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i3L Newsletter

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i3L CAMPUS HIGHLIGHTS



Blood Donation: Community Outreach of Sci X Palang Merah Indonesia

Blood Donation is an event conducted by the Community Outreach division of Sci in collaboration with Palang Merah Indonesia [PMI] to contribute to fulfilling blood demands in the Indonesian healthcare sector. This program is open to all i3L students and staff. There are two sessions conducted. The first session was conducted on Friday, 11 November 2022, in the i3L lobby and attended by 89 donor applicants. In summary, there were 73 successful donors. Then, the second session was conducted on Thursday, 13 April 2023, in the i3L lobby and attended by 80 donor applicants. In summary, there were 73 successful donors.

New Faculties in i3L: Let's get to know them!



Dina Hermawaty
Biotechnology



Ananditya Nugraha
Food Technology



Pradip Iramdhan A.
Pharmacy



Dewi Safitri
Pharmacy



Silvi Hafianti
MBM

PowerTalk: Application for Bioinformatics in Biotechnology and Bioprospecting of Natural Resources for Industry and Conservation



On May 16th, 2023, Adhityo Wicaksono, Ph.D., MRSB, a Postdoctorate Fellow from Chulalongkorn University, Thailand, shared his insights about the application for Bioinformatics in Biotechnology and Bioprospecting of Natural Resources for Industry and Conservation to i3L students. In this Power Talk, he also shared his experience of studying in Thailand. The participants were very excited to learn something new from the speaker.

Indo Panda x i3L: Collaboration for Scholarships and Study Programs in China

On the 25th of May, 2023, i3L together with Indopanda hosted the China Uni Edutour Jakarta, in which several Chinese universities came to promote collaboration for scholarships and study programs in China! The event highlights the advantages of studying in China, the 2023 Scholarship Application Process, and favorite majors with bright career prospects [Chinese/English taught].

Speakers in the Edutour include the CEO and Co-Founder of Indopanda himself, Mr. Hendri Zhang – with representatives of three reputable Chinese universities Shanghai Dianji University, Qingdao University of Science & Technology, and Sichuan University of Science and Engineering. The event was enthusiastically attended by event-goers from both i3L and the public.



i3L Students: "Are you Bold Enough to Go Abroad?" English Class Session with Britzone at Kemendikbudristek's Library



On May 27th, 2023, two i3L students, Graciella Virginia Irwantoho and Vanessa Ellivia from the Food Science study program had the opportunity to share their experiences as IISMA awardees in an English class session conducted by Britzone [the biggest English Community in Indonesia] at Kemendikbudristek's library.

CSR Activity at Rumah Belajar Merah Putih, Kampung Nelayan Cilincing

On May 27th, 2023 biomedicine, biotechnology, and pharmacy faculties together with the students visited Rumah Belajar Merah Putih which is located in Kampung Nelayan Cilincing. We performed socialization regarding the dangers of bacterial skin infection and the importance of maintaining personal hygiene for the children there. Furthermore, in collaboration with Perhimpunan Dokter Spesialis Parasitologi Klinis Indonesia (PD-SPARKI), we performed free skin health examinations for children and free general health examinations for adults living in the area. The doctor suspected that along with bacterial infections, the children suffered from parasitic infections. We also took skin swab samples from the infected children to be characterized further in our laboratory. From our characterization, all of the samples showed the presence of Gram-positive bacteria which constitute normal flora. However, under certain circumstances, this normal flora can turn into an opportunistic pathogen.



A Visit from De La Salle Institute

On May 30th, 2023, i3L was visited by Mr. Jomel Vasquez, a representative from De La Salle Philippines to discuss exciting prospects of collaboration with i3L. Areas of collaboration that were enthusiastically proposed were in possibilities of research, exchange students, and faculty for the i3L Life Science and De La Salle Medical and Health Sciences Institute. Both institutes look forward to proceeding in cooperating and establishing new and exciting collaborative programs.



i3L's Got Talent 2023: Show the Creative Talent of i3L Body!

i3L's Got Talent (iGT) is an annual event of the Welfare x Community Outreach Division of SCi that aims to showcase the creative talent of the i3L body. This event was held offline for the first time after the pandemic, with 15 performances and over 300 seats sold on the 31st of May, 2023. The talents exhibited all went through online auditions prior to the offline shows to ensure the quality of the event. The number of performances itself was limited due to time constraints.



