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ベトナム短期留学コースの再開 Undergraduate Medical Science Course in Tsukuba



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第6回感染症ワークショップ他、ベトナム短期留学コースの再開

森川一也、Vong Cat Khanh、牛島由理、Ho Kiong

本コースは国際パートナーシップ研修（東南アジア）（全学自由科目）として開設しているものです。医療科学類生は国際生命医科学研修という科目としても履修することができます。学生の海外派遣は医療科学類でも2020年以降ごく限定的にしか行うことができませんでしたので、今回は約3年半ぶりの開催となりました。大学院生は教育実習としての役割も兼ねており、コース内外で学類生のサポートにもあたってくれました。

【参加学生*】

小楠英里（医療科学類2年）
福田彩乃（国際総合学類2年）
Anika Rachel Claxton（生物資源学類2年）
Jiwon Baek（医療科学類3年）
鎌田菜々美（医療科学類3年）
小谷千香子（医療科学類3年）
岩川舞香（医学類6年）
清水 桃（修士課程、Shimano lab）
Nguyen Bao Nghi（修士課程、Morikawa lab）
Nguyen Duong My Kiew (Human Biology Program, Ho lab)

**【教職員】引率、コースの実施**

森川一也（筑波大医学教授/医療科学類）
Ho Kiong（筑波大医学准教授/医療科学類）
Voung Cat Khanh（筑波大医学助教/医療科学類：シンポジウムオーガナイザ）
Van Anh（筑波大学ホーチミン市オフィス現地職員）

【耐性菌調査班】コースと併行して薬剤耐性菌を調査、コースや引率にも協力**

牛島由理（筑波大医学助教/医療科学類）
東出正人（江東微生物研究所検査本部長：感染症ワークショップアドバイザー）

【日程】

（1月23日：派遣前説明会）

2月17日（金） Narita 発、Ho Chi Minh City 着

2月18日（土） シンポジウムに参加：感染症問題に取り組む方法

2月19日（日） 市内見学、コース準備（細菌のサンプリング）

2月20日（月）～23日（木） 感染症ワークショップ

2月23日（木） Ho Chi Minh 発、Narita 着（24日）

* 参加者は はばたけ！筑大生の奨学金、その他によるサポートをいただきました。手続き等は各エリア支援室、医学インターナショナルオフィス、エリアコモンズ等の職員の皆様にもサポートいただきました。

**環境にいる薬剤耐性菌の調査をワークショップと併行して行いました。結果の一部は本号掲載の「ベトナムホーチミン市の薬剤耐性菌市場調査報告」にまとめてありますのでご覧ください。

* 本コースは二国間交流事業（JPJSBP120229908）、AMED（22fk0108630h0001）、医学医療系からのサポートをいただきました。

2023 Feb 18

The 3rd US – UT, Joint symposium in Biomedical Science

到着翌日は、終日シンポジウムに参加しました。

感染症だけではなく、医学、医科学、バイオテクノロジーに関する多様なテーマの基調講演2件、口頭発表11件、ポスター発表48件が、ホーチミン市の協定校や、筑波大学を卒業したベトナム研究者、筑波大学等からありました。筑波大学からは、基調講演：細菌薬剤耐性（森川一也、微生物学）、口頭発表：脂肪酸伸長酵素（清水桃、修士課程、代謝内科）、ポスター：熱帯植物抽出物の効果（Nguyen Bao Nghi、修士課程、微生物学）、mRNA recapping 酵素（Nguyen Duong My Kiew、ヒューマンバイオロジー学位プログラム、分子寄生虫学）、の発表がありました。ベトナム研究者らの内容も高いレベルのものがあり、中でも筑波大学卒業生がベトナムで展開している研究、例えば Dr. Vong Bihn Long(International University, HCMC)の nanomedicine、Dr. Cao Sy Luan(Blood Transfusion and Hematology Hospital, HCMC) の CAR (chimeric antigen receptor) therapy の talk などが印象的でした。参加者は医科学の様々なトピックスに触れ、ポスターセッションでは発表者と直接活発な交流が来ていました。また、感染症の問題に取り組む方法論にどのようなものがあるか、個々に発見できたと思います。



2023 Feb 20-23

6th Workshop on Infection Diagnosis

(Biotechnology Center of Ho Chi Minh City, Vietnam)

主旨：薬剤耐性菌対策（AMR 対策）という世界的な喫緊の課題に取り組む。我が国と異なり、ベトナムや周辺諸国では抗生物質は実際的には処方箋を必要とせず入手可能な現状が残っており、家畜等への抗生物質の使用、廊下にまで患者があふれる都市部病院での院内感染など、薬剤耐性菌の伝播・蔓延の問題が我が国よりも起こりやすく深刻な状況にある。さらには東南アジアから耐性菌（耐性遺伝子）が家畜、食肉、ヒトなどを介して世界各国に拡散することも問題である。このような状況に鑑み、我々はベトナム・バイオテクノロジーセンター等と共同して「感染症ワークショップ」を実施し、現地社会人や大学生らを対象に薬剤耐性菌問題に関する啓蒙・診断トレーニングを行っている。AMR 対策の解決に各学生がどのように主体的に貢献しうるかを考える機会を提供することを目的とした。



Biotechnology Center of HCMC との共催で、センター長の Dr. Dang Quan Nguyen、本学卒業生の Dr. Nguyen Thi Le Thuy、その他多くの職員に協力・参加いただきました。BTC に新しく教育目的の棟が出来ており、その新しい場所で行いました。



