, we used a SciVario twin bioreactor control system equipped with BioBLU® 1c Single-Use Bioreactors for large-scale exosome production and demonstrated the suitability of the system for producing MSC-derived exosomes in a controlled environment.

Material and methods

We used iPSC-derived MSCs (ATCC®, ACS-7010). You find a detailed description of material and methods in the Eppendorf Application Note 435*. Exosome production and analysis included the following workflow steps:

1. Cell culture

1.1. We expanded the cells first in T-75 flasks, then in T-175 flasks in a CellXpert® C170i incubator (Eppendorf).

1.2. To achieve the number of cells required for inoculating the bioreactor, we expanded the cells further in multilayer flasks.

1.3. We harvested the cells from the multilayer flasks and seeded them onto collagen-coated microcarriers (Pall Corporation), that were in a glass bottle.

1.4. Following incubation, we transferred the microcarriers to a BioBLU 1c Single-Use Bioreactor, that was prefilled with culture medium.

1.5. We cultivated the cells in the bioreactor for 14 days. After day 5, we partly exchanged the medium every two days or daily. The process parameters from two experiments are summarized in Table 1.

2. Exosome collection and analysis

2.1. At day 5, 8, 11, and 14 of culture, we collected 50 mL of culture broth containing iPCS-derived MSCs on microcarriers and exchanged the medium with medium containing exosome-depleted fetal bovine serum.

2.2. We cultivated the iPSC-derived MSC/microcarrier system for 48 h at 37 °C, 5 % CO_2, and 50 rpm using a New Brunswick S41i CO_2 incubator shaker.

2.3. We then removed the supernatant and isolated and purified exosomes using ExoQuick-TC PLUS Kit (System Bioscience, EQPL10TC-1).

2.4. We quantified tetraspanin-containing exosomes through an ExoELISA-ULTRA CD63 Kit (System Bioscience, EXEL-ULTRA-CD63-1).

3. Cell analysis

We collected a sample every day during the first experiment or every two days during the second experiment from the bioreactors to determine the cell density and the concentrations of glucose, ammonia, and lactate.

	First experiment	Second experiment
Parameters	**Setpoints**	
Starting volume	700 mL	
Ending volume	1 L	
Initial agitation	80 rpm (0.62 tip speed)	
Temperature	37 °C	
Inoculation density	3×10^4 cells/mL	10.4×10^4 cells/mL
Cell culture medium	DMEM/F12 medium	ATCC complete medium
DO setpoint	40 % (P = 0.1; I = 0.001)	
pH setpoint	7.2 (deadband = 0.1), cascade to CO_2 (acid) cascade to 0.45 M sodium bicarbonate (base)	7.6 (deadband = 0.1), cascade to CO_2 (acid) cascade to 0.45 M sodium bicarbonate (base)
Overlay N_2 gas flow	0.20 SLPM	0.25 SLPM
Gassing range	0.1 SLPH – 30 SLPH	
Gassing cascade	Set O_2 % at 30 % controller output to 21 % and at 100 % controller output to 21 %. Set flow at 0 % controller output to 0.5 SLPH, and at 100 % controller output to 30 SLPH.	

Table 1: Process parameters and setpoints of the first and second experiment

Results and discussion

After the initial expansion of the cells in T-flasks, we analyzed their stemness capacity by flow cytometry. Cells were positive for CD90 and CD29 (typical MSC markers) and negative for hematopoietic markers such as CD34 and CD11b.

Next, we established the optimal cell culture conditions. In our first experiment, we used 17 g/L microcarriers to provide cell support and used DMEM/F12 as the cell culture medium. We inoculated the bioreactor at an initial cell density of 5×10^3 cells/cm² (3×10^4 cells/mL). After the initial cell expansion, the cell count was erratic, especially after each collection day. Overall, cell growth increased 4-fold more than the initial cell density on day 15 of culture, but the final density was low. We attributed this behavior to the low inoculation density and the use of DMEM/F12 cell culture medium, whose composition may be suboptimal for the expansion of iPSC-derived MSCs.

