Higher Height
Pfizer Biotech Fellows

Outcome Report

Pfizer Biotech Fellowship

Together achieving higher height

June - November 2021

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About Pfizer Biotech Fellowship

Higher Height
Pfizer Biotech Fellows

The Pfizer Biotech Fellowship is an initial initiative by Pfizer Indonesia in collaboration with Tenggara Strategics, and supported by the Centre for Strategic and International Studies (CSIS), Prasetiya Mulya University and The Jakarta Post, for Indonesian university students pursuing a major in medical biotechnology.

This six-month program was conducted virtually with the tagline ***'Together Achieving Higher Height'***, representing Pfizer's aspiration to take Indonesian medical biotechnology development to a new height through education and partnerships.

The program, first and foremost, strives to foster interest and skills in medical biotechnology research in the education sector. It consists of three categories. The first two categories are national-scale competitions, Undergraduate Competition and Graduate Education Grants, which invite undergraduate and graduate students to present their research ideas on how to elevate the biotechnology sector. The third category, Training of Trainers, targets university lecturers and researchers in medical biotechnology through a series of training and sharing sessions to actively contribute to and share their views on the subject matter.

Undergraduate students competed through essays on their ideas to improve research on medical biotechnology and graduate students through their research proposals. Undergraduate and graduate students received virtual coaching and mentoring from professional researchers and exposure to the international research community. Winners secured education and research grants to reinvigorate research initiatives and improve human resources in Indonesia's medical biotechnology sector. Starting with universities, it is hoped that the program can serve as a launching pad for young and promising talent in the biotechnology sector.

The program is also aimed at providing capacity-building for lecturers and stimulating a discussion to further improve Indonesia's medical biotechnology education. The program included soft skills training, as well as sharing sessions with both local and global experts on medical biotechnology. Also included in the Training of Trainers category was a roundtable discussion, during which lecturers participated in formulating a joint statement to take the country's medical biotechnology to a new level.

Program partner

TENGGARA STRATEGICS

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Executive Summary

The program invited undergraduate students, graduate students and lecturers from universities across Indonesia to participate in a series of competitions, as well as training and sharing sessions, in a bid to help elevate Indonesia's research capacity in medical biotechnology. A total of 90 undergraduate students, 14 graduate students and 21 lecturers from 10 universities across Indonesia participated in this competitive program. The Pfizer Biotech Fellowship competitions are overseen by 16 distinguished reviewers and judges, including biotechnology experts, journalists and diplomats. The program commenced in June 2021 and ended at the end of November.

While the program began in June with the dissemination of materials to universities and in July with the submission of outline essays by undergraduate students and research proposals by graduate students, the competition officially commenced on Aug. 12 with a national seminar as a grand launch event, and culminated in the awards ceremony on Nov. 23. The grand launch, with the overarching theme of "Strengthening Human Resources in Medical Biotechnology as the Foundation of National Health System Resilience" was attended by Deputy Health Minister Dante Saksono Harbuwono and Acting Director General of Higher Education, Research and Technology Prof. Nizam, while the awards ceremony was attended by Health Minister Budi Gunadi Sadikin.

Essays from the program's Undergraduate Competition were assessed based on several criteria, such as the accuracy and originality of the essay's arguments in relation to the selected topic, problems identified within the topic, proposed solutions and conclusion, references used and writing skills. The presentation stage, which was also the final stage of the competition, was evaluated based on the quality of the presentation, public speaking technique, the clarity and accuracy of the information, the impacts of the proposed ideas and the ability to answer questions. Furthermore, research proposals for the Graduate Education Grant were evaluated based on the introduction, the quality of the proposed ideas and solutions, the research significance, research planning and methodology, literature review, references and citations and writing skills.

Included in both the undergraduate and graduate programs are the program's Virtual Mentoring and Virtual Bootcamp sessions. The Virtual Mentoring sessions focused on academic writing and knowledge sharing of recent developments in biotechnology, whereas the Virtual Bootcamp sessions focused on soft skills and research skills. Along with this, the program's Training of Trainers: Capacity Building also focused on increasing the soft skills and knowledge of lecturers in the field of biotechnology through various training sessions. A roundtable discussion among the lecturers also took place, and a joint statement to elevate the biotechnology sector was produced.

Opening Remarks

Stephen Leung,
Country Manager of Pfizer Indonesia

As the country manager of Pfizer Indonesia, Stephen Leung gave his welcoming remarks both at the Grand Launch and the Awards Ceremony of the Pfizer Biotech Fellowship. He said in his remarks that he had been with Pfizer for three decades and the one thing that had not changed was Pfizer's vision of saving patients' lives. Whenever Pfizer had worked for development, it was channeled from the passion to prolong people's lives and enhance their quality.

While stressing research and development, he said, Pfizer was passionate about developing people. Being a growing company, Stephen Leung considered people's development an important element of the company's growth. This applied not only to Pfizer in Indonesia but also to Pfizer as a global company.

Stephen Leung was delighted to see the success of the Pfizer Biotech Fellowship, especially with 100 students from 10 different universities entering the program. He noted that all the research submissions were of the highest quality, making it difficult for the judges and reviewers to select the winners. However, he emphasized that all participants were winners by challenging themselves and gaining fruitful experience in the program.

Stephen Leung closed his speech by encouraging all participants to follow their heart and passion. Success, he noted, was all about the journey, not the destination, and success would come to those who followed their passion through any endeavors.

Keynote Speech

Budi Gunadi Sadikin,
Health Minister

The Pfizer Biotech Fellowship was graced by the presence of Health Minister Budi Gunadi Sadikin, who gave his keynote speech at the Awards Ceremony. The health minister started his keynote speech by acknowledging the human resource problem in Indonesia's biotechnology sector. Budi appreciated the Pfizer Biotech Fellowship strategy of building an education and research ecosystem that supported the improvement of human resources in biotechnology, as it was in line with the goals of the government's national science and technology system.

The health minister congratulated the winners of the Pfizer Biotech Fellowship and expressed hope that medical biotechnology in Indonesia would be pushed to a higher level through the program. In the future, Budi said, he also looked forward to the medical biotechnology innovations created by the students and expected them to provide input in the preparation of a road map for advanced medical biotechnology in Indonesia. He supported the development of medical biotechnology research so that it could be utilized and optimized for the betterment of the country.

Budi Gunadi Sadikin closed his remarks by congratulating the winners once more and expressing his hopes that the award would be able to inspire and motivate experts to further innovate in the development of medical biotechnology in Indonesia.

Prof. Nizam,
Acting Director General of Higher Education, Research and Technology at the Education, Culture, Research and Technology Ministry

The 2021 Pfizer Biotech Fellowship welcomed Prof. Nizam, who gave his keynote speech at the Grand Launch. He began his keynote speech by expressing his appreciation to Pfizer for initiating the fellowship. With the future generation in mind, Prof. Nizam focused his attention on two broad themes: advancing research and human resources in the field of biotechnology and the role of higher education in supporting this advancement.

Starting by illustrating how the pandemic had proven the importance of research and human resources capacity building in the health sector, Prof. Nizam explained that Indonesia's dependency on imported medicine and medical equipment and devices showed the need to develop superior human resources. Through this development, Prof. Nizam stated that it was possible to explore Indonesia's potential, as the country was home to an immense body of biological and natural resources that could be used for medicine. Additionally, he mentioned that the 2021 Pfizer Biotech Fellowship was essential in encouraging the advancement of such human resources.

Prof. Nizam also discussed the role of higher education in advancing human resources. One way was through the Kampus Merdeka (Freedom Campus) program, introduced by the Education, Culture, Research and Technology Ministry, which, he noted, provided an opportunity for students to harness their potential. Students were engaged in off-campus activities in the industry, such as internships and microcredentials, that support self-development and helped them become more prepared to enter their intended profession. Prof. Nizam also asked for industry partners to welcome students through the program and allow lecturers to conduct research, both domestically and abroad.

Ending his speech, Prof. Nizam mentioned that the government would aid the programs and continuously collaborate with the Health Ministry to support research and human resources in the health sector. He expressed hope that the 2021 Pfizer Biotech Fellowship would succeed in generating superior human resources in the health sector in general and specifically in the field of biotechnology.

National Webinar – August 12, 2021

Strengthening Human Resources in Medical Biotechnology as the Foundation of National Health Resilience

Prof. Ir. Nizam M.Sc., DIC., Ph.D.

Dante Saksono Harbuwono

Prof. Dr. Sangkot Marzuki

Dr. Vivi Setiawaty M. Biomed

Dr. rer. nat Sulistyo Emantoko Dwiputra

Dra. Evie Yulin

The Pfizer Biotech Fellowship program was kickstarted by a national webinar titled "Strengthening Human Resources in Medical Biotechnology as the Foundation of National Health System Resilience" which was held on August 12, 2021. The webinar provides a forum for discussion for academics, practitioners, researchers, and government representatives. The webinar serves as the foundation of the 2021 Pfizer Biotech Fellowship.