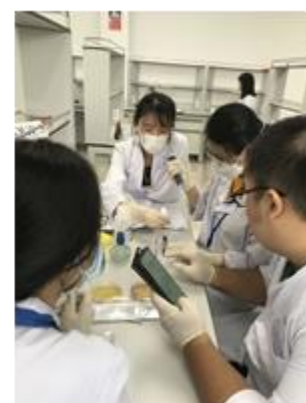
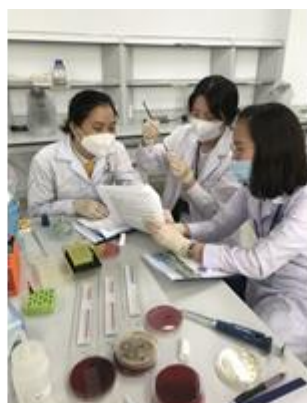
オープニング ワークショップにはベトナムの社会人、大学院生、大学生など 10 名も参加し、4 名ずつのグループに分かれて行いました。



左：BTC のスタッフがワークショップの各グループの TA をしてくれました。

中央：東出先生は現地の耐性菌調査の目的で同行しましたが、ワークショップの指導にも参加してくれました。

右：Dr. Nguyen Thi Le Thuy はコースの計画、試薬の準備、実験の指導など全般的に活躍してくれました。



実験風景 分野外の人にとっては初めての事ばかりで大変ですが、分からないところをグループで教え合ったり調べたりすることですすめていきます

以下の日程で、未知病原体の同定、薬剤感受性試験、薬剤耐性遺伝子の検出などを行いました。

20/Feb (Mon)

Lecture 1: Dr. Kazuya Morikawa (University of Tsukuba)

Lecture 2: Dr. Nguyen Thi Le Thuy (BTC)

Experiment:

Aseptic technique,

Gram staining

Biochemical tests

Single colony isolation, Confirmation medium

Antibiotics susceptibility test (Disk diffusion)



21/Feb (Tue)

Biochemical species identification by diagnosis kit (API-20E, API-Staph)

Antibiotics susceptibility test (Microdilution method)

Gene analysis (Colony PCR)

22/Feb (Wed)

Gene analysis (Colony PCR result: electrophoresis)

DNA Sequencing

Antibiotics susceptibility test (additional test, Linezolid, Vancomycin etc)

23/Feb(Thu) morning

Data analysis (DNA sequence)

Presentation/ Discussion

Closing ceremony (12:00)



更に、今回新しい試みとして、日本からの参加者には現地到着後サンプリングのためのスワブが配布され、耐性菌がいそうな場所を推定して調査するという自由調査も加えました。レストラン前の水たまりからは MRSA が検出されたり、メコン川で釣れた魚からはシゲラ・サルモネラ培地に硫化水素産生細菌が沢山検出されたり、あるいは市場で売られていた野菜からブドウ球菌が検出されたことは意外でした。環境で様々な病原細菌、薬剤耐性菌の伝播の様子を想像する一週間となりました。また議論の際には法規制と実際の生活、国家の役割、経済など、医科学の枠を超えた意見も出されていました。本コースで参加者が考えた課題には簡単な解決策がありませんが、様々な背景の人材が協力することで何かが起こるということを少しでも感じていただけたのであれば、十分な意義があったと思います。



＜参加者のエッセイ＞

“Once-in-a-lifetime experience”

Anika Rachel Claxton (G30 Agro-Biological Resource Science)

The Workshop on Infection Diagnosis held in Ho Chi Minh City was a once-in-a-lifetime experience that left a deep impression on me not only in terms of acquiring medical science laboratory knowledge, but also in terms of the whole experience of going to Vietnam.

As a student from the School of Life and Environmental Science, almost all of the laboratory work we did was something I learned for the first time. I got an opportunity to utilize culture methods, multiple diagnosis tests, PCR, and DNA sequencing. While not all of these skills may be transferable, I strongly believe that the majority of those are essential not only for medical science students but any science students, especially those who are aspiring to become a researcher like myself.

One can argue that going to Vietnam was not necessary to learn how to identify pathogenic bacteria. In terms of gaining knowledge and skills, that is true. However, I believe understanding the issue of antibiotic-resistant bacteria as a fact and understanding it as a reality are two very different things. I grew up in a developed country where the majority of the deadly issues prevalent, especially in developing countries, can be "read" on the computer screen. However, this workshop gave me a chance to "feel" the issue by actually visiting there, hearing stories from Vietnamese, and performing experiments. In

Vietnam, I heard that when they are sick, the majority not only buy medicines for fever but also antibiotics at the pharmacy. Such easy access to antibiotics without prescription causes a higher resistance rate to antibiotics.

However, such antibiotic-resistance bacteria are not only found in humans. In this workshop, we were given a chance to diagnose samples from the environment. While not all samples had antibiotic-resistant bacteria, we were able to see that there are such bacteria in various environments in Vietnam. This made me understand the severity of the issue by heart, and actually going there and learning about them made this an invaluable experience I will never forget.

Furthermore, while unrelated to the actual workshop itself, I got a chance to visit the Vietnamese War Museum in my free time. While the workshop itself was a phenomenal experience, I believe visiting this museum was also a great use of time because the value of human lives emphasized through the museum hits you deeply. I believe this also ties into the workshop itself as this antibiotic-resistant bacteria is a global health issue where, similar to war, this is an issue that endangers human lives. I highly recommend going to the museum as well if you want to learn about the history of Vietnam, but as the war photos were quite explicit, I will only recommend it to those who are fine with those types of photos.

This workshop further amplified my interest in global health issues, and I believed this workshop helped me not only build knowledge, but to build connections with various people. As a student in the English Program, being able to interact with the Vietnamese and with the Japanese was a great experience on its own, and the difference in culture that can be felt through the interaction was very interesting. This workshop was not only great in terms of education, but it also gave me an excellent opportunity to make more friends. I am grateful for this once-in-a-lifetime experience, and I firmly believe this workshop is a great opportunity for all students to gain an understanding of global health issues with an open-minded view.