To improve the exosomes production yield, in a second experiment we changed

Stem Cell Exosome Production on the SciVario® twin Bioreactor Control System

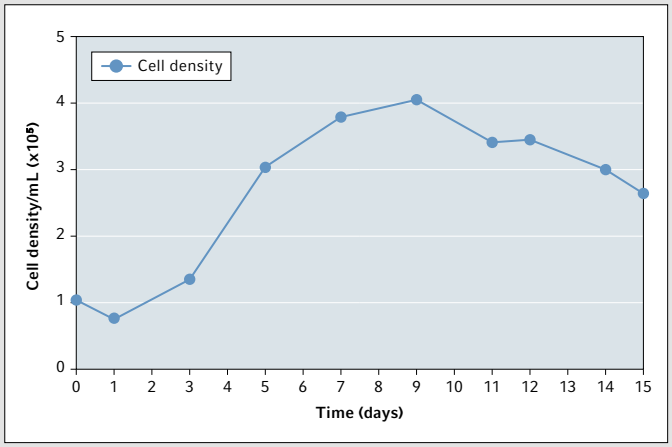


Fig. 1: iPSC-derived MSC's growth profile in BioBLU 1c Single-Use Bioreactor with ATCC complete medium

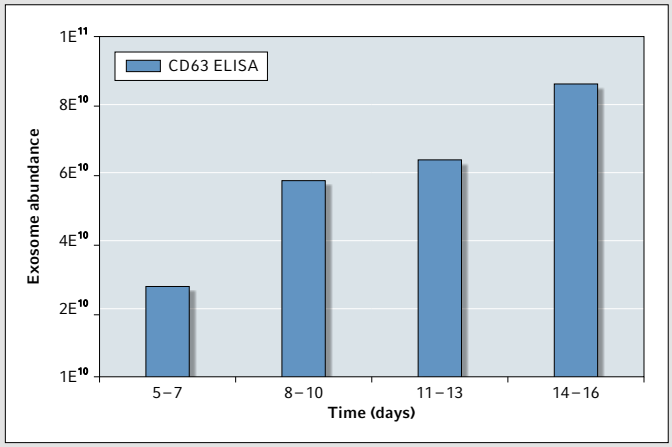


Fig. 2: Exosome abundance secreted by iPSC-derived MSCs on each collection period

the cell culture conditions relative to the first experiment. We used ATCC complete medium and increased the inoculation cell density to 17×10^3 cells/cm² (10.4×10^4 cells/mL), maintaining the microcarrier concentration at 17 g/L. We observed an initial lag phase 24 h after the inoculation followed by a steady increase of cell growth between days 1 and 9 of culture. After reaching the stationary phase around day 9, the cell density decreased until day 15 (Fig. 1).

At day 9, a maximum cell density of 4.1×10^5 cells/mL was reached. However, we observed substantial microcarrier aggregation later in the run. Therefore, we based the cell count in the later stages on only the floating microcarriers, thus the true average of the cell expansion in the vessel was undoubtedly higher.

We determined the consumption of glucose and production of lactate and NH_3 while maintaining the concentration of lactate and NH_3 below 1.2 g/L and 1.2 mmol/L, respectively during the whole run. As the glucose level was significantly lower in the ATCC complete medium than in the DMEM/F12, in the second experiment the addition of glucose on day 11 was necessary (see Application Note 435*).

We used a direct Enzyme-Linked Immunosorbent Assay (ELISA), to quantify the exosome abundance in the culture medium. The number of iPSC-derived MSC exosomes constantly increased from day 5 (2.6×10^{10}) to day 16 (8.6×10^{10}). In addition, we found a direct correlation between cell density and secreted exosomes up to day 9, while the decrease in cell density in the bioreactor did not influence the exosome secretion after the stationary state (Fig. 2).

Conclusions

We have established the feasibility of producing MSC-derived exosomes using the SciVario twin bioreactor control system and BioBLU 1c Single-Use Bioreactors. These experiments are preliminary studies and have not yet been optimized to ascertain the maximum exosome production levels.

However, our observations can serve as a guideline for further improvements in MSC-derived exosomes isolation, purification, and scale-up protocols.