This virtual webinar was opened by a keynote speech from Prof. Nizam who discussed how universities can improve biotechnology research and come up with innovations that will be able to answer today's biotechnology challenges. This was followed by a keynote speech from Deputy Health Minister Dante Saksono Harbuwono about the Health Ministry's strategy in developing health biotechnology talents to improve national health resilience.

The event continued with a panel discussion filled with biotechnology experts such as Prof. Dr. Sangkot Marzuki, a member of the Medical Science Commission at the Indonesian Science Academy (AIPI). He discussed the development of an ecosystem of medical biotechnology research and innovation to strengthen the national defense system.

A representative from the Health Ministry also contributed to the panel, with the presence of Dr. Vivi Setiawaty M. Biomed, Head of Research and Development Center for Biomedical and Basic Health Technology at the Ministry of Health of the Republic of Indonesia. She discussed the transformation of the health system in Indonesia throughout 2021. Dr. rer. nat Sulistyo Emantoko Dwiputra, chairman of the Indonesian Biotechnology Programme Association (IPSBI) delved deeper into the role of higher education by addressing the strategy for formulating a biotechnology curriculum that sustains the development of the national health system. Meanwhile, vice chairwoman of the International Pharmaceutical Manufacturers Group (IPMG) Dra. Evie Yulin discussed human resource improvement in medical biotechnology as a foundation for the national health resilience system. The session ended with dialogue between panelists and moderator on issues concerning the situation of public health management, biotechnology.

Speakers of the webinar

Keynote Speaker: Prof. Ir. Nizam M.Sc., DIC., Ph.D., Acting Director General of Higher Education, Research and Technology, the Ministry of Education, Culture, Research and Technology

Keynote Speaker: Dante Saksono Harbuwono, Deputy Health Minister

Panelists:

1. Prof. Dr. Sangkot Marzuki, member of the Medical Science Commission at the Indonesian Science Academy (AIPI)
2. Dr. Vivi Setiawaty M. Biomed, head of Research and Development Center for Biomedical and Basic Health Technology, Ministry of Health of the Republic of Indonesia.
3. Dr. rer. nat Sulistyo Emantoko Dwiputra, chairman of the Indonesian Biotechnology Programme Association (IPSBI)
4. Dra. Evie Yulin, vice chairwoman of the International Pharmaceutical Manufacturers Group (IPMG)

Moderator: Yalun Arifin, Ph.D

A faculty member and the head of Food Business and Technology at Prasetiya Mulya University, Indonesia

Outcome

Undergraduate Competition's Winning Essays

The Undergraduate Competition targeted final year undergraduate students majoring in medical biotechnology. Each team, consisting of three individuals, submitted an essay on one of the three topics provided by the committee:

- Building Indonesia's capabilities on medical biotechnologies: key strategic imperatives
- Building supportive policy ecosystem to improve application and public acceptance of biotechnology products
- Understanding the global supply chain on medical biotechnology innovation: implications for Indonesia.

Each group submitted outlines of their essays throughout July as a condition for participating in this Biotech Fellowship Program. Each outline was reviewed and assessed by four reviewers. After the assessment, 20 teams were selected to enter the next stage. The 20 selected teams each developed their outline into an essay. The results were then again reviewed and assessed by reviewers to select the top 10 teams to the next stage. Teams that qualified for the top 10 received virtual mentoring in the form of a series of training sessions to improve participants' soft skills, including their writing and presenting abilities to present scientific ideas. The top 10 teams also had the opportunity to receive briefings from faculty and members of the Multi-Regional Clinical Trials from Harvard University and global experts. Then, the top 10 were asked to finalize their draft essay into a final written result which was then used as the basis for selecting the top 5 teams.

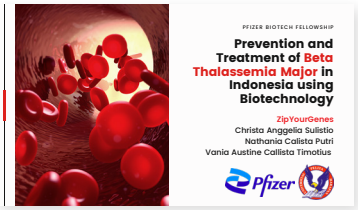
The top 5 teams participated in a virtual bootcamp that invited experts from Pfizer and several other professionals to increase the selected teams' knowledge of medical biotechnology. The top 5 teams then presented their work online in front of a panel of judges consisting of medical biotechnologists, government public policy experts, and professionals from the industry.

Three teams were then selected as winners. The first prize was awarded to team Humboldt, while team Unlocked and ZipYourGenes were runner-ups.

The Winners

Development of labspace to support the growth of medical biotechnology in Indonesia
By Humboldt (Devina Checylia Setiawan, Velecia Salim and Wenny Novella)
International Institute of Life-Sciences

Three key imperatives for the foundation of producing primer as a raw material for PCR technology in Indonesia: Research, development, infrastructure and commercialization
By Unlocked (Deby Cyntia Chandra, Reza Hanun Alyaa and Jessica Renata Wijaya Tumboimbel),
International Institute of Life-Sciences



Prevention and treatment of Thalassemia beta mayor in Indonesia with biotechnology
By ZipYourGenes (Christa Anggelia Sulistio, Vania Austine Callista Timotius and Nathania Calista Putri),
Pelita Harapan University

Outcome

Undergraduate Competition's Winning Essays

Abstract

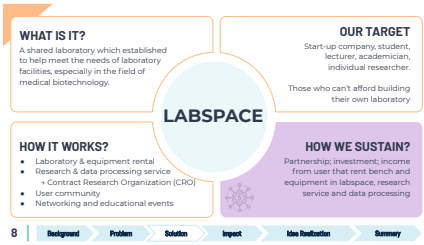
Development of labspace to support the growth of medical biotechnology in Indonesia

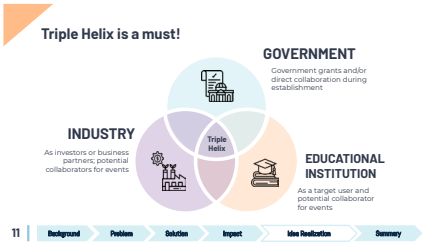
By Humboldt

- Devina Checylia Setiawan
- Velecia Salim
- Wenny Novella

International Institute of Life-Sciences

The health industry in Indonesia has been recognized by the government as one of the industrial sectors that have the potential to compete globally. This is shown by the inclusion of the health sector in the Making Indonesia 4.0 program, aimed at accelerating the development of industries with global potential. However, such potential has not been optimally developed. Two of the inhibiting factors are the lack of laboratory facilities and a limited number of professional researchers in the field of medical biotechnology. A possible solution to these problems is by providing a labspace, an easily accessible public laboratory with the necessary facilities. In this essay, we aimed to analyze the importance of a labspace to support medical biotechnology in Indonesia by describing the potential benefits we may reap, as well as the challenges we may face. A labspace is expected to facilitate research and promote the growth of Indonesian researchers, and eventually, medical biotechnology innovations in Indonesia. Although more considerations are needed, a labspace can be established by anyone, anywhere. To be successful, though, it is important to consider a triple helix model of innovation – involving academia, industries and the government – in establishing a labspace.





Abstract

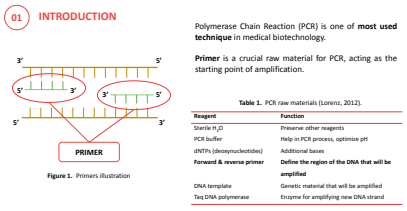
Three key imperatives for the foundation of producing primer as a raw material for PCR technology in Indonesia: Research, development, infrastructure and commercialization

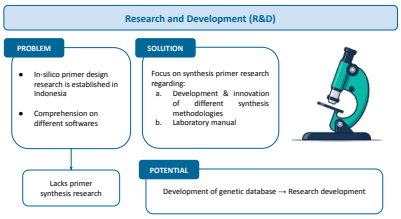
By Unlocked

- Deby Cyntia Chandra
- Reza Hanun Alyaa
- Jessica Renata Wijaya Tumboimbel

International Institute of Life-Sciences

Medical biotechnology is one of the most developed sectors that have a high market value. Within medical biotechnology itself, there are a few crucial technologies that can benefit humanity, one of which is polymerase chain reaction (PCR) technology. The PCR has many applicative functions, including real-time testing for COVID-19 diagnostics. One of the most important components of PCR testing is the primer, which acts as the starting point of amplification. The primer plays a big role in the development of the medical biotechnology sector as it determines the availability of PCR utilization. Indonesia does not produce its own primer and, therefore, faces problems in primer availability due to a lack of supporting research, cooperation among stakeholders, as well as facilities. On that note, this paper proposes three key imperatives to address the problem: research and development, commercialization and infrastructure. Research and development focus on the potential of primer synthesis research and how it contributes to biotechnology advancement in general. Commercialization discusses how a joint venture could be a feasible solution to address the issue at hand. And infrastructure addresses the problem of the lacking of facilities and structural foundation.