「医療における失敗とは何か?」

福田彩乃（国際総合学類）

今回私は人文社会分野からの学生として参加した。薬剤耐性菌の知識は僅かしかなく、実験ミスは数知れず犯した。それにも関わらず同じグループの仲間は私のミスに寛容であり、筑波の学生メンバーには不明点を詳細に教えてもらった。大変感謝している。

さて、ワークショップで実験をしていく中で私の中である疑問が生まれた。医療における失敗についてである。

人文社会領域を専攻しているとどうしても思考の型が偏ってしまう。つまり、明確な基準となる数値がないため普段から「失敗」を意識することがあまりないのである。少なくとも私にとって、失敗はポジティブなものであったし替えの利くものが多かった。得られた結果も一つのデータでしかなく可も不可もない。しかし、医療分野においては失敗のラインがあるように思えた。そしてその道の人々は私たち以上に失敗に対して strict だと感じたのである。

偏に失敗と言っても多くのベクトルが存在する。実験に関して言えば知識不足による器具の誤操作、異物混入のような防げるミスから、臨床段階では治験・投薬の失敗もある。防ぐことができない失敗や許されない失敗もある。例を挙げればきりがない。そして更に複雑性を帯びているのが、成功も選択次第で失敗になりうるという可変性である。抗生物質を生み出したアレクサンダー・フレミングは、抗生物質の発明と同時に懸念点を指摘した。先見の明に富んだ彼の言及は実際に本ワークショップの意義として現れている。

現在の恩恵は我々が知りえない実験や治験、失敗のもとに成立していることは自明である。成功につながる失敗は必ずしもネガティブなものではないが、物議を醸す事例もある。（中略）

以上の特徴を踏まえ、私なりに思うことは医療における失敗はキリストの功罪になぞらえて「不可避なものとして背負う十字架」だと思う。逃れることのできない過程・要素は、その重みを担うことによって同時に救いとなりうるのではないだろうか。十字架はキリスト教では希望の象徴でもある。希望の裏に負う重みは超越的なものであるが、医療と失敗の関係は類似したもののように思われた。

このほかにもぼったくりを回避する方法から、薬剤耐性菌の知識まで様々なことを学んだ。個人的に分野の違うレクチャーを受けたことで「結果」に対する考えが変化し、学問研究において新しい視点を得ることができた。また、他学生との交流は異なった考えを共有する良い機会となった。各人特徴的なバックグラウンドを持った学生だったため、個人的にその多様性から視野を広げる良い刺激となった。今回の経験を人文社会の道から社会にどのように還元できるかは模索中であるが、個人としては本当に貴重な体験となった。ぜひ今後も医療分野以外の学生の採用を行ってほしいと思う。

最後に本ワークショップの関係者のすべての方への感謝を著し、本エッセイのむすびとする。



「チャレンジすることを躊躇わず、主体的に動くことを意識していきたい」

鎌田菜々美(医療科学類)

今回、3年ぶりのベトナムでのワークショップという事で、実際に日本を離れ、現地で言語が異なる学生と交流し、共に学ぶことができる環境にチャレンジしたいという思いで申し込みました。

まず、ベトナムに到着してバイクの交通量にカルチャーショックを受けました。交通ルールや渋滞、街の人の多さから浮かび上がる問題点や国が違うことで用心深くなっている自分に気づきました。日本とは異なる地に来たことを実感すると共に、このような経験は、国際的な視野を身につけることにおいて必要不可欠であり、他の国でも色々な文化や独自の営みを知り、学びたいと刺激を受けました。

4日間、Biotechnology centerにおいて、ベトナムの学生とワークショップに参加しました。取り組んだ内容は医療科学類における講義や実習と重複する部分があり、親しみやすく、同じチームのメンバーには手技を教え、結果の読み取り方を一緒に考えることが出来ました。英語を言語ツールとすると、母国語が日本語の私は、伝えたいことを表現するのに苦戦する場面が多々ありました。ただ、伝えたい相手も母国語はベトナム語でお互いなんとか意思疎通を図ろうとジェスチャーや簡単な単語で会話をしていました。それを続けていると、最終日の発表会の後は、少し頭をフル回転させて単語をつなぐのではなく、自然に出てくる英語が増えていました。その過程が私には非常に勉強となりました。このワークショップに参加するまでは、英語を話すことに億劫な自分がいて、ラボ内で留学生と日常会話をするのが難しいと実感している日々でしたが、コミュニケーションをとろうと動き出し、会話やお互いの考えの理解を深めることが大切で、その過程がコミュニケーション能力の向上に繋がるのではないかと考えました。

また、筑波大学から参加したメンバーにもかなり刺激を受けました。帰国子女やベトナム国籍の学生など自分の学類に限らず、言語の異なる学生と共に参加できました。バスの中、ワークショップだけでなく、日常的に英語を使う1週間でした。そして、それぞれに研究や勉学に対する取り組み方が非常に主体性に溢れたメンバーで、自分の将来や今のラボや医療科学類での過ごし方を見つめなおす、良いきっかけとなりました。1年間ラボで無我夢中に実験や考え方を教えてもらう日々でしたが、自分から考えること、チャレンジすることを躊躇わず、主体的に動くことを意識していきたいと思いました。

1週間の研修でしたが、濃く学びの多い時間を過ごすことが出来ました。この経験から考えたことをこれからラボや学生生活で活かしていきたいです。ありがとうございました。



<編集者への手紙>

ベトナムホーチミン市の薬剤耐性菌市場調査報告

Antibiotics susceptibilities of Enterobacteriaceae isolated from local markets in Ho Chi Minh City.