SciVario twin Bioreactor Control System equipped with BioBLU 1c Single-Use Bioreactors

*Download of Application Note 435 at https://eppendorf.group/s5rrsq

SIMON PLATE, EPPENDORF SE

Sustainable: Pipettes with the ACT® Label

Sustainability is one of our core themes for the future; this includes prudent allocation of resources within the life cycles of our products. In this context, the Eppendorf Research® plus single-channel pipettes with variable volume were the first laboratory pipettes ever to be certified with the "ACT" Environmental Impact Factor Label by the non-profit organization "My Green Lab®".

Through evaluation of Accountability, Consistency, and Transparency – ACT – in the areas of manufacturing, energy consumption, water consumption, packaging, and disposal, the ACT label supports and simplifies the selection of more sustainable products. Designated ACT products are individually tested by the Sustainability Management & Strategy Collaborative (SMSC), a consulting firm in the area of sustainability, and published by My Green Lab.

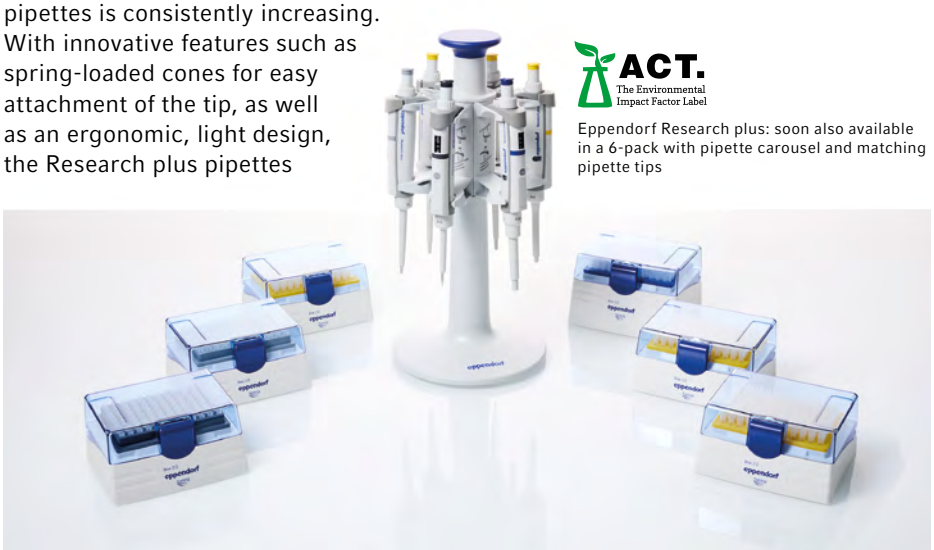
Sustainably manufactured, highly ergonomic, and durable

Research plus pipettes are manufactured in a modern production facility which operates with 100 % renewable energy. In collaboration with parts suppliers, reusable packaging systems are employed, and the proportion of recycled material used for the packaging of pipettes is consistently increasing. With innovative features such as spring-loaded cones for easy attachment of the tip, as well as an ergonomic, light design, the Research plus pipettes support healthy working conditions in the laboratory. With regular cleaning and maintenance, they can serve scientists for years to come.

Soon also available in a 6-pack

The first pipette ever to be certified with an ACT label will soon also be available as a 6-pack at an attractive special price. The perfect set: with all common single-channel volume variants, matching tips, and a practical pipette carousel that saves space while keeping pipettes organized, safe from contamination and ready for use.

More information at https://eppendorf.group/mq7bk7



ACT. The Environmental Impact Factor Label

Eppendorf Research plus: soon also available in a 6-pack with pipette carousel and matching pipette tips

News

Have You Ever Pipetted Electronically?

In comparison with their manual siblings, electronic pipettes offer a whole series of advantages:

> Improved ergonomics, requiring almost no operating forces

> Higher precision and reproducibility

> More efficiency through different operating modes: for example, you can pipet and dispense using a single instrument.

The electronic pipettes Eppendorf Xplorer® and Xplorer plus enable easy and fatigue-free operation; they deliver accurate results, and you retain full control over the pipetting process at all times.