Abstract

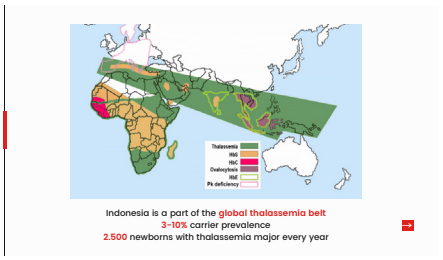
Prevention and treatment of Thalassemia beta mayor in Indonesia with biotechnology

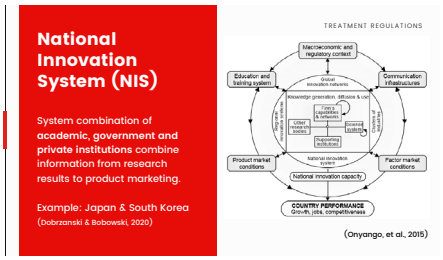
By ZipYourGenes

- Christa Anggelia Sulistio
- Vania Austine Callista Timotius
- Nathania Calista Putri

Pelita Harapan University

As part of the global thalassemia belt, Indonesia encounters problems related to a high prevalence of thalassemia and its incurred medical costs. Prevention, the main solution in reducing thalassemia prevalence, can be achieved through pre-marital screening and genetic counseling programs. Certain policies and regulations are required in order to support prevention efforts, such as the distribution of medical workers and facilities all around Indonesia, acknowledgment of genetic counselor status, digital services for genetic counseling, subsidizing screening tests and genetic counselor sessions, as well as improving and public awareness through the insertion of information about thalassemia into school curricula and integration into local culture and the media. Furthermore, stem cell therapy can be a breakthrough to treat thalassemia beta major. Supporting policies are needed to support the development of the stem cell industry. The support could be in the form of faster processing of licenses, more guidelines for the industry, more thorough collection of data, insurance coverage, lower import taxes, technology diffusion and blood registry. In addition, the support for stem cell therapy should also come from academics by including stem cell therapy in their curriculum, science communicators and the establishment of institutions specialized in stem cell therapy. Also, support from the media is necessary for successful implementation and public acceptance of stem cell therapy in Indonesia. In conclusion, the reduction of thalassemia beta major cases in Indonesia could be achieved through premarital screening and genetic counseling programs as prevention measures and stem cell therapy.





Outcome

Graduate Education Grants

Graduate Education Grants is a research proposal writing competition, based on the graduate students' research thesis on medical biotechnology. Participants submitted their research proposals in July. The selection committee read, reviewed and evaluated the proposals until November. Each proposal was assessed by five members of the selection committee. While their proposals were being assessed, the students joined their undergraduate peers in session briefings from Harvard University and global experts. After the assessment, five winners were selected to become Pfizer Fellows and receive research grants to realize their submitted thesis research. The following are abstracts of the five winning research proposals.

Abstract

Acute Toxicity Testing of DBL2β-PFEMP1 Recombinant Protein as a Candidate for Malaria Vaccine Based on Peptides

by Leny Yulia Widya Sari

University of Jember

Malaria is an infectious disease caused by Plasmodium and has long been a global issue. The pathogen of severe malaria is mediated by a protein called P. falciparum erythrocyte membrane protein 1 (PfEMP1), a protein complex consisting of a Duffy binding-like domain (DBL: α, β, γ, δ, ε, χ) and a cysteine-rich interdomain region (CIDR: α, β, γ, δ). The DBLβ2 domain has a main building area for the ICAM-1 receptor of the tryptophan residue, the initial half of the C2 domain and the Y motif. Toxicity testing on the DBLβ2-PfEMP1 domain was carried out to obtain information to develop peptide-based vaccines. The test aimed to determine the safety of the DBLβ2-PfEMP1 recombinant protein from P. falciparum, which was used as a candidate for a malaria vaccine. Observations of the toxicity were carried out by injecting varying doses of peptides into mice and calculating what dose caused 50 percent death in the population and observing the histology of the liver and kidneys in the mice and the levels of IL 6 and TNFα through the ELISA method. The results were analyzed using an SPSS Kruskal Wallis test and One Way Anova test.

Abstract

Cellular and Humoral Immune Response to Recombinant Protein CIDR1α-PfEMP1 Indonesian Isolate as a Candidate for Malaria Vaccine Based on Peptides

by Nurul Istinaroh

University of Jember

Malaria has become a problem around the world, including in Indonesia. Malaria is caused by Plasmodium spp, where Plasmodium falciparum is the most common cause. Several clinical manifestations of P. falciparum are triggered by the extensive sequestration of infected erythrocytes (IEs) in the host microvasculature, leading to impaired tissue perfusion and resulting in organ failure. Immunological reactions to P. falciparum infection involve cellular and hormonal immune responses. The CIDR1α domain of the PfEMP1 protein (CIDR1α-PfEMP1) on the surface of IE is able to induce the activity of CD4+ T lymphocytes and natural killer cells by secreting various cytokines and can stimulate the proliferation of B lymphocytes. Humoral immune responses can be analyzed based on immunoglobulin (Ig) G as antibodies against the surface antigens that function as mediators of immunity against malaria, while cellular immune responses can be measured based on the activity of CD4+ T lymphocytes. The activation of CD4+ T lymphocytes in malaria by specific peptides is expressed through the MHC II molecule and regulates key aspects of immunity during Plasmodium infection. The purpose of this study was to predict the epitope of T and B lymphocyte cells and to analyze the cellular and humoral immune responses to the recombinant protein CIDR1α-PfEMP1 Indonesian isolates of P. falciparum. The bioinformatics analysis was performed using the Bepipred 2.0 application and Kolaskar Tangaonkar, while the analysis of the CD4+ cellular response and humoral IgG was performed using the ELISA method. The data will be analyzed statistically using an independent t-test with a 95 percent confidence interval. The CIDR1α-PfEMP1 domain is expected to induce cellular and humoral immune responses to provide basic information for the development of peptide-based malaria vaccines.

Abstract

Cloning of Cathelicidin-Coding Genes from Asian Common Toads (Duttaphrynus Melanostictus) in Escherichia co.

by Alfandy Hermansyah

Atma Jaya Catholic University of Indonesia

Antibiotic resistance has become a major issue in the treatment of bacterial infectious diseases. In an attempt to address antibiotic resistance, new antibiotics continue to be developed, one of which is oligopeptide. Oligopeptide has the potential to be developed as Cathelicidin. A less studied form of Cathelicidin is the one produced by frogs. Duttaphrynus melanostictus, also known as the Asian common toad (commonly referred to as kodok buduk in Indonesian), has a parotid gland that produces toxins that function as a defense mechanism. This gland also produces the antibiotic Cathelicidin which belongs to the antimicrobial peptide class. The purpose of this study is to obtain the gene encoding Cathelicidin to be cloned into Escherichia coli. The method of this study begins by collecting parotid glands from Asian common toads, then the RNA is extracted and reconstructed into cDNA. Afterwards, the cDNA fragments, which carry gene-encoding intact Cathelicidin, are isolated using the Rapid Amplification of cDNA End (RACE) method. The DNA fragments are cloned into pGEM-T plasmids and transferred into Escherichia coli. Cathelicidin gene expression results are tested for antimicrobial activity. The result of this research serves as the foundation of a new antibiotic to overcome resistance to antibiotics.

Abstract

Biosurfactant and Anti-Inflammatory Activity Test of Multistrain Probiotic Product for the Prevention and Treatment of COVID-19

by Denny Nyotohadi

University of Surabaya

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, has become an immense threat to humanity. Various drugs, ranging from synthetic drugs to herbal medicines, are utilized for the prevention and/or treatment of the virus. However, the World Health Organization (WHO) has not recommended a drug that could cure COVID-19. The strategy of this research is to employ the biosurfactant properties of multistrain probiotics (a mixture of several lactobacillus and rhodopseudomonas palustris) for COVID-19 prevention to damage the virus' membrane. Biosurfactants are known to be safe consumables and have detergent-like properties capable of dissolving fat. The SARS-CoV-2 virus is enveloped by a membrane composed of fat (membrane phospholipids). Through the activity of biosurfactants, the viral cell membrane can, hopefully, suffer from lysis and that damage could weaken the interaction of the virus in the human body and eventually dissipate. Preliminary activities of biosurfactants from multi-strain probiotics were studied qualitatively using drop collapse, emulsification stability and/or hemolysis tests on the blood. Biosurfactant toxicity was observed through quantitative hemolysis and Vero cell viability testing. The effectiveness of the biosurfactant was observed directly by testing the inactivation of the SARS-CoV-2 virus against Vero cells. The results of this study can be used to further develop multi-strain probiotic products for the prevention of SARS-CoV-2 infection to clinical testing.

Abstract

Exosome Encapsulated MIMIC-miR-143-3P Microrna Therapy against K-RAS Gene in Triple Negative Breast Cancer

by Indriana Pratiwi

Gadjah Mada University

Triple negative breast cancer (TNBC) is a type of breast cancer that has a more aggressive nature than other types of breast cancer. TNBC has a poor prognosis, hence early detection of this type of cancer is difficult. Regular TNBC treatment uses adjuvant chemotherapy and drugs, but the side effects produced following the treatment are known to reduce the patient's survival rate. Therefore, alternative therapies are needed for the treatment of TNBC. One particular method that has the potential to be applied is to induce miRNA to suppress miRNA dysregulation in cancer cells. In this study, mimic-miR-143-3p is used as a tumor suppressor encapsulated with exosomes and induced in cell line 4TI. The characteristics of exosomes were observed through transmission electron microscopy, flow cytometry and particle size analysis. The expression of mimic-miR-143-3p was assessed through cytotoxicity trials and qPCR, using the KRAS gene as a target oncogene.