東出正人（医療科学類非常勤講師；江東微生物研究所）

Nguyen Thi Le Thuy (Biotechnology Center of HCMC)

Nguyen Bao Nghi、牛島由理、森川一也（医療科学類）

2023 年 2 月、国際パートナーシップ研修（東南アジア）として第 6 回感染症ワークショップが開催されました。本ワークショップでは薬剤耐性菌対策（AMR；Antimicrobial resistance 対策）という世界的な課題がテーマでした。2015 年 5 月、世界保健総会で AMR に関するグローバル・アクション・プランが採択され、加盟国は 2 年以内に AMR に関する国家行動計画を策定することが求められ、わが国では以下の 6 分野が掲げられていますので、どこかで目にしたことがあると思います。

日本の AMR グローバル・アクション・プラン 6 分野

- 1.普及啓発・教育：薬剤耐性に関する知識や理解を深め、専門職等への教育・研修を推進
- 2.動向調査・監視：抗微生物剤使用量の継続的監視、薬剤耐性の変化・拡大の把握
- 3.感染予防・管理：適切な感染予防・管理の実践による薬剤耐性微生物の拡大阻止
- 4.抗微生物剤の適正使用：医療、畜水産等の分野における抗微生物剤の適正使用の推進
- 5.研究開発・創薬：薬剤耐性微生物の予防・診断・治療手段の開発および研究の推進
- 6.国際協力：国際的視野で多分野と協働し、薬剤耐性対策を推進

AMR 対策は、ヒトのみではなく家畜や動物に対する抗生物質の使用から考える必要があります。家畜への抗生物質投与は、病気予防に加え、成長促進剤として多用されてきた歴史があり、安易な抗生物質の使用は耐性菌蔓延の原因となります。特に東南アジアは抗生物質の入手が容易であること、安価な食品の輸出国としての一面もあり、食肉、ヒトを介して耐性菌を拡散される可能性が危惧されています。これまで森川ラボは、東南アジア地域の薬剤耐性ブドウ球菌（MRS）の調査を複数回実施しています。今回、MRS と併せて世界的に問題となっている薬剤耐性菌“基質特異性拡張型 β -ラクタマーゼ”（ESBL；extended-spectrum β -lactamase）産生性菌と“カルバペネマーゼ産生性腸内細菌科細菌（CPE；carbapenemase-producing Enterobacteriaceae）の現地調査を実施したので、その結果を報告します。

【サンプル調達】

写真はホーチミン中心部からタクシーで 15 分程度の中華街にある An Dong（安東）市場です。ここでは店舗ではなく、軒先や歩道で売られている食材を調査対象としました。ベトナムも他の東南アジア諸国と同様、肉や魚、野菜・果物など多くの生鮮食品が路上同然の環境で売られています（写真）。勿論、冷蔵庫など温度管理ができるような環境にはありません。肉類の販売は午前中で売り切れるのか、終了するのか、午後からは殆ど見かけなくなります。写真右は皮を剥がされ、頭も切り落とされているのにも関わらず元気良く？動いていたカエルです。東南アジア諸国ではカエルは定番ジビエのようです。また、日本でも馴染みのあるティラピアやナマズなどの淡水魚も売られていましたが、今回はトリやブタなどの食肉を対象とし、魚やカエルなどは調査対象外としました。



下の写真はホーチミン市のローカル系スーパー CO・OP mart です。手荷物は店舗入口の鍵付き無料ロッカー（写真中央）に保管しての買物がルールようです。店内には日本のスーパーと同様、食料品や日用雑貨などひと通りの商品が揃っています。写真右は“Nhong kg 79.000D”と書かれた食材です。“Nhong”とは日本語で“まゆ”のことで、成虫がどんな虫なのかは分かりませんが、日本円で約 395 円/kg の値札が付いていました。このまゆの右隣にあるムール貝のむき身が約 735 円/kg でしたので、まゆはムール貝の半額程度ということになります。日本でも一部の地域で古くから昆虫食の食文化はありますが、ベトナムでは一般的なのかも知れません。



【調査サンプル】

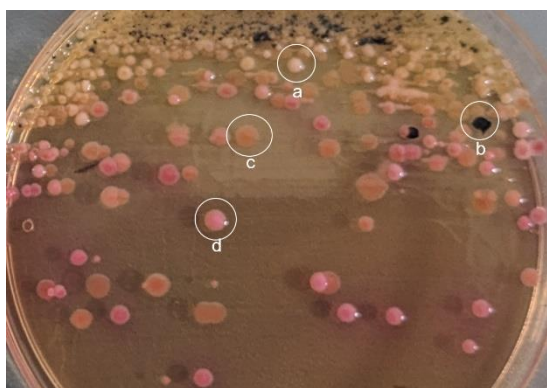
右写真は調査対象とした An Dong 地区の市場とスーパーで購入した食材です。No.1 は場外市場で購入した烏骨鶏で、内臓をはじめ骨や皮膚まで黒色のやや小ぶりの鶏です。日本ではあまり見かけませんが、美味しい鶏とのこと。一羽丸ごと購入したので表皮側（No.1）と内臓側（No.1'）を検査対象としました。その他、豚腎臓（No.2）、豚肝臓（No.3）、豚脾臓（No.4）、豚子宮（No.5）を購入しました。スーパーでは、パック売りの鶏もも肉（No.6）、豚の尻尾（No.7）、牛肉（No.8）、鶏手羽先（No.9）を追加し、当日中に細菌検査を実施しました。



【食品から検出された細菌】

調査サンプルの細菌検査には、サルモネラ・シゲラ寒天培地（SS 寒天培地）、マッコンキー寒天培地、BTB 乳糖加寒天培地、ヒツジ血液加寒天培地を使用し、 $35^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 18~20 時間好気培養しました。これらの培地は医療科学類生であれば必修項目ですので原理の説明は割愛します。

写真は烏骨鶏の皮膚表面（No.1）を塗布した SS 寒天培地です。細菌は培地、菌種ごとに特徴的な集落を形成しますが、ここでは a~d の 4 種類の集落が確認されています。参考までにこれらの同定結果を下記に記します。



- (a) 露的状集落：Klebsiella pneumoniae
- (b) 黒色集落：Citrobacter freundii
- (c) 薄紅集落：Escherichia coli（大腸菌）
- (d) 桃色集落：Enterobacter cloacae

同定結果の一部を、次項 表に示します。9 サンプルより 5 菌種 30 株の腸内細菌が検出されています。これらはヒトや動物の腸管内常在細菌で、通常は下痢や胃腸炎などを起こす事はありません。また、鶏や家畜、爬虫類が保菌するサルモネラ属菌やアリゾナ菌などの食中毒菌や赤痢菌などの感染性腸炎を惹起する病原菌は検出されませんでした。