With the help of an additional WiFi module, Xplorer pipettes can also be connected via the VisioNize® pipette manager. This external control panel allows even faster work; it offers ideal settings for many types of liquids ad hoc, as well as functions for pipette management and documentation of individual steps within the workflow.

Find more information about electronic pipetting with Eppendorf on our new website www.eppendorf.com/DiscoverXplorer

Tip: Solve our prize puzzle on page 15. With a little luck you could win the main prize – 1 Eppendorf Xplorer plus 8-channel pipette.

ULRIKE RASCHE, EPPENDORF SE BIOPROCESS CENTER, JUELICH, GERMANY

Increase the Reproducibility of Your Cell Culture Bioprocess

Reproducible cell growth and reliable production of the desired product – this is the ideal scenario for any bioprocessing engineer! After all, the poorer the reproducibility, the higher the risk of needing to discard the batch and repeat the entire bioprocess – at a high cost in terms of time, resources, and nerves. We asked the bioprocessing specialists in our Eppendorf Application Laboratory to find out which factors are likely to lead to inconsistent results, and we received valuable tips that can help increase the reproducibility of cell culture bioprocesses.

Tip 1:
Start with equal conditions

A bioprocess does not begin inside the bioreactor. The cells used for inoculation have a history: typically, they were thawed, expanded in a stepwise manner in shaker flasks and then transferred to the reactor. For reproducible results, it is crucial to maintain the cells in an optimal state throughout the entire workflow in order to achieve a consistent quality of the inoculum. To this end, it is helpful to develop a standardized protocol for the handling of the cells throughout the initial stages of process development. Several relevant factors are summarized in Figure 1. Establishing consistent culture conditions with narrow parameters can considerably improve reproducibility between individual runs.

Tip 2:
Use sensors correctly

Reproducible results require reproducible conditions inside the bioreactor; these depend on reliable sensor data which, in turn, depend on the precise calibration of the sensors. As an example, let's take a look at the concentration of dissolved oxygen (DO). Polarization and calibration time of the DO-sensor may differ considerably depending on the user, which can potentially impact measurement results. Specialized software functions can help; for example, the function *Auto Calibrate* of the BioFlo® 320 and BioFlo 720 bioreactor control systems polarizes and calibrates the DO-sensors automatically, thus delivering reliable and reproducible results every time.

Dissolved oxygen, temperature, and pH are routinely measured in real time throughout the bioprocess. The integration of additional sensor types into bioprocess control enables capture of information regarding the condition of the cells or the concentration of nutrients and byproducts, and it also allows the implementation of feedback loops. This approach allows automation of, for example, culture feeding, based on the glucose concentration in the medium, and nutrient availability may be standardized.

In summary: reproducible conditions inside the bioreactor contribute to reproducible behavior of the cells, thus providing a solid basis for optimal process performance.