Outcome

Lecturers' Recommendation

The Training of Trainers program was joined by 21 medical biotechnology lecturers from nine different universities: Sumbawa Technology University, Pelita Harapan University, Surabaya University, Gadjah Mada University, i3L, Esa Unggul University, Andalas University, Jember University, and Atma Jaya Catholic University. They received soft skills training particularly on improving the quality of their academic writing, public speaking, and how to present their research in the mass media.

The lecturers also had the opportunity to have a discussion with both local and global experts on medical biotechnology including those from Kjeldgaard and Multi-Regional Clinical Trials Center of the Brigham and Women's Hospital and Harvard (MRCT Center). Toward the end of the program, lecturers gathered in a roundtable discussion to devise and advocate initiatives that could advance the biotechnology sector in Indonesia. The following is their recommendation:

Joint Recommendation

Building Research Ecosystem as a Foundation for National Health Resilience

The COVID-19 pandemic was a rude awakening for many countries, including Indonesia, on the importance of national health resilience in dealing with disease outbreaks. In order for Indonesia to become more prepared to face similar challenges in the future, it is imperative that efforts are taken to involve various stakeholders to strengthen the national health resilience. In leading this joint effort, the government has a central role to ensure synergy between all working parties.

The first step in building national health resilience is improving the quality of human resources, including lecturers and researchers within the field of medical biotechnology, as it is the driving sector of innovative breakthroughs in responding to various public health challenges in the future. To achieve this, a supportive policy is needed to build an education and research ecosystem.

Through the Pfizer Biotech Fellowship program, we, the lecturers and researchers of medical biotechnology from universities throughout Indonesia, were given the opportunity to exchange ideas and discuss with local and foreign experts about ways to advance Indonesia's medical biotechnology sector in order to improve the national health resilience. After a series of discussions, we have formulated several proposals that the government and stakeholders involved in creating national health and education policies would take into consideration. They are as follows:

1. We propose that the government and stakeholders work hand-in-hand to promote medical biotechnology science so that it may attract the best talents of the country's future generations to pursue this field.
2. We encourage the government to advance research, development, studies and their applications, as well as medical biotechnology inventions and innovations.
3. We encourage the government to create a supportive policy that would ease universities to conduct research collaborations between universities within the country as well as universities and/or researchers from abroad.
4. We urge the government to synergize all research resources for a more effective and efficient research collaboration between institutions and universities. We encourage the Ministry of Health; Ministry of Education, Culture, Research and Technology; and the National Research and Innovation Agency (BRIN) to collaboratively develop a clear and targeted roadmap for the development of medical biotechnology by involving other stakeholders.
5. We urge the government to ensure that regulations derived from the Job Creation Law, National System of Science and Technology Law, and other regulations related to education, science and technology support innovative and sustainable research.
6. We urge the raise of research funding sourced from the State Budget (APBN) to encourage innovative research and a simpler administration of research funding in order for researchers to be able to focus more on their work rather than fulfilling administrative requirements.

Jakarta, November 23, 2021.

Journey

Undergraduate Competition

July 01 - July 31:

Submitted outlines of the participants' essays are reviewed by the committee and external reviewers. Only 20 outlines are selected for the next stage.

Aug. 12:

Participants gather virtually to attend the grand launch of the Pfizer Biotech Fellowship 2021.

Sept. 12 - Sept. 28:

The first draft of the participants' essays are submitted and the teams are reduced to the top 10.

Sept. 29 - Nov. 06:

The top 10 teams are instructed to revise and submit their final essay. Five teams are selected.

Oct. 07 - Oct. 21:

The top 10 teams attend a series of virtual mentoring sessions led by professional mentors.

Nov. 08 - Nov.11:

The top 5 teams participate in a virtual bootcamp facilitated by Pfizer and non-Pfizer experts.

Nov. 15:

The top 5 teams present their final essay to a panel of judges, and the top 3 are selected.

Nov. 23:

The top 3 winning teams are announced during the Awarding Ceremony.

Journey

Graduate Education Grant

July 01 - July 31:

Submitted research proposals by graduate students are reviewed by the committee and external reviewers based on its quality and potential impacts.

Aug. 12:

Participants gather virtually to attend the grand launch of the Pfizer Biotech Fellowship 2021.

Sept. 01 - Oct. 04:

The reviewers sort and select the top 10 research proposals based on funding needs, feasibility, potential success rate of implementation, and probable research impacts.

Oct. 05 - Oct. 25:

The top 10 participants revise and submit their final research proposal.

Oct. 12 - Oct. 21:

Participants attend a week-long virtual mentoring session helmed by experts in the field of biotechnology.

Oct. 26 - Oct. 31:

The reviewers assess the top 10 research proposals and select the top 5.

Nov. 08 - Nov. 10:

Participants attend a series of virtual bootcamp sessions facilitated by Pfizer and non-Pfizer experts, aimed at enriching the participants' knowledge in medical biotechnology.

Nov. 23:

The top 5 research proposals are announced during the Awarding Ceremony.

Journey

Training of Trainers

July 01 - Sept. 10:

Lecturers nominated by participating universities submit their application.

Aug. 12:

The lecturers gather virtually to attend the grand launch of the Pfizer Biotech Fellowship 2021.

Oct. 12 - Oct. 21:

The lecturers participate in a week-long series of capacity building sessions on soft skills and knowledge sharing from experts in medical biotechnology and other related fields.

Nov. 08:

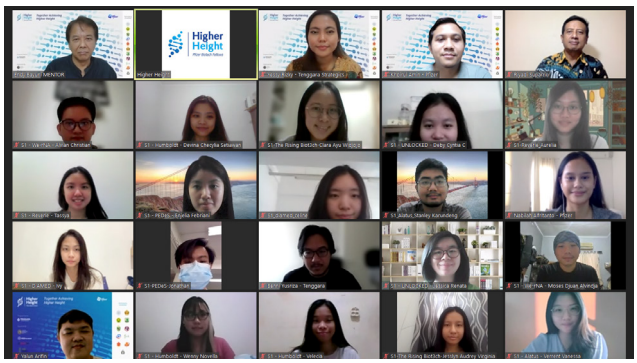
The lecturers take part in a roundtable discussion, where they talk about the outcomes of the discussions they had with experts during the capacity building session.

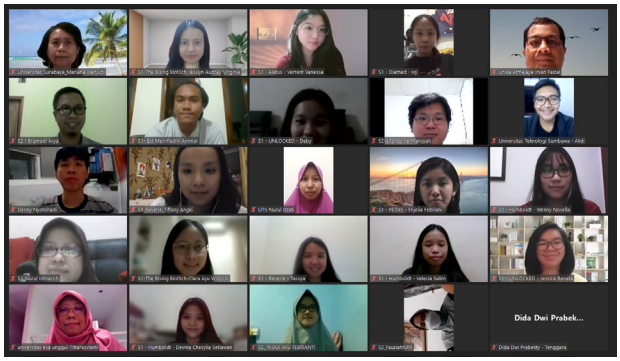
Nov. 23:

Representatives of the lecturers read out their recommendations during the Awarding Ceremony.

Sessions

Virtual mentoring, Virtual Bootcamp & Training of Trainers: Capacity Building





A series of virtual mentoring and virtual bootcamp organized for undergraduate and graduate students, as well as capacity-building for lecturers as part of the Pfizer Biotech Fellowship program, with the aim of providing training and knowledge exchange with health biotechnology experts. Experts from reputable institutions and Pfizer's internal experts shared their knowledge with selected medical biotechnology students and lecturers.

Participants were eager to learn more about the drug development process, including challenges to their development, the mainstream focus on contemporary medical biotechnology and the levels of synergy among academia, industries and the government. Participants had opportunities to challenge themselves by expanding their perspectives and also actively engage with leading intellectuals and professionals, in order to reinvigorate their knowledge and become part of the global medical biotechnology community.

Virtual mentoring & Virtual Bootcamp (for undergraduates and graduates):

- R&D Basics: Drug discovery and pre-clinical development by MRCT Center.
- R&D Basics: Clinical trials, phase 1-3, through marketing application by MRCT Center.
- Overview of Value Chains and Policies in Biopharmaceutical Industries by Richard Kjeldgaard.
- Ask the experts with MRCT Center.
- Biotherapeutic Drug Discovery by Pfizer Global Supply.
- Supply Chain Management by Pfizer Global Supply.
- Public policy discussion on the development of medical biotechnology in Indonesia by Prof. Dr. Sangkot Marzuki, M.Sc., Ph.D., D.Sc.
- Soft Skills Training: Research Methodology, Writing, Presentation Skills.