Furthermore, fundraising was also incorporated into this event to give back to society, making it a charity event. The fundraising includes merchandise selling, dinner preorders, offline selling, as well as open donations that were opened throughout the event. As a result, a total of Rp10,511,660 net donations were successfully collected and directly donated to Yayasan Onkologi Anak Indonesia (YOAII) in the hope of helping children with cancer in Indonesia. Hence, the objective of this event, which was a talent showcase to raise funds and help people in need, was successfully achieved



Deakin University Australia X i3L: More Collaboration Programs!



Wednesday – 9 August 2023, Deakin University Australia's Head of School, Prof. Marnie Campbell, Associate Head of Schools Dr. Elizabeth Weldon, David Francis, and Janine Mc Burnie with Country Manager Lina Darliana, and Partnership Coordinator Sebastian Gunawan, came to i3L to visit and discuss on expanding the current partnership with more collaboration programs, for students from both institutions. Several ideas on programs were laid out and both institutions were receptive to the prospects, in which the visitation was then concluded with a campus tour and lunch.

Empowering Educators: i3L's Pedagogy Workshop Revolutionizes Classroom Management



The age-old adage "change is the only constant" rings truer than ever before. As the educational landscape evolves, the days of conventional teaching methods that involve passive listening and monotonous lectures are rapidly dwindling. In their place emerges a new paradigm—one that champions dynamic and interactive learning environments. i3L [Indonesia International Institute for Life Sciences] has taken a proactive step by regularly organizing pedagogy workshops. These workshops play a crucial role in equipping educators with the latest tools and techniques, ensuring a dynamic and effective learning environment. The most recent workshop conducted by i3L centered around the essential theme of classroom management. This workshop centered around the concept of fostering fun activities that build connections between lecturers and students.

During the workshop, participants delved into various aspects of classroom management. They learned about the importance of establishing clear expectations and rules from the outset of the academic year. Strategies for fostering positive teacher-student relationships were also explored, emphasizing the role of mutual respect in creating a harmonious classroom. Furthermore, the workshop provided insights into the significance of interactive teaching techniques. Educators were introduced to innovative methods to encourage student participation, collaboration, and critical thinking. These techniques not only make the learning process more engaging but also aid in managing a classroom where students are actively involved and motivated to learn. As education continues to evolve, institutions like i3L are at the forefront of driving positive change, fostering a generation of learners who are not only knowledgeable but also adaptable and well-prepared for the challenges of the future.

"In this workshop, I had the opportunity to discuss the challenges encountered during the teaching process and seek potential solutions from fellow faculty members. I have also acquired new teaching method ideas that I can implement in my classes."

"I will try to build personal interaction with students before the class and try to understand their motivation for learning."

North Carolina State University Visitation

**NC STATE
UNIVERSITY**

On 30 May 2023, i3L was visited by a representative from North Carolina State University, Fred A Wright Ph.D – Distinguished Professor, Director of Bioinformatics Research Center, and Professor of Departments of Statistics and Biological Sciences. The meeting has opened new doors of career prospects for students and graduates of the Bioinformatics major, where the North Carolina State University were open on receiving researchers and student researchers in areas of statistical research.

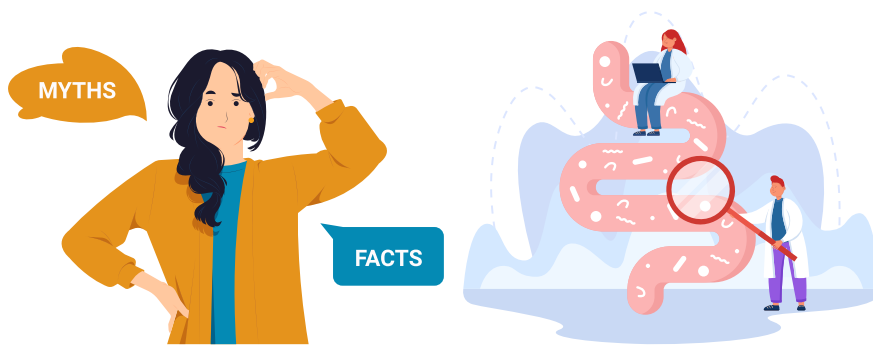
Myth or Fact? Gut Microbiota, the Key to ASD Development