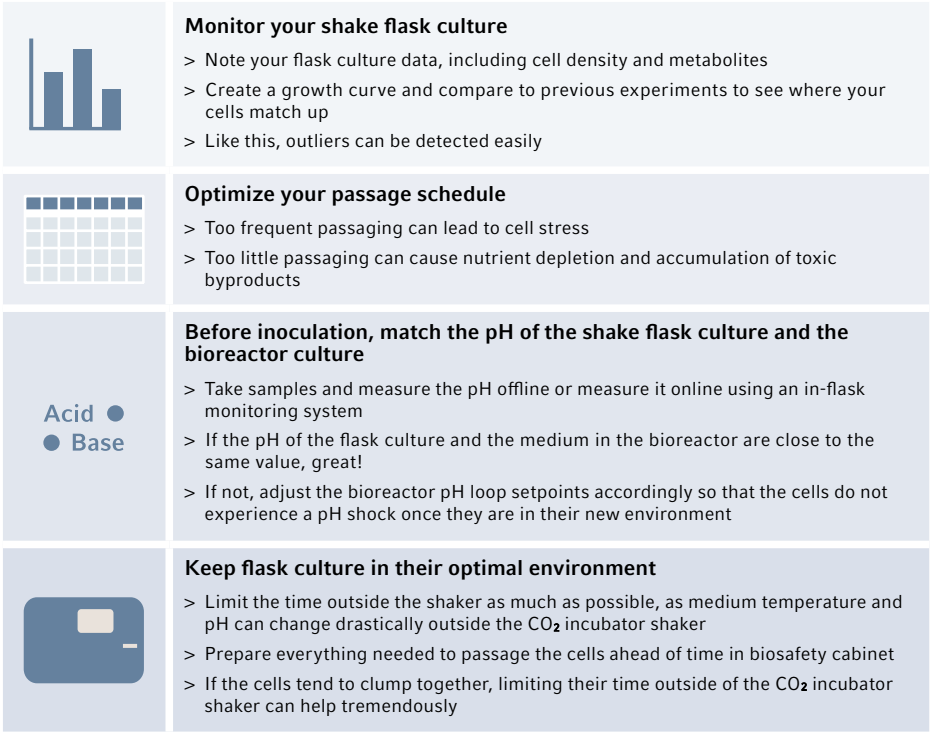


Fig. 1: Tips for a high-quality inoculum

Tip 3:
The right bioprocessing equipment

For cell culture processes, reproducibility is defined as equal behavior of replicates as well as comparable process behavior independent of scale. In both cases, bioprocessing equipment can help. On a small scale, during process development, parallel systems allow the simultaneous use of multiple bioreactors under identical conditions. Medium and inoculum originating from the same batches can be used to increase reproducibility between runs. The DASbox® Mini Bioreactor System, to name an example, allows parallel control of up to 24 vessels. The use of a family of instruments with consistent parameters is helpful during the scale-up process from small scale to pilot scale. Relevant factors include vessel geometry, material, and features.

First steps towards troubleshooting

If you notice that cell growth and the product yield of your bioprocess vary from day to day, it's time to do some troubleshooting. It makes sense to first concentrate on the most obvious and the most accessible factors. One possible technical problem could be that sensors or gas lines were not connected properly. A reasonable subsequent step could include the analysis of process data, such as, for example, the supply of gases and liquids for the control of DO as well as pH; the feeding of media, as well as the various sensor data. A bioprocess software which offers deep and detailed insights into the performance of the bioreactor can help. Ideally, you will compare process data with historical runs, even if a novel process design is being evaluated.

Changes in the workflow also have the potential to alter results: for example, did I refrigerate my medium this time whereas previously I stored it at room temperature?

One final thought: is the system maintained on a regular basis? With increasing age, the quality of sensors and actuators will decline, which will lead to deviations. This effect can be minimized through regular calibration and adjustment.

Conclusion: there are many possible sources of error; it is important to have the right tools on hand to obtain sufficient high-quality data in order to be able to determine their cause.

Read our ebook "Increasing the Reproducibility of Cell Culture Bioprocesses" to learn more: **https://eppendorf.group/pelubk**

Close-Up

Smart Cable Management

Does the cable clutter next to your bioreactor control system bother you? Then you will like the cable management guide of the SciVario® twin bioreactor control system, shown in our close-up.

Its cable clips allow you to insert cables and tubing of different diameters safely and easily. Like this, you can arrange sensor cables and tubing for liquid and gas exchange in a tidy way. And the best thing: bench-space next to the control system becomes freely available and no dust can accumulate below cables lying on the bench.

Usability was one of the main drivers throughout the development of the SciVario twin bioreactor control system, which you can see in its entirety below. To get to know, what makes its bioprocess control software and hardware especially user-friendly, visit: **https://eppendorf.group/dit7fg**

DAVID SOLBACH, EPPENDORF SE BIOPROCESS CENTER, JUELICH, GERMANY

Stem Cell Community Day 2021: Hybrid and Different – a Review

The Stem Cell Community Day (SCCD), "Stem Cell Day" for short, has been organized and hosted by Eppendorf since 2017; it brings together researchers from academia and industry to discuss current advances and the latest technologies in the field of stem cell research. With a special focus on stem cell cultivation in bioreactors, the Stem Cell Day has served as a platform for the exchange of knowledge and experience for the past five years. Read here about the challenges we had to overcome in 2021 due to COVID.