Training of Trainers: Capacity Building & Roundtable Discussion (for lecturers)

- R&D Basics: Drug discovery and pre-clinical development by MRCT Center.
- R&D Basics: Product development, clinical trials, phase 1-3, through marketing application by MRCT Center.
- Overview of Value Chains and Policies in Biopharmaceutical Industries by Richard Kjeldgaard.
- Public policy discussion on the development of medical biotechnology in Indonesia by Prof. Dr. Sangkot Marzuki, M.Sc., Ph.D., D.Sc.
- Soft Skills Training: Writing for Media & Advocacy, Writing for International Journals, Public Speaking.
- Discussions on biotechnology issues in academia with Prof. Dr. Sangkot Marzuki, M.Sc., Ph.D., D.Sc.
- Discussions on increasing the quality of human resources in the biotechnology sector with Prof. Dr. Sangkot Marzuki, M.Sc., Ph.D., D.Sc.

Virtual mentoring

R&D Basics: Drug discovery and pre-clinical development by MRCT Center

Barbara Bierer

Jonathan Davis

The virtual mentoring session started with Barbara Bierer's explanation of the differences between clinical trials in the United States and in Indonesia. First, in terms of numbers, where there are 150,000 clinical trials running in the US, Indonesia only has 741 ongoing trials. The second difference is in their financial capabilities as most US trials are funded by the government and/or the private sector, while Indonesia has yet to enjoy such a privilege. With that in mind, Bierer said Indonesia had untapped potential in the drug development sector.

Bierer explained that it takes nine to 15 years for a drug to be approved, starting from its discovery, isolation and product refinement to preclinical testing. Moreover, most drug development projects are discontinued due to toxicity or lack of efficacy. Bierer reminded participants that COVID-19 related drugs were an exception in this case and should not be an example. Because COVID-19 is a global phenomenon, there are many exceptions to its drug development.

During the discussion, Bierer emphasized the importance of finding the right dose during drug development. Without the right dose, the drug will only be either ineffective or potentially toxic. To quote Paracelsus: "All things are poison and nothing is without, only the dose makes a thing not a poison."

She pointed out that even paracetamol — a drug we use daily — can be deadly in an overdose.

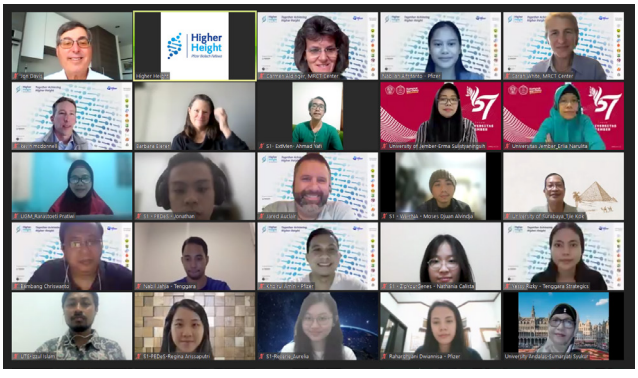
The next session was continued by Jonathan Davis about the needs of infants and children that have not been addressed. Davis emphasized that this population is a very vulnerable population, because there is little development of drugs aimed at infants and pregnant women. He explained that in the United States each year in about 6 percent of 3.8 million births, the babies are placed in intensive care unit (NICU). While the US is one of the most developed countries in the world, it has the highest prematurity rate, approximately 11 percent of babies born in the US are born premature.

Part of the reason is that drug and device development have been quite slow for this population, most drugs used in the NICU queue, are not approved by the US Food and Drug Administration, and are used mostly off-label. Davis said the pressing problem was because in the last 30 years there has not been significant drug development for preterm neonates. Not only is it a small market involving primarily rare diseases but it is difficult to perform clinical trials, the disease has a high risk and high liability profile

Davis showed data that out of 406 medicines that were actually studied in children, only 28 of those drugs, 7 percent, were studied in neonates. The majority of developed drugs were not used routinely for the population, hence the drug's developments were halted due to the lack of clinical relevance. In addition, there are issues in paediatric clinical trials, most trials fail due to inadequate enrollment. It is difficult to get consent from parents to enroll their children in clinical trials and the trial infrastructure is fragmented and lacks sustainability.

Davis emphasizes that developing drugs for infants and children should be national and global priorities. These studies require detailed planning sand, the design of the studies involve broadly engaging team science. Involvement of pivotal stakeholders, such as the government, is very essential. The key to develop drugs for neonates, Davis added, is to empower global networks and consortium initiatives, especially for rare diseases, and the use of real world data to generate real world evidence.

The session closed with a Q&A session. Bierer was asked whether it was ethical to conduct a clinical trial on cancer patients at the stage-four level. She replied that it was possible, and as long as the trial created an opportunity to treat the illness or symptoms, or prolong the patient's life, it was ethical. However, this must be done by properly recognizing the risks and benefits of the study; the higher the risk, the more important it is to carry out in-depth research to obtain the patient's consent.



Virtual mentoring

R&D Basics: Product development, clinical trials, phase 1-3, through marketing application by MRCT Center.

Jared Auclair

Kevin Mcdonnell

In the next session, Jared Auclair provided material based on his experience in handling research and drug discovery. According to Auclair, the most interesting aspects of research are innovation and improvement when doing drug development, as they empower the biotechnology space.

His experience as a researcher began when he grew an interest in learning about HIV when he was a graduate student. That developed into an interest in biotechnology. He sees biotechnology as a multifaceted approach, but at its simplest, biotechnology is technology based on biology, where cellular and molecular processes, technologies and products can improve the lives and health of patients.

Auclair sees drug research and development in the modern era as interdisciplinary, so his research requires computer science and data, and these elements greatly influence the development of drug products. One of the things that Auclair emphasized regarding drug development is product quality, which must be considered from research to commercialization.

In a different session, Kevin McDonnell shared his experience about how to develop drugs from the research in labs to the steps required for the approval prior to the marketing to consumers. McDonnell was explaining how to apply chemistry principles in a biological system. He was using the case of the research of small molecules for drugs as an example. He also emphasized the importance of a multidisciplinary approach in conducting research for innovations.

McDonnell explained the use of nanotechnology in drug development. He showed how certain designed molecules with nanoparticles could work to fight cancer cells in the human body. Later, McDonnell described the challenges during clinical trial, in which biotech companies should be prepared for. One example is that the drug for the trial must be produced in a sufficient amount with the same properties and performances. Also, funding commitment is essential particularly when the trial may take years. The companies should be able to deal with the drug production scale-up, making sure that the product is standardized and able to be delivered using the supply chain available in an efficient way.

During Q&A session, McDonnell mentioned about the sharing of data obtained from clinical trials. The data sharing, albeit the intellectual properties should be protected, is important to allow a joint effort to develop a solution such as in the case of Covid-19 vaccine and drug developments. A real collaboration that includes public engagement is vital. Also in the session, McDonnell explained the future of RNA technology in drug discovery and how this technology may have important roles.

Virtual mentoring

Overview of Value Chains and Policies in Biopharmaceutical Industries

Richard Kjeldgaard

"Environment that facilitates collaborations and innovation requires human capital, infrastructure for R&D, regulatory environment, IP protection, and knowledge-transfer environment."

The session began with Richard Kjeldgaard emphasizing the fact that innovation in the biopharmaceutical industry involves high up-front expenditures over a long period of time with a high risk of failure. The high up-front costs are driven in part by extensive and strict regulations requiring clinical proof of safety and efficacy. He continued that this global industry requires high-performing collaboration among both government and private institutions. In addition, the industry is still in its developing stages, so growth opportunities are still wide open.

In addition, the industry is beginning to deploy a wave of new innovative therapeutic platforms known as gene and cell therapies. These new platforms may require a different business model than traditional product-based therapies. Cell therapy, for instance uses cells taken from a person's body; modified and then returned to the patient to deliver a therapeutic effect. With gene therapy, genes of a patient are modified to address a genetic disease. These new innovative platforms therefore do not necessarily create products that can be widely distributed through pharmacies. That could result in development of business models tailored to therapeutic service being provided to individual patients.

One of the highlights of Kjeldgaard's discussion was a summary of technology transfer policy changes in the United States that occurred in the 1980s. Those changes allowed universities to own and manage the intellectual property covering innovations developed by university scientists funded by the government. Before those changes, universities could not hold exclusive rights to their government funded innovations and government owned intellectual property was generally not be licensed exclusively. As government funding of scientific research at universities increased significantly after World War II, interest grew in seeing products developed from those expenditures – in addition to scientific publications. The policy changes made by the government opened up opportunities for universities and the private sector to hold their own innovative intellectual property and use those rights to deliver products that benefit society and generate economic activity.

Kjeldgaard also mentioned the difficulty of obtaining Food and Drug Administration (FDA) approval for pharmaceutical products. It takes the right level of efficacy and minimal side effects to develop pharmaceutical products. With that long and winding process, it takes on average 10 years to get approval from the FDA. Once the product is approved, its earnings must recover the investment from the decade's worth of spending and support other potential products in the innovation pipeline. Kjeldgaard said the situation in the market stressed the importance of intellectual property protection that support universities and the private sector.