【薬剤感受性試験結果】

今回検出された細菌の薬剤感受性試験成績を表にまとめました。

薬剤は AMP/CVA (amoxicillin/clavulanate)、CAZ (Ceftazidime)、CTX (Cefotaxime)、CPDX (cefepodoxime)、Cefepime (CFPM)、OFLX (ofloxacin)、IPM (Imipenem) の 7 種類を使用し、CLSI M100,29th ed. 2019 のディスク拡散法¹⁾に準拠して実施しました。

表) サンプル 9 品目より検出された腸内細菌と薬剤感受性成績

No	菌名	AMP/CVA	CAZ	CTX	CPDX	CFPM	OFLX	IPM
1_1	<i>Citrobacter freundii</i>	S	S	I	I	S	S	S
1_2	<i>Enterobacter cloacae</i>	I	I	R	R	I	S	S
1_3	<i>Escherichia coli</i>	S	S	S	S	S	S	S
1_4	<i>Klebsiella pneumoniae</i>	I	S	S	S	S	S	S
2_1	<i>Citrobacter freundii</i>	R	S	S	S	S	S	S
2_2	<i>Enterobacter cloacae</i>	R	S	S	S	S	S	S
2_3	<i>Escherichia coli</i>	R	S	S	I	S	S	S
2_4	<i>Klebsiella pneumoniae</i>	S	S	S	S	S	S	S
3_1	<i>Enterobacter cloacae</i>	S	S	R	R	S	S	S
3_2	<i>Escherichia coli</i>	S	S	S	S	I	S	S
4_1	<i>Escherichia coli</i>	R	S	S	S	S	S	S
5_1	<i>Escherichia coli</i>	R	S	S	S	S	S	S
6_1	<i>Enterobacter cloacae</i>	S	S	S	S	S	S	S
7_1	<i>Citrobacter freundii</i>	I	S	S	S	S	S	S
7_2	<i>Escherichia coli</i>	S	S	S	S	S	S	S
8_1	<i>Escherichia coli</i>	S	S	S	S	S	S	S
9_1	<i>Escherichia coli</i>	S	S	S	S	S	S	S

『薬剤感受性試験結果解釈について』

「S；感性」：通常の投与量で治療効果が期待できる薬剤であることを意味します。

「I；中間」：精度管理上の干渉ゾーン。

「R；耐性」：通常の投与量で治療効果が期待できないことを意味します。

薬剤感受性試験の結果、第三世代セファロスポリン系薬（CTX、CPDX）耐性の *Enterobacter cloacae* が 2 株（No.1-2、No.3-1）検出されています。これらは ESBL と同様、抗生物質の選択範囲が限られ、治療上注意が必要な薬剤耐性菌です。

『ESBL、CPE の検査結果』ESBL (extended-spectrum β -lactamase: 基質拡張型 β ラクタマーゼ) の鑑別は、CLSI M100,29th ed.2019 の DDST 法²⁾に準拠し、CPE (carbapenemase) は SMA (2-メルカプトプロピオン酸) ディスク法³⁾にて実施しました。その結果、今回分離された 5 菌種 30 株から ESBL および CPE は検出されませんでした。

【まとめ】

ESBL は penicillinase の基質特異性が拡張し、本来は分解できなかった第三世代セファロスポリン系薬まで分解 (=耐性) してしまう β -lactamase です。CPE は“最後の切り札”と例えられるカルバペネム系薬の分解酵素 carbapenemase で、ESBL と同様、プラスミドを介して多剤耐性を付与する伝達性の β -lactamase として知られています。これまで、ESBL や CPE は大腸菌や *K. pneumoniae* などの腸内細菌や *Pseudomonas aeruginosa* (緑膿菌) などから検出されています。大腸菌をはじめとする腸内細菌群はヒトや動物の腸管内常在菌であり、ヒトや動物の腸管内が薬剤耐性遺伝子の伝達場所となることが危惧されます。

2016 年、Do Phuc Nguyen⁴⁾ らは 330 サンプルの食肉、魚類から分離された大腸菌の 30% 以上が ESBL 産生菌だったことを報告しています。今回、われわれの調査では ESBL、CPE は検出されませんでした。第三世代セファロスポリン系薬耐性の *E. cloacae* が検出されており、ベトナムの食材にコロナ禍を経た今でも薬剤耐性菌が広まっていることが示されました。

東出は今回、3 年ぶりに開催された Biotechnology Center of HCMC と筑波大学が共催する感染症ワークショップに併行し、薬剤耐性菌の現地調査を担当させていただきました。2017 年の第一回ワークショップにも参加しており今回で 2 回目でしたが、本ワークショップは筑波大学が実践する“AMR アクションプラン”の一つであることを改めて実感しました。機会があれば再調査をしてみたいと思います。今回、現地調査を担当させていただいた森川ラボおよび Biotechnology Center のスタッフの皆さま、筑波大学に感謝いたします。

参考文献

- 1) Criteria for Performance of ESBL Test; CLSI M100,29th ed. 104-105,2019.
- 2) 仁木誠: ESBL 産生菌の検出法. 臨床と微生物, Vol.47, No.5, 2020.
- 3) 大友志伸, 前田和樹: CRE の検出, 阻害剤を使用した型別方法. 臨床と微生物, Vol.47, No.5, 2020.
- 4) Do Phuc Nguyen, Yuko Kumeda et al., Dissemination of Extended-Spectrum β -Lactamase Producing *Escherichia coli* within the Food Distribution System of Ho Chi Minh City, Vietnam. BioMed Research International Epub 2016 Feb 17.