"Building a Stem Cell Community"

It is under this motto that Eppendorf has been hosting the Stem Cell Community Day since 2017. Initially held annually, the event has taken place in two-year intervals since 2019. The focus of every Stem Cell Day is the exchange of knowledge between researchers from academia as well as industry. On average 150 participants from different countries meet to take part in workshops and listen to expert presentations. In order to support and promote direct knowledge exchange, the poster exhibition – an opportunity for young scientists to present their research – constitutes an integral part of the Stem Cell Day. Selected by a jury, the best poster is awarded a prize of € 1,000.00.

Hybrid and even more international

The continuing COVID-pandemic posed a significant challenge to the organizers of the Stem Cell Community Day, scheduled to take place in Cologne in November 2021. On the one hand, we wanted to create an attractive event with in-person participation, while ensuring the highest possible safety. On the other hand, we had to compromise with respect to the number of participants in order to be able to guarantee precisely this safety. We therefore decided to hold the SCCD 2021 as a hybrid event. Our event team pulled all the stops and not only found a great venue which allowed adherence to current COVID safety regulations, but they also identified an agency which competently supported the technical implementation of the hybrid concept.

Even in the face of considerable challenges, the event was worth the effort, and the overwhelmingly positive feedback we received confirmed our decision. The hybrid format definitely pushed the SCCD towards more international participation. Since the initial Stem Cell Days had taken place in different European cities, most participants had originated from Europe. Thanks to the hybrid nature of the 2021 event, we not only welcomed participants from all over the world, but we were able to attract international speakers to present their work and discuss solutions to problems within the international community.

SCCD 2023: quo vadis?

Eppendorf will organize the next Stem Cell Day in 2023. We are looking forward to suggestions as to where it should take place.

Simply send us an e-mail to
stemcellday@eppendorf.de

www.stemcellday.de

EILEEN DUVE, EPPENDORF SE

Your Online Path to More Expert Knowledge

Cross your heart! How many sources do you access in order to expand your knowledge on all things laboratory? These days, it seems easy to simply consult the internet to research the facts on laboratory topics. Not only Google® and Wikipedia®, but also language services such as Alexa® are at our service 24/7 to provide us with information. These avenues, however, carry the risk of distraction or losing track.

Project Manager Marketing Matthew Jurkiewicz (left) and Steve Dey, Head of Regional Segment Marketing, Eppendorf UK, during the world premiere of our webinar series on the topic of digitalization

Eppendorf Lab Channel: Experts. Knowledge. Live.

Under this motto, Eppendorf created a virtual platform for knowledge transfer and exchange in 2021. Following free, uncomplicated registration, Lab Channel users will be able to retrieve versatile video content as well as tips and tricks, all about laboratory work. On the Eppendorf Lab Channel, we offer you live and on-demand webinars as well as product and application demos. Presented by Eppendorf experts and different guest speakers who are familiar with their scientific topics and solutions down to the smallest detail, and who look forward to the interactive exchange of knowledge with you – via chat and survey function. Ask your questions, provide food for thought, or use the Eppendorf Lab Channel for networking purposes.

A growing array of topics

In our webinars and demos, we cover a variety of topics – for example, digitalization, cell culture, pipetting, PCR, and centrifugation. And that's just the beginning!

Piqued your interest?
At www.eppendorf.com/labchannel, you will find all scheduled webinars and demos as well as recordings of past events. We look forward to you joining us!

Tip

Live again at last

After a 2-year absence from the trade fair during the COVID-19 pandemic, the Eppendorf Live Marketing Team is finally looking forward to welcoming you back on site. Complete with a new trade fair concept, whose development not only focused on a pleasant atmosphere for good discussions and exciting product presentations, but also on the crucial transfer of knowledge amongst each other.

Expand your knowledge with interesting seminars, guided tours, and talks directly at the Eppendorf booth. Interested visitors can register for participation in advance at the reception. As the number of places is limited, participation will be determined by "first come, first served"!