The discussion was wrapped up with a Q&A session in which Kjeldgaard was asked how researchers from developing countries such as Indonesia could access research grants abroad. Responding to the question, Kjeldgaard said research funding organizations such as CERN from France or the National Institutes of Health in the US have opened the door to proposals from around the world, including Indonesia. Kjeldgaard hinted that collaborating with universities was easier than making direct funding requests. The second question was on how to develop drugs for patients who have rare diseases. Kjeldgaard answered by saying that it was the industry's toughest challenge. Kjeldgaard suggested that patients with rare diseases may search for the patient population globally to maximize research opportunities. This further emphasized the importance of cooperation between countries in biopharmaceuticals in order to find drugs for rare diseases more efficiently.

Virtual mentoring

Soft Skills Training: Research Methodology, Writing, Presentation Skills

Prof. Dr. Amarila Malik, M.Si., Apt.

Endy Bayuni

Maria Advenita Gita Elmada, S.I.Kom., M.Si.

To equip the students with the knowledge necessary for their career; training on research methodology, writing, public speaking and presentation skills was conducted.

Prof. Dr. Amarila Malik, M.Si., Apt., a professor from the School of Pharmacy at the University of Indonesia (UI), shared her knowledge on research methodology by covering two topics: scientific ideas of medical biotechnology and scientific research on medical biotechnology. In the first topic, she highlighted how scientific ideas must root from new ideas and be realistic. To produce a long-term and broad impact, it must also be on a massive scale. Subsequently, in constructing scientific ideas, it should be supported with valid data about the biotechnology field today. Prof. Amarila added that it should be written in a logical and systematic manner. Continuing to the second topic, Prof. Amarila pointed out how medical biotechnology research could be approached using several strategies, such as database mining research, lab research and action research. This research must have a state-of-the-art quality, a sharp research problem and consist of relevant and trusted data.

Endy Bayuni, a senior editor at The Jakarta Post, shared insights into producing a communicative scientific work. For scientists, disseminating scientific work is important because scientific work provides a way to communicate the scientist's thoughts to its readers. Several media outlets today give room for scientists to share their work, but their writing must be more communicative. Endy explained how this could be achieved. First, he said scientists should know their target audience and picture themselves as one of them when writing. It should also be written concisely in the Indonesian language and any specific terms related to a certain field of study must be explained. Additionally, Endy stressed the importance of citations as a fact-checking tool that can increase the credibility of a scientist in their field.

Maria Advenita Gita Elmada, S.I.Kom., M.Si., a lecturer at Multimedia Nusantara University, taught the students public speaking and presentation skills. Talking about the basics of public speaking, Maria assured the students that nervousness before a presentation was normal. Sufficient preparation, thinking positively and not expecting perfection are several ways to handle such feelings. In their presentations about biotechnology, the students were told to remember their audience. Maria stressed the importance of approaching each audience differently and tailoring the speaker's communication based on the audience's unique interests. Specifically, in presenting scientific research, Maria advised the students to not only know their audience but to also provide visuals, avoid jargon and explain the scientific process. Moreover, preparing possible questions and formulating their answers beforehand can help the students tackle questions during the presentation.

Virtual Bootcamp

Biotherapeutic Drug Discovery

Drug Development from Concept to Patient-Pfizer Global Supply

Alfredo Darmanin Sheehan

Alfredo Darmanin Sheehan, Ph.D. is the senior principal scientist at Pfizer Worldwide Research, Development & Medical's BioMedicine Design (BMD). He has worked in antibody discovery and optimization for 20 years and is passionate about developing novel biotherapeutics and their application to oncology and immune disorders. Dr. Alfredo currently leads a team of research scientists within BMD whose primary focus is novel biotherapeutic discovery and optimization in a range of business areas. Based in Dublin, Ireland, he has worked on many preclinical projects and academic collaborations across therapeutic areas.

Dr. Alfredo kicked off the session by giving an overview of what BMD does, explaining that BMD fits in the very early phase of drug discovery and is preclinical within a product life cycle. His department partners up with research units such as oncology, inflammation and autoimmunity, cardiovascular, neurological pain and rare diseases, as well as manufacturers in order to find a biotherapeutic solution to these particular biological or therapeutic indications and to deliver innovative, world-class medicines while minimizing the timelines and costs. He also mentioned that drug discovery was a war of attrition in which tens of thousands of compounds are screened through a triage of phases to get one approved medicine.

The process of drug discovery begins with a "drug ability" assessment, where BMD along with the research unit it works with figure out how accessible their target is with biotherapeutic drugs. They then proceed to form a strategy. There are various strategies that can be applied depending on the project, such as blocking a pathway. The team would then be formed with collaborations of units within Pfizer to generate lead compounds. This is also the execution stage of project design, generating candidate molecules and proving preclinical efficacy in vivo in multiple models. Afterward, the team would then collaborate with drug development/clinical to deliver candidates with appropriate properties, proving manufacturability and Investigational New Drug (IND) documents.

During the Q&A session, Dr. Alfredo was asked about edible vaccines; specifically, how to determine the dose and activity of the vaccines. Although the question was beyond Dr. Alfredo's expertise, he kindly explained that typically, the stability or delivery of the proteins through ingestion could be quite a challenge. Dr. Alfredo was also asked about the efficacy of peptide-based vaccines, specifically the difference between antigen-based or mRNA. He responded by giving a discovery perspective where the peptide approach is far more established and a lot more understood. At this point, it is hard to have a clear winner on which is more effective because there needs to be a lot more understanding as there are a lot of pros and cons. A question about research funding was also asked, questioning whether or not drug discovery should be treated as a business. Dr. Alfredo explained that there were incredible risks associated with research and getting into a clinic was a huge undertaking. The amount of time invested can be quite a significant challenge to overcome and from a personal perspective, he advised to take a combination of perspectives.

The session was closed with a case study from the three speakers, followed by a Q&A session. A participant asked if it was easier for pharmaceutical companies to deliver raw materials instead of final products considering that raw materials tend to be more stable than the final product. The speakers answered that their experience in delivering vaccines was unique because of the time crunch. It was valuable because they found that it was possible to deliver products as fast as possible while making sure there are supportive infrastructures for them.

Virtual Bootcamp

Supply Chain Management

Distribution – Supply Chain for Biotech by Pfizer Global Supply

Menoune Benamara

Chahira Farah Ighrayene

Mohamed Maamoun

Menoune Benamara is the Africa Middle East Logistics Lead in Pfizer. She has accountability for platform logistic processes and design across AFME along with direct management oversight of the AFME in-house distribution centres. Chahira Ighrayene is the demand and supply manager of Pfizer Algeria who prior to joining Pfizer, had a different mission in FMCG companies and several experiences in supply planning, demand planning, production scheduling, inventory management and product launch. Mohamed Maamoun is the Africa Middle East Supply Chain Performance Lead in Pfizer who had a long career in the pharmaceutical industry, including 10 years at GSK in Egypt and 4 years leading AFME supply chain performance in Pfizer.

The session was opened by Menoune who explained that the learning objectives from the session was to give key reading of the supply chain, understand the basics of supply chain management, learn about the forcefulness of the supply chain concept as well as how to improve efficiency across the SC process, and to develop a critical analysis from an industry case study. Menoune started off by explaining the supply chain management where a chain of actors and activities deliver products and services to customers. It is also an optimization supported by software integration and data sharing. She continued that the components of supply chains are suppliers, manufacturers, warehouses & distribution centers, and customers. Menoune also explained that the objectives are to manage supply chain expenses, increase clients expectation for higher product variety and rapid fulfilment, maximize resource productivity, construct standardized processes, remove duplicate efforts, minimize inventory levels, utilize the distributed order management technology to complete orders, and cost efficiency.

Chahira then took over the session and explained the supply chain process flow. One of the processes that is globally used is the Sales and Operation planning process (S&OP), a process to develop tactical plans that provide management the ability to strategically direct its businesses to achieve competitive advantage on a continuous basis by integrating customer-focused marketing plans for new and existing products with the management of the supply chain. The rule of thumb of S&OP is to ensure the balance between demand and supply planning. An important process is demand management because it ensures the correct understanding of the market and the customer's needs. Some major attributes of S&OP planning are to connect business planning to tactical planning, balance supply and demand at product family level, plan at the volume level using aggregate time buckets, and so on.

After understanding the supply chain, Mohamed explained that it is important to understand the improvement embedded in our culture and day to day activities. An important thing to understand is key performance indicators (KPI). KPIs should be specific, measurable, attainable, realistic, and timely (SMART). It should also cover all processes in the supply chain from demand to customer service and be updated based on the challenges faced. KPIs should be monitored monthly through a Balance Score Card (BSC) that covers all aspects at the same view.

Mohamed also explained that there are two ways to optimize a supply chain. The first one is called Six Sigma, usually used to eliminate defects, and reduce variation. It typically improves process effectiveness. While Lean Management is used to reduce waste and create flow in processes as well as drive continuous improvement. Lean Management improves process efficiency.

The session was closed with a case study from the three speakers, followed by a Q&A session. A participant asked if it is easier for pharmaceutical companies to deliver raw materials instead of final products considering the raw materials tend to be more stable than the final product. The speakers answered that their experience in delivering vaccines was unique because of the time crunch. It was valuable because they found that it was possible to deliver products as fast as possible while making sure there are supportive infrastructures for it.