謝辞

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Undergraduate Medical Science Course in Tsukuba 2023

Norihiko Ohbayashi, Aya Fukuda, Keiko Ookawa,
Yukari Okita, Vuong Cat Khanh, Hyojung Jeon, Thomas Mayers,
Suzuyo Nakane, Mizuho Cohen, Kiong Ho, Kazuya Morikawa, and Koji Hisatake

Undergraduate Medical Science Course in Tsukuba 2023 was held from February 19 to 25, 2023. We invited 13 foreign students from some of our partner universities in Indonesia, Vietnam, and Taiwan.

Participants:

University of Indonesia (Medicine):	2 students
University of Indonesia (Pharmacy):	2 students
University of Padjadjaran (Pharmacy):	2 students
University of Science HCMC (Biotechnology):	1 student
University of Science HCMC (Biology):	2 students
International University, VNU HCMC (Biotechnology):	1 student
National Cheng Kung University (Medicine):	2 students
National Cheng Kung University (Medical Laboratory Science and Biotechnology):	1 student
University of Tsukuba (School of Medical Sciences):	14 students

This program was supported by “Japan-Asia Youth Exchange Program in Science” (SAKURA Exchange Program in Science), Japan Science and Technology Agency (JST). <http://ssp.jst.go.jp/EN/index.html>

Schedule

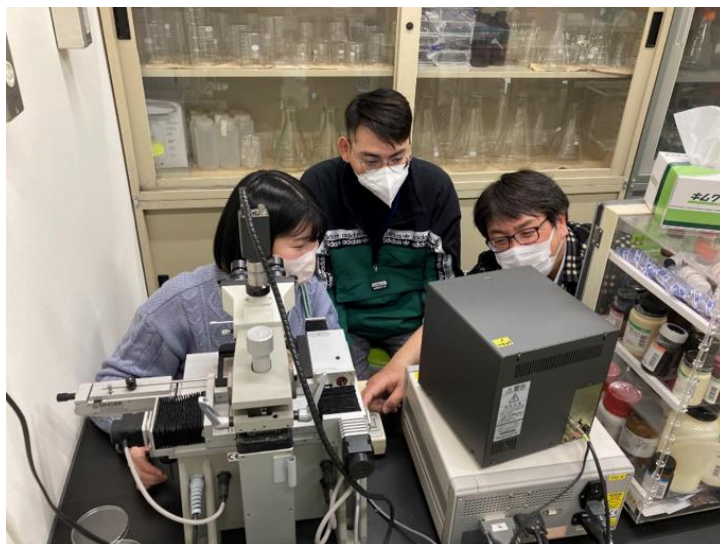
Date and Time			Activities
Day 1	(2/19/2023) Sun		Arrival (Narita), Check-in (Global guest house) 入国（成田）、チェックイン（グローバルゲストハウス）
Day 2	(2/20/2023) Mon	AM	Orientation (course introduction, self introduction etc.) オリエンテーション（コース概要説明、自己紹介、各校紹介など）
		PM	Laboratory Experiments 研究室
Day 3	(2/21/2023) Tue	AM	Laboratory Experiments 研究室
		PM	Laboratory Experiments 研究室 Lecture for presentation プレゼンに関する講義
Day 4	(2/22/2023) Wed	AM	Laboratory Experiments 研究室
		PM	Laboratory Experiments 研究室
Day 5	(2/23/2023) Thu (holiday)	AM	UT hospital, Proton beam therapy center 筑波大学附属病院 陽子線治療センター見学
		PM	JAXA (Japan Aerospace Exploration Agency) JAXA（宇宙航空研究開発機構）見学
Day 6	(2/24/2023) Fri	AM	Preparation for final presentation (Laboratories) 発表準備（各研究室）
		PM	Final Presentation 発表会 Farewell party 送別会
Day 7	(2/25/2023) Sat		Check-out, Departure (Narita) チェックアウト、出国（成田）

List of participating laboratories

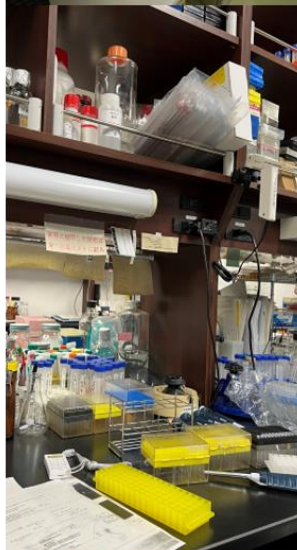
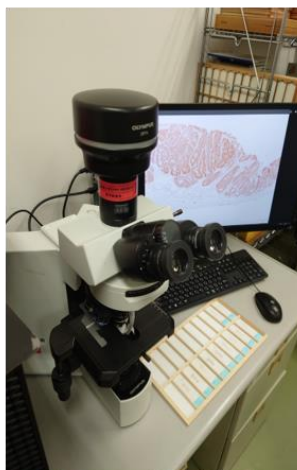
Laboratory	Supervisor	Research Theme
International Institute for Integrative Sleep Medicine (WPI-IIIIS) Lazarus/Oishi Laboratory 国際統合睡眠医科学研究機構 (WPI-IIIIS) ラザルス / 大石研究室	LAZARUS Michael	Single-cell gene expression analysis of crosstalk between sleep and the immune system シングルセル遺伝子発現解析による睡眠と免疫系のクロストークの解明
Hematology 血液学	SAKATA-YANAGIMOTO Mamiko 坂田 麻実子	Oncogenesis of hematologic cancers/Oncoimmunology 血液がんの病態研究あるいはがん免疫研究
Molecular Cell Biology 分子細胞生物学	IRIE Kenji, SUDA Yasuyuki 入江賢児・須田恭之	Yeast Genetics, Post-transcriptional regulation of gene expression 酵母の遺伝学、遺伝子発現制御
Laboratory Animal Science 実験動物学研究室	MIZUNO Seiya 水野聖哉	Establishment of a rapid gene function analysis system by in vivo genome editing in vivo genome editingでの迅速な遺伝子機能開発系の開発
Laboratory of Experimental Pathology 実験病理学研究室	KATO Mitsuyasu 加藤光保	Stem cell induction and reset of cell division lifespan of cancer cells がん幹細胞誘導とがん細胞の分裂寿命リセットの研究
Medical Sciences 医療科学	AITA Yuichi 會田雄一	Nutrigenomics, elucidating how the genome is read to control nutrient flows ニュートリゲノミクス：栄養環境適応に際してゲノムはどのように読まれるか
Immunology 免疫制御医学研究室	SHIBUYA Kazuko 渋谷和子	Functional analysis of immune receptors 免疫受容体の機能解析
International Institute for Integrative Sleep Medicine (WPI-IIIIS) Yanagisawa/Funato Laboratory 国際統合睡眠医科学研究機構 (WPI-IIIIS) 柳沢/船戸研究室	YANAGISAWA Masashi 柳沢 正史	Assessment of mouse sleep-wake behavior and memory through optogenetics 光遺伝学によるマウスの睡眠・覚醒行動と記憶の評価
Vascular Matrix Biology 血管マトリクス生物学	YANAGISAWA Hiromi, KIMURA Kenichi, RAJA Erna	Role of Extracellular Matrix in Disease of Skin and Vessels 細胞外マトリクスと疾患について
Regenerative medicine and Stem cell Biology 再生医学幹細胞生物学	OHNEDA Osamu 大根田修	Breast cancer and COVID-19
Endocrinology and Metabolism 内分泌代謝・糖尿病内科	SHIMANO Hitoshi 島野 仁	Research on energy metabolism and metabolic diseases
Molecular Virology 分子ウイルス学	KAWAGUCHI Atsushi 川口敦	Molecular mechanism of cell-to-cell transmission of SARS-CoV-2 for the development of antivirals
WPI-IIIIS Sakaguchi-lab 国際統合睡眠医科学研究機構 (WPI-IIIIS) 坂口研究室	SAKAGUCHI Masanori 坂口昌徳	Memory processing during sleep and its clinical application