Good to know: The seminars will be streamed live via the Eppendorf Lab Channel (see article on the left) and made available there on-demand.

Welcome to ACHEMA2022

From August 22–26, the Eppendorf Live Marketing Team welcomes visitors to ACHEMA® 2022 in Frankfurt/Main. At the world's leading trade fair for the process industry, we invite you to good discussions and lively exchanges with our experts.

Visit our exhibition stand in Hall 4.1 to discover bioprocess technology and our workflows.

We look forward to your visit:
Hall 4.1, Stand B35

We will look after your health and safety with our own hygiene concept that will exceed the measures recommended by the exhibition organizers.

Visit our website for more information and register for a free ticket:
www.eppendorf.com/achema

CORDULA RICHTER, EPPENDORF SE

Thi Hoang Duong Nguyen Receives Eppendorf Award 2022

The independent jury chaired by Prof. Reinhard Jahn selected Dr. Thi Hoang Duong Nguyen, MRC Laboratory of Molecular Biology, Cambridge, UK, as the winner of the *Eppendorf Award for Young European Investigators* 2022.

Thi Hoang Duong Nguyen, born in 1987, receives the € 20,000 award for her pioneering work on the structure and function of two RNA-protein complexes that are essential for all higher organisms: spliceosome and telomerase.

"Thi Hoang Duong Nguyen's work provided fundamental insights into the structure and function of these complexes and will have a lasting impact on the understanding of RNA processing and genome stability", the judges said.

Thi Hoang Duong Nguyen: "I feel humbled and honored to receive the 2022 Eppendorf Award. I am very grateful to my laboratory, past and present colleagues, mentors, collaborators, and family, without whom this would have not been possible. The award recognizes our contribution to the elucidation of the molecular mechanisms of important processes through visualization of the three-dimensional structures of the biological molecules involved.

Our current research focuses on cellular pathways that maintain the essential chromosome caps to preserve genomic information. Failures in these pathways result in numerous human diseases. We hope that the insights gained from our work will facilitate therapeutic developments to treat these diseases."

The award ceremony took place on July 5, 2022, at the Advanced Training Center of the European Molecular Biology Laboratory (EMBL) in Heidelberg, Germany.

Further information on application modalities, selection criteria, and previous winners can be found at
www.eppendorf.com/award

Eppendorf & Science Prize for Neurobiology 2022

The winner had not yet been determined at the time of going to press.

More information at
www.eppendorf.com/prize

Win an Electronic Pipette

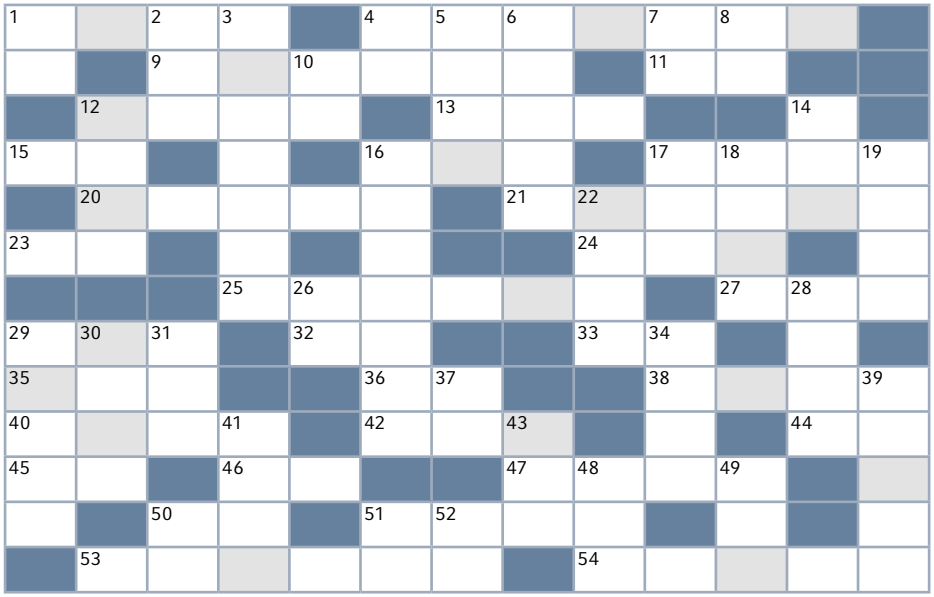
The solution of the prize competition of BioNews No. 55 was "VISIONIZE LAB SUITE". The main prize, an Eppendorf Research® plus Move It® multi-channel pipette, went to Ute V., Austria.