Virtual Bootcamp

Public policy discussion on the development of medical biotechnology in Indonesia

Prof. Dr. Sangkot Marzuki, M.Sc., Ph.D., D.Sc.

The discussion kicked off with Prof. Sangkot mentioning Indonesia's standing in the field of biotechnology. Indonesia is greatly left behind, which he attributes to the lack of support for the development of science, technology and innovation. Departing from this matter, Prof. Sangkot focused the discussion on two topics: global best practices on research connectivity and best practices on the role of higher education in advancing biotechnology research.

Prof. Sangkot delved into the first topic by addressing the importance of research connectivity in relation to the ages of research. In line with the industrial revolution, scientific problems have become more complex and require a range of technologies. This impacts the way research is conducted, as Prof. Sangkot emphasized that the approach to conductiong research develops in accordance with the complexity of scientific problems.

The way research is conducted can be observed from the eras of research. Prof. Sangkot highlighted the eras: the individual research (first era), the institutional team research (second era), the national collaboration research (third era) and the international collaboration research (fourth age), which sees research conducted through international collaboration with other research groups. Using his own career as an example, Prof. Sangkot stressed that research connectivity was important for the progression of the research eras, as well as for developing research institutes. He elaborated that in Indonesia's biotechnology field, the Eijkman Molecular Biology Institute, before its merger with BRIN was already in the fourth era of research.

The discussion continued onto the second topic. Prof. Sangkot explained that in biomedical science, there were no clear boundaries between basic, applied and technological development. He believes such conditions must be taken into consideration when conducting research. Subsequently, science is more than just an upstream process to industrial development. Indonesian students often hear how science is only needed as an innovation tool, but in order to assist innovation, science must be supported by policies that understand science itself. In Indonesia, Prof. Sangkot believes that science has not yet integrated into the lifestyle and mindset of its people; therefore, strengthening scientific culture is essential to support quality research. There must also be a clear understanding of the different approaches between science and technology.

During the Q&A session, Prof. Sangkot was asked questions surrounding the role of universities as both a body of science and an entrepreneurship platform, in addition to the ways university students can build international collaboration for research. Responding to the first question, Prof. Sangkot conveyed the need for balance between the two roles, as the traditional role of universities in advancing the body of science cannot be abandoned in favor of entrepreneurship. Lastly, to close the discussion, Prof. Sangkot advised the students to build international collaboration through participation in scientific conferences and connecting with fellow students and scientists.

Training of Trainers: Capacity Building

Public policy discussion on the development of medical biotechnology in Indonesia

Prof. Dr. Sangkot Marzuki, M.Sc., Ph.D., D.Sc.

Indonesia is falling behind in its biotechnology sector. The 2019 Global Biotechnology Innovation Scorecard showed that the country's biotechnology was ranked 52nd out of 54 countries. The lack of biotechnological development in Indonesia is due to the complex and multi-dimensional problem of a research ecosystem that is far from supportive of the development of science, technology and innovation. This discussion was divided into two groups where the first one was led by Prof. Sangkot and the second room was led by Yalun Arifin.

Prof. Sangkot explained in the main room that the discussion was divided into two groups in order to give everyone a chance to speak as well as discuss their experiences. The issue of an unsupportive research ecosystem has long been a problem according to Prof. Sangkot. He started by sharing his experience in the Eijkman Institute since its reestablishment in 1992 to its merger into BRIN in 2021. Prof. Sangkot added that creating a sustainable working environment was made possible by the internet, far more easily than it was 20-30 years ago. He further shared that the Indonesian regulations are not friendly to international cooperation. That good science comes from international collaboration, and it is a growing trend worldwide. Although collaboration with western countries such as the United States and all over Europe is decreasing, scientists are collaborating throughout Asia, namely China, India and South Korea. The existence of big data is solid evidence for scientists to be transparent with one another. Isolating themselves and their discoveries from international networks will only negatively affect the development of science and technology.

A lecturer stated that current developments in medical biotechnology are heading in the right direction. This is shown through the vast molecular biology database. As a lecturer and a researcher, she believed that her duty now is to figure out how to transform these data into something useful or worthy of publishing.

She also shared her personal view of the government and the new minister. The lecturer feels that university lecturers are forced to be all-rounders, not only as scientists but entrepreneurs as well. This is due to the fact that scientists must be able to innovate and benefit the community. Although she agreed with these facts, she felt burdened having to participate in the Education Minister's Independence Campus (MBKM) program in order to obtain certain funding.

In the other room, Yalun kicked off the discussion by asking the lecturers for recommendations that could be given to legislators in regard to the advancement of medical biotechnology such as networking. The lecturers began by discussing the National System of Science and Technology Law and identifying concerns such as the exploitation of indigenous knowledge or problems relating to knowledge transfer by overseas scientists. Prof. Sangkot's previous fear of foreign scientists refusing to collaborate with Indonesia due to strict regulation was also brought up. It was explained that the licensing for foreign scientists to do research in Indonesia is provided by an ethical committee. However, the problem is there is no such committee. The existence of an ethical committee is seen as a burden because researchers need consent from patients and so on. Therefore, an ecosystem of invention and innovation is required in order to create a product and publish research. The lecturers believed that BRIN needs to be a coordinator for researchers in Indonesia so that everyone has the same goal.

Training of Trainers: Capacity Building

Soft Skills Training: Writing for Media & Advocacy, Writing for International Journals, Public Speaking

Maria Advenita Gita Elmada, S.I.Kom., M.Si.

Robby Irfany Maqoma

Dr. Vivitri Dewi Prasasty

This capacity-building session saw lecturers trained in soft skills such as public speaking, writing for media and advocacy, and writing for international journals.

Maria Advenita Gita Elmada, S.I.Kom., M.Si., a lecturer at Multimedia Nusantara University, provided the participants insights into public speaking. Covering topics from the structure of public speaking to voice and gesture management, Maria said public speaking was a way of making the speaker's ideas public by sharing them and influencing other people. She also shared tips on giving a more effective scientific presentation, such as plenty of practice, treating the presentation like a conversation and not being afraid of questions. Further explained by Maria, public speaking consists of an introduction, a body and a closing, all of which when conveyed to an audience must be met with good control of the voice and body language of the speaker. Body language may consist of movement, gestures and eye contact, whereas the voice may refer to pitch, volume, pronunciation and articulation.

Robby Irfany Maqoma, an editor of The Conversation, presented training on writing for media and advocacy. He started by mentioning the two sides of science created by social media: one where the trust for it strengthens and another where the trust weakens. Science itself has to become a clearing house of information amid rampant disinformation and to do so, it must reach a wider audience by gearing publications toward the media. Robby explained that popular articles could be sourced from research carried out by the writer or another person, or they can be an analysis of a certain topic. He also emphasized how popular articles must be accurate, brief and clear so readers can understand them. Additionally, scientific articles can be transformed into popular articles with slight changes to the writing structure.

Dr. Vivitri Dewi Prasasty, a lecturer at Atma Jaya Catholic University, shared her knowledge on writing for international journals. Dr. Vivitri began by describing the process of publication, starting with the research idea, the working paper, the manuscript and lastly, the journal submission.

Submitted manuscripts are proofread and prepared according to the journal's requirements, which vary from one journal to another. After the manuscript is submitted, it will either get accepted, rejected or needs revision. Regardless of the outcome, Dr. Vivitri advises the lecturers to respond quickly, to try working on the changes and not start any unnecessary arguments. Journal articles also have structures, most notably AIMRaD, consisting of the abstract, introduction, materials and methods, results and discussion. Dr. Vivitri pointed out several reference management tools that lecturers can use to support their writing process, such as Mendeley, Zotero and EndNote.

Profile of Winners

Undergraduate Winners

Humboldt

Devina Checylia Setiawan, Velecia Salim and Wenny Novella are undergraduate students from the International Institute of Life-Sciences majoring in Medical Biotechnology with hopes of completing their bachelor's degree in 2023. Along with their academic achievements, the Humboldt team members are active in their university's organization as extracurricular activities. The team looks forward to becoming a part of the medical biotechnology industry and contributing to society through medical advances as well as healthcare innovations

Unlocked

Deby Cyntia Chandra, Reza Hanun Alyaa and Jessica Renata Wijaya Tumboimbela are third year undergraduate students from the International Institute of Life-Sciences majoring in Medical Biotechnology. The team members of Unlocked are active in their communities and their passion for learning have led them to join various competitions. The team aims to become scientists for a sustainable future with a collaborative environment for Indonesian scientists in order to build the country's capabilities on research and development within the field of biotechnology.

ZipYourGenes

Christa Anggelia Sulistio, Vania Austine Callista Timotius and Nathania Calista Putri graduated in 2021 with a bachelor's degree in Biotechnology from Pelita Harapan University. The ZipYourGenes team members record impressive achievements in both academic and non-academic activities, having led various organizations, became a research assistant, and participated in the National Student Science Week in 2020. They envision a career in medical biotechnology in hopes of making a positive impact on society and improving the quality of human life through science such as developing better medicine.