Laboratory Experiments

During the program, one Tsukuba student made a group with one overseas student, and stayed in different laboratories to have research experiences.



Lab Works



Other Activities

We had a chance to visit the proton beam therapy center at University of Tsukuba hospital. This program provided us an opportunity to visit the research institute in Tsukuba city, Japan Aerospace Exploration Agency (JAXA). We also attended an English lecture to learn how to give a good presentation.



Presentation

On the last day, all participants presented the results of experiments which they have done in each laboratory during this program.



Presentation



Farewell Party

We thank all of you for participating this program. We hope that we can see you again in near future.



Undergraduate Medical Science Course in Tsukuba
~Feb 19 to 25, 2023~



Letters from participants

By Nei Ogawa, University of Tsukuba (School of Medical Sciences)

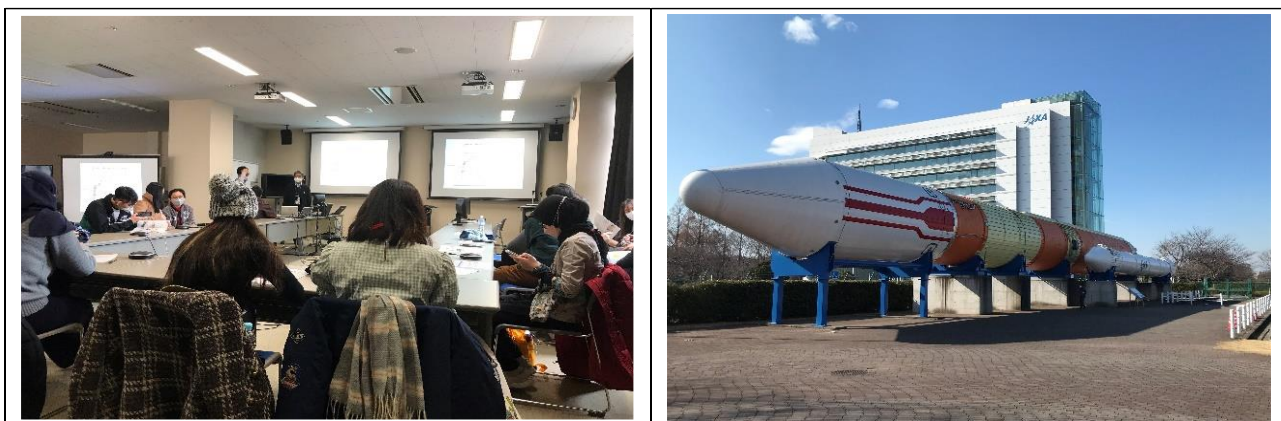
Before joining the Sakura Project, I was full of anxiety. I had never participated in such an English project before and I was not confident in my English at all. So to be honest, I regretted a little bit about joining this project. However, this project has changed my mind.

My pair was Tran Minh Y, an international student from Vietnam. She was very smart and asked many questions to the research students in the lab to deepen her knowledge. She was also a person who clearly expressed her opinions, so we had very meaningful discussions about the results of experiments and presentations. She also seemed to be used to giving presentations and was very good at making slides. On the other hand, I was not used to giving presentations, so without her, our presentations would not have been successful. Thank you so much Minh!

As for the lab activities, our pair participated in an immunology lab activity. The research we conducted this time was very difficult for me and I had a hard time understanding the contents, but thanks to the careful instruction given to us by the research students, we succeeded in our research. Through this research, I was very happy to have gained knowledge and experience in immunology and the use of flow cytometry and other equipment used in actual research, which I would not have been able to gain in my usual classes and experiments. Once again, I would like to thank Professor Shibuya and all the research students who provided us with a variety of guidance.

During the past week, we had various exchanges with international students. First, regarding meals, we ate Japanese food together such as sushi, yakitori, tonkatsu, and ramen (although ramen is not Japanese food). At first, they seemed to be confused about how they looked and how to eat them, but when they tried them, they seemed very satisfied with the food. Next, as for activities, we went shopping at iias Tsukuba with Vietnamese students. I was very surprised to see that each student spent tens of thousands of yen.