Good luck in our new competition!

Simply arrange all letters in the light gray boxes of the crossword in the correct order. Send us the solution until **October 31, 2022**.

Participate online at **www.eppendorf.com/bn-service** or e-mail the solution to **bionews@eppendorf.de**.

All correct answers will be considered for a prize for use in your lab. Winners will be notified in writing. Cash payment of the prize is not possible. No recourse to legal action. The judges' decision is final. Eppendorf employees and their families may not participate. The winner of the first prize will be published in BioNews No. 59.



1st Prize:

1 Eppendorf Xplorer® plus 8-channel pipette

2nd to 5th Prize:

1 Amazon® Voucher worth 50.00 EUR

6th to 10th Prize:

500 bonus epPoints® each

(epPoints registration required)

ACROSS

1 Manner, way, method
4 Famous football club based in London
9 There is no "B" version of it
11 Includes hardware, software, and peripheral equipment (abbrev.)
12 Provides access to ships or boats
13 Animal park
15 Home of the Lakers (abbrev.)
16 Covers heads, bottles, tubes, and more
17 Needed for take-off und landing
20 Noisy and violent, frequently expensive
21 Iconic comic dog
23 Approval (abbrev.)
24 Immortal inhabitant of Middle-earth
25 Developed a DNA sequencing method
27 If Charlie had been Italian he would have had … angels
29 "CRISPR-associated" (abbrev.)
32 Not out
33 Direct current (abbrev.)
35 Complements hop, pie, po, and ster
36 Complements Motion, T.I.P.S., Points, and Services
38 Black and white, eats fish, mammals, birds
40 Male first name
42 Provides controlled experimental conditions (colloquially)
44 Seoul is the capital (ISO country code)
45 Between RE and IR
46 Absorbance of a material (abbrev.)
47 Above, on top of
50 Fight-ending criterion in e.g. boxing (abbrev.)
51 In NYC they are yellow (sing.)
53 Racket sport
54 Black and white, eats bamboo

DOWN

1 Kuala Lumpur is the capital (ISO country code)
2 Unit of print resolution
3 Caenorhabditis … what?
4 Principality in the Pyrenees mountains (ISO country code)
5 Male first name of Persian origin
6 Halts, stations
7 Between CO and CU
8 Country in the Alps known for its composers (ISO country code)
10 Third-most abundant gas in the Earth's atmosphere (chemical symbol)
12 Bundle, stack
14 Set of step-by-step instructions (abbrev.)
16 Between Southern England and Northern France
17 Roman sun god
18 Large unpartitioned space over a factory
19 Kind, sort, category
22 Devoted to intellectual, academic, or technical interests
26 Aquired by learning machines
28 Musik genre
29 Disorder and confusion
30 Acquired immune deficiency syndrome (abbrev.)
31 Provides massages, saunas, baths
34 The binary version consists of 0 and 1
37 Here you can pay with Balboa (ISO country code)
39 Area where sports, entertainments, and other public events are held
41 Destination of the Apollo missions
43 Container, carton, case
48 Celebrity, famous person
49 Race, sprint
50 Nairobi is the capital (ISO country code)
51 Transition metal, used e.g. in implants (chemical symbol)
52 Between GE and SE

Solution hint for prize competition of BioNews No. 57:

				N						A							E	

Send us the solution until **October 31, 2022**. Participate online at **www.eppendorf.com/bn-service** or e-mail the solution to **bionews@eppendorf.de**.
Information about the use of your personal data can be found at **www.eppendorf.com/gdpr**