By: Clarissa 22010045 [Biotechnology], Janice Clarisa Tissadharma 22010074 [Fsn], Stephany Gabriela Bonnyta 22010146 [BM]

Hippocrates once said that the existence of all diseases starts from our gut. Several health conditions have confirmed that the gut is the key player in the rising of the diseases, such as Inflammatory Bowel Disease [IBD], obesity, Congestive Heart Failure [CHF], and Type 2 Diabetes [T2D] [Harkins et al., 2021; Zhang et al., 2015]. Additionally, advanced studies have suggested that the pathogenesis of neurodegenerative diseases and neurodevelopmental disorders, such as ALS and ASD. ASD or Autism Spectrum Disorder is a heterogeneous neurodevelopmental condition characterized by a range of symptoms and behaviors that impact an individual's social communication, interactions, and behavior patterns [Hodges, et al., 2019]. Respectively can be supported by the gut, one of them is Amyotrophic Lateral Sclerosis [ALS] [Boddy et al., 2021]. However, Hippocrates only emphasized it on the diseases, What if it leads to a disruption in our body.

Autism Spectrum Disorder [ASD] is one of the prevalent neurodevelopmental disorders, distinguished by cognitive, behavioral, and communication challenges, with an occurrence rate of 4.3 cases out of 10,000 people [Ansari & Ahmed, 2013; Morton et al., 2023]. Individuals with ASD may exhibit difficulties in understanding and responding to social cues, which can impact their ability to form and maintain relationships. Clinical evidence also shows that ASD patients suffer from non-neurological comorbidities such as gastrointestinal [GI] dysfunction, and immune and sleep problems, while no specific cure has been discovered yet [Liu, 2022].

ASD is characterized by a range of challenges related to social communication, repetitive behaviors, and restricted interests. Repetitive behaviors, such as repeating phrases or engaging in specific routines, are common among individuals with ASD and can provide a sense of comfort and predictability. Additionally, individuals with ASD often display intense interest in specific topics or activities [American Psychiatric Association, 2013]. Moreover, people with autism tend to show selective eating behaviors, and autistic children have more limitations towards food which leads to a lack of nutrient intake [Kałużna-Czaplińska & Jóźwik-Pruska, 2016]. Diet restrictions in turn influence the amount and type of gut microbiota presented, leading to gut dysbiosis.



There is a hypothesis that the gut microbiome is the trigger of ASD development. It is stated that ASD can be triggered by the imbalance of the gut microbiome which causes inflammation and neuro-immune dysfunctionality in ASD patients [Siniscalco et al., 2018]. This gut dysbiosis induces the decrease of the short-chain fatty

acids [SCFA] which is important for the functionality of the gut barrier [Hughes et al., 2018]. Due to the lower amount of SCFA, the gut permeability increases and the possibility of brain inflammation becomes more likely to happen [Srikantha & Mohajeri, 2019]. When the gut leaks, bacterial metabolites such as lipopolysaccharide [LPS] can go in and trigger the immune system to activate the microglia, hence activating the production of cytokines [Fattorusso et al., 2019]. The maternal immune activation, triggered by exposure to a viral mimic, led to changes in the gut microbiota composition in the offspring. These changes were associated with an increase in specific cytokines, including interleukin-17a [IL-17a], which is known to be involved in inflammation [Buffington et al., 2016; Sharon et al., 2016]. These cytokines can be harmful to brain neurons which it can pass through the blood-brain barrier and trigger the brain microglia which promotes the high levels of proinflammatory cytokines such as IL-1 β , IL-6, IL-8, tumor necrosis factor [TNF]- α in the peripheral blood.

These cytokines can cause an imbalance in neural signal transmission which causes behavioral impairment, hence elevating the severity of ASD development [Zhao et al., 2021]. However, according to research, alterations in gut microbiota composition may contribute to some symptoms or worsen pre-existing disorders, but they are not the sole cause of ASD. Gut microbiota may influence the development of ASD by the gut-brain axis and signaling pathways between the gastrointestinal tract and central nervous system. [Mehra et al., 2022b].

It is important to note that current scientific understanding does not support the hypothesis that gut microbes cause ASD. It is due to the fact that there is a lack of data in humans that shows this hypothesis causes ASD but the data from the animal models strongly showed the links which confirmed the hypothesis to be true [Madore et al., 2016]. To date, the current scientific evidence considers that the neuro-inflammation hypothesis is the trigger of neuropsychiatric symptoms in ASD patients [Taniya et al., 2022]. The link between gut microbiota and autism spectrum disorder is complicated and multidimensional, including complex interactions between genetics, the immune system, and the central neurological system. It is crucial to understand that ASD is a complex neurodevelopmental condition with a strong hereditary base, and its etiology involves a mix of genetic, environmental, and epigenetic variables [Hsiao et al., 2013].