On the 23rd, we went to visit the Proton Beam Center in the University of Tsukuba Hospital in the morning. Here we started with a lecture on proton therapy and then looked around the actual proton therapy site and machines. For me, I was very excited to see this proton therapy with my own eyes because I had not had this proton therapy only in class. In the afternoon, we went to visit JAXA. Here we looked around the building while listening to explanations of the facilities and exhibits within JAXA. I had a slight interest in space, so the JAXA tour was a lot of fun. The photo on the left shows a lecture at the Proton Beam Center, and the photo on the right shows a JAXA rocket.



Finally, I am very happy to have participated in the Sakura Project. As I mentioned in the beginning, I was full of anxiety before participating in this project, but despite my anxiety, I was able to gain various experiences through this project, such as improvement of my English, knowledge of immunology, and presentation skills. I was also able to build new relationships through interaction with people from overseas and cooperation with other Japanese students. It was a very hard schedule, but I was more than happy to have succeeded in this project. I can only thank the teachers for giving me such a precious opportunity. Thank you so much! I hope that all the participants of this project will make the most of this experience and move in a better direction in the future.

ありがとうございました！

By Yuan-Fang Cheng, National Cheng Kung University (Medicine)

This year, I am selected as one of the Taiwanese invitees of “Sakura Science Program”. The following are the two main parts of this program: Laboratory experiments and cultural exchange.

First, my partner from University of Tsukuba, Tanabe Moeko, and I visited Prof. Yanagisawa Hiromi’s laboratory in TARA center in University of Tsukuba. Professor’s research focuses on thoracic aorta aneurysm and dissection (TAAD). The aortic wall consists of three layers: tunica externa, tunica media, and tunica intima. Aortic dissection is an acute process of a tear in the aortic wall that allows the bloodstream flows into the aortic layer and forces the intima and media layer apart. There are multiple risk factors in TAD, including chronic hypertension, atherosclerosis, history of heart or aortic surgery, aortic bicuspid valve, and genetic disorders. During the time we spent in the laboratory, we learned experimental techniques and tested the relation between gene A mutation and thoracic aorta dissection (TAD). We did genotyping, mouse dissection, sectioning of the frozen tissue, and H&E staining. According to our results, gene A mutant homozygous mice showed an aortic dissection phenotype. On the last day, we gave a presentation in front of all the participants to present what we have done within four days in the laboratory.



Fig. 1 Western blot experiment



Fig. 2 Cryostat



Fig. 3 Mouse dissection

On the day we first met Prof. Yanagisawa Hiromi, she greeted us kindly and gave each of us the printed schedule of what we were going to do in the following days. The lab members in charge of teaching us devoted much time and effort. Whenever we encountered any problem regarding the experiments or presentation, they are always willing to help us, and I could not appreciate it more. I have never done so many experiments within only a few days before in Taiwan. I really treasured this opportunity to go through each experimental step by myself instead of just standing aside watching. Besides, all the lab members are hospitable to us. On the third day after our arrival, they held a welcome party for me and Moeko in a Japanese restaurant. It was so nice and cheerful to have self-cooked Japanese traditional dishes, okonomiyaki and monjayaki, together. Since most of the members are from other countries, all of them can speak English well. I am very thankful for everything the professor and lab members had done for us.



Fig. 4 Lab welcome party

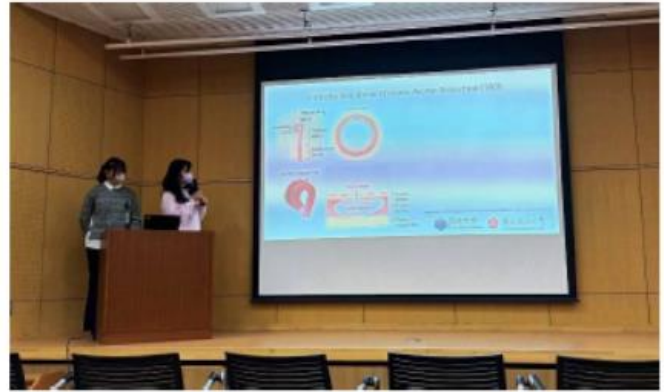


Fig. 5 Final presentation

Second, in addition to laboratory experiments, we visited the proton beam therapy center in UT hospital and JAXA (Japan Aerospace Exploration Agency). University of Tsukuba hospital is famous for its cutting-edge development of proton beam therapy, and JAXA is a core agency to support the overall aerospace development in Japan.



Fig. 6, 7 Proton beam therapy center in UT hospital

During the time we stayed in Japan we had a great time interacting with our partners from University of Tsukuba and learning more about Japanese culture. The three Tsukuba students, Sora, Haruka and Moeko, treated us so well that they are just like close friends to us. Although we spent most of the time in the laboratory, thanks to them, we were able to try various delicious Japanese cuisine, visit Asakusa and Shibuya for sight-seeing, and enjoy a joyful karaoke night.



Fig. 8, 9, 10 Shibuya and Asakusa

In conclusion, I would like to thank all the people that had kindly provided their support for this program. After coming back to Taiwan, I shared my experiences with many classmates, senior students and junior students and highly recommended this program to them. I sincerely hope that this program can continue supporting overseas young students to contribute to innovation in science and technology in the future.



Fig. 11, 12, 13, 14 Group photos

By Indira Laksmi Maharani, University of Indonesia (Medicine)

I haven't been outside of my country for the last 13 years, and being abroad, alone, for a week, as a starter, really made me anxious. As someone who started their college years during the pandemic, I have only a few prior experiences in laboratory work. It made me worry even more about how I will perform in Japan. But those thoughts disappeared once I met the other delegates from Indonesia and the welcoming Japanese partners. They were so friendly that I instantly forgot that I was nervous before. My partner, Akari, was also very kind and considerate. She asked about my food restrictions and helped me read Japanese ingredients in