Profile of Winners

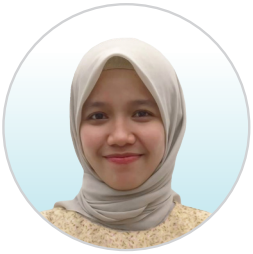
Graduate Winners

Alfandy Hermansyah
Atma Jaya Catholic University of Indonesia

Alfandy Hermansyah is a graduate student at Atma Jaya Catholic University of Indonesia majoring in Biotechnology. With hopes to become a researcher, Alfandy visions his research career focusing on the genetic and bioengineering of animals.

Denny Nyotohadi
University of Surabaya

Denny Nyotohadi is a graduate student at the University of Surabaya majoring in Biotechnology. With hopes to graduate in the fall of 2022, Denny was granted a scholarship and selected as a student role model by his university. His career vision is to become a researcher that contributes to human wealth.



Indriana Pratiwi
Gadjah Mada University

Indriana Pratiwi is a graduate student at Gadjah Mada University majoring in Biotechnology. Motivated to learn, grow, and excel in medical and food biotechnology, she was awarded a scholarship of academic achievement from the Education, Culture, Research and Technology Ministry during her undergraduate studies. Her research also received funding from the PNBP research group of Sebelas Maret University. Currently, she is participating in research that focuses on delivering drugs for cancer. Indriana visions her career as a lecturer or scientist that provides innovation for medical and food biotechnology development in Indonesia.

Leny Yulia Widya Sari
University of Jember

Leny Yulia Widia Sari is a graduate student at the University of Jember majoring in Biotechnology with hopes of completing her degree in 2022. Her achievements include receiving the Cahaya Pintar scholarship during her undergraduate studies. Leny visions her career as a lecturer in the field of health analytics and biotechnology.

Nurul Istinaroh
University of Jember

Nurul Istinaroh is a graduate student at the University of Jember majoring in Biotechnology with hopes of completing her degree in June 2022. An honors student, Nurul's achievement as an awardee of a short term training program to Russia granted her an award for academic achievement from the Education, Culture, Research and Technology Ministry. Her career vision is to become a researcher of medical biotechnology in university.

Profile of Reviewers and Judges

Undergraduate Reviewers

Prof. Dr. Amarila Malik

Amarila Malik is an expert in microbiology and molecular biology from the University of Indonesia. She acquired her Ph.D. from Bogor Agricultural University. She is also the laboratory head of the Department of Pharmacy at the University of Indonesia.

Endy M. Bayuni

Endy M. Bayuni is a journalist who served as chief editor of The Jakarta Post from 2004 to 2010 and 2016 to 2018. He is a co-founder and executive director of the International Association of Religion Journalists. In May 2020, he was named an inaugural member of Facebook's Oversight Board. Endy writes regular columns on Indonesian politics, foregn affairs, economic development, and the changing media industry.

Iqbal RF Elyazar

Iqbal RF Elyazar is the deputy head unit and a biostatistician in Eijkman Molecular Biology Research Center. He earned a BSc in Statistics, MPH in Health Informatics, and a DPhil in Malaria Disease Mapping. He has focused on biostatistics, disease surveillance, spatial epidemiology and malaria elimination strategies for 17 years. He received a Wellcome Trust Fellowship of Public Health and Tropical Medicine in 2012. His vision is to develop a quantitative framework for human mobility and assess the feasibility of eliminating malaria in Indonesia.

Masteria Yunovilsa Putra

Masteria Yunivilsa Putra is a researcher at the Research Center of Oceanography, LIPI. He acquired his Ph.D. from Marche Polytechnic University in Italy, majoring in Marine Science. He is an enthusiast in marine biodiversity, as shown by his publications on marine organisms and marine-derived natural products.

Profile of Reviewers and Judges

Graduate Reviewers

Azzania Fibriani, S.Si., M.Si., Ph.D

Azzania Fibriani is a Ph.D. from Erasmus Universiteit Rotterdam, Netherlands. She acquired both her bachelor's degree and master's degree from Institut Teknologi Bandung (ITB), majoring in Biology. An expert in molecular biology, she recently published research papers on the spread of the COVID-19 from a geospatial perspective.

Dewi Nur Aisyah

Dewi Nur Aisyah is a senior epidemiology and health informatics expert in the Ministry of Health. She obtained her Ph.D. from University College London (UCL) and obtained her master's degree from Imperial College London. Dewi is also a recipient of the 2021 Gatra Award in the health sector. As an epidemiologist, Dewi continues to educate the public about the origins of disease, how disease spreads, and the prevalence of diseases in specific populations, successfully curbing the number of COVID-19 cases in Indonesia.

Endang Sukara

Endang Sukara is a professor and lead researcher in microbiology and biodiversity studies at the LIPI Biotechnology Research Center. Endang earned a bachelor's degree at the National University of Jakarta, Indonesia and earned his doctorate at the University of Queensland in Brisbane, Australia. For most of his life, Endang has been fully dedicated to researching and studying biodiversity in Indonesia, publishing ten international publications. He was awarded the LIPI Sarwono Award XIX by LIPI.

Iqbal RF Elyazar

Iqbal RF Elyazar is the deputy head unit and a biostatistician in Eijkman Molecular Biology Research Center. He earned a BSc in Statistics, MPH in Health Informatics, and a DPhil in Malaria Disease Mapping. He has focused on biostatistics, disease surveillance, spatial epidemiology and malaria elimination strategies for 17 years. He received a Wellcome Trust Fellowship of Public Health and Tropical Medicine in 2012. His vision is to develop a quantitative framework for human mobility and assess the feasibility of eliminating malaria in Indonesia.

Pretty Multihartina

Pretty Multihartina is the head of the Research and Development Center for Health Resources and Services in the Ministry of Health. Once, she took part in the Ivermectin clinical trial with the Ministry of Health and was part of the cooperative work in US-Indonesia's efforts to eradicate COVID-19

Profile of Reviewers and Judges

Judges

Monica Nirmala

Monica Nirmala is the coordinator of the Strategic Delivery Unit Office for the Minister of Health at the Health Ministry. With expertise in public health policy and planetary health, she also holds the position of advisor to the Minister of Maritime and Investment Affairs, focusing on COVID-19 response in Indonesia. Monica is also a Fulbright Scholar, having received a Master of Public Health in Global Health from Harvard University. She received her bachelor's degree from the University of Indonesia, majoring in dentistry.

Landry Haryo Subianto

Landry Haryo Subianto is the chief country representative of the US-ASEAN Business Council in Jakarta, Indonesia. Prior to joining the Council, he was the Deputy Director for Policy Support and External Programs at the Office of Foreign Minister from 2017 to 2019. As a senior diplomat, he helped develop foreign policy initiatives, namely the Indo-Pacific concept, and developed policy materials for G20, APEC, and ASEAN. He has also worked as a policy analyst at the Center for Strategic and International Studies (CSIS). Landry received his M.A. in Political Economy from Essex University, UK, and read for a Doctor of Philosophy in International Relations at the University of Oxford as a Jardine Scholar.

Parulian Simanjuntak

Parulian Simanjuntak is the executive director of the International Pharmaceutical Manufacturers Group (IPMG). He has held previous positions at Schering-Plough Indonesia as its vice president commissioner and president director. Parulian holds a degree in business administration from the University of Cologne, Germany.

Prof. Sangkot Marzuki

Sangkot Marzuki is a distinguished biotechnology scientist in Indonesia and the president of the Indonesian Science Academy (AIPI). Previously, he was the director of the Eijkman Molecular Biology Research Center in Jakarta, which he helped rebuild after his 17 year tenure as a medical faculty staff member of Monash University, Australia. Through his work at the Eijkman Molecular Biology Research Center, Sangkot extended research on human genome diversity and infectious diseases in Indonesia. He was also made an Honorary Member of the Order of Australia and received the Bintang Mahaputra Utama of the Republic of Indonesia for his extensive contribution to science. Sangkot graduated as a medical doctor from the University of Indonesia and obtained his M.Sc from Mahidol University in Bangkok, along with a Ph.D from Monash University.

Profile of Reviewers and Judges

Judges

Wien Kusharyoto

Wien Kusharyoto is the head of Eijkman Molecular Biology Research Center and a biotechnology researcher at the National Research and Innovation Agency (BRIN). His research expertise includes structural bioinformatics, protein engineering, and molecular diagnostics. Wien obtained his Ph.D. from the University of Stuttgart, Germany.

Yalun Arifin

Yalun Arifin is a faculty member and the head of Food Business and Technology at Prasetiya Mulya University, Indonesia. He received his Ph.D. in Biological Engineering from the University of Queensland, Australia and his M.Sc in Chemical and Biochemical Engineering from Delft University of Technology in the Netherlands. With research areas in food bioprocess engineering, metabolic engineering, and algae biorefinery, his work as an academic and research staff has spanned several universities in Indonesia, Australia, and Malaysia.

Yulita Priyoningsih, S.Sos

Yulita Priyoningsih is the sub-coordinator of Special Learning at the Directorate General of Learning and Students Affairs under the Education, Culture, Research and Technology Ministry. Her previous experience includes working as a curriculum and learning analyst.