In conclusion, the intricate relationship between gut microbiota and ASD reflects the evolving understanding of their interplay in human health. Hippocrates was correct and current research is unraveling the impact of gut health on diseases such as neurodevelopmental disease. This disorder, marked by cognitive, behavioral, and communication challenges, presents a complex tapestry of symptoms including selective eating behaviors and gut dysbiosis. The hypothesis of the gut microbiome triggering ASD through inflammation and neuro-immune dysfunctionality has gained traction, yet it's crucial to recognize that current scientific understanding does not assert gut microbes as the sole cause of ASD. While animal models offer compelling links, the complex relationship between gut microbiota and autism spectrum disorder remains multifaceted, involving intricate genetics, immune responses, and neurological factors.

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Biosimilars: A Cheaper Alternative to the Future of Medicine

By: Josia Shemuel [21010105 - Bioinformatics] & Daphne Tan [21010062 - Food Science & Nutrition]

A fundamental understanding of biology has provided humans with medicines derived from living organisms since ancient times. These medicines, which we now label as biologics, took on various forms. For instance, powdered scabs were used in tenth-century China to inoculate people against smallpox. Despite this, it was not until Herbert Boyer and Stanley Cohen conducted the first genetic engineering in 1973 that the field underwent rapid growth. The availability of cutting-edge genetic tools in manufacturing highly specific and efficient drugs has set the global biologics market size to an impressive \$461 billion by 2023.

However, the multifaceted manufacturing process of biologics inside living cells requires precise design and control. Furthermore, the development of biosimilars must receive approval from the Food and Drug Administration, where analytical, animal, and clinical studies are all assessed, which may take upwards of six to nine years. This complex process has led to the hefty prices of biologics, ranging from \$10,000 - \$30,000 per year on average and \$500,000 for the most expensive ones. Further incentivized by the expiring patents of numerous targeted drugs, researchers have since developed similar copies of biologics that contain the active substance of the reference drug at a much cheaper price. These drugs are known as biosimilars: They exhibit a high degree of biosimilarity, defined as possessing similar pharmacokinetic and pharmacodynamic properties, to the reference drug, only differing in the clinically inactive compounds with the target biologics. Approved biosimilars have been proven to provide the same degree of efficacy and safety without reduced quality. There are 30 different biosimilars distributed in the growing market as of 2023, with the first one being approved as recently as 2015.

Biosimilars undergo a rigorous manufacturing process. Firstly, the clinically significant compounds that determine the effectiveness and safety of the drug must be comprehensively characterized from the target biologics. These compounds are known as the critical quality attributes (CQAs). Upon characterization, the process of manufacturing biosimilars can move on to the key step in its complex framework: Matching the CQAs between the reference drug and the intended biosimilar. This step requires constant monitoring by the manufacturers to ensure that the biosimilar's CQAs are controlled within a range specified by the reference drug. An analytical comparability exercise is then conducted to ensure the clinical efficacy and safety of the product.

This novel type of medicine has been prescribed for a large number of inflammatory and autoimmune diseases, including diabetes, as well as cancer. However, low awareness regarding the potency of biosimilars is known to cause unwanted nocebo effects: A negative effect during treatment caused by an individual's negative expectations. These adverse effects are independent of the drug's pharmacological properties; rather, its pathophysiology can be attributed to psychological and environmental factors. To combat this, the NOCE-BIO Consensus Group agreed that a good relationship between healthcare professionals and patients is key in limiting the negative bias towards biosimilar products. Knowledge pertaining to the safety and efficacy of biosimilars should be promoted and positive framing is recommended.

The widespread development and adoption of biosimilar is expected to help mitigate the rising prices of drugs. This is especially important in developing countries like Indonesia, where the GDP per capita is 15 times lower than in developed nations like the USA. In the near future, biosimilars are expected to grant greater accessibility for treating various diseases. These novel drugs hold much promise for the future of biological medicine.



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i3L UPCOMING PROGRAM



**WE INVITE YOU
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Open House Day - 30 Sep 2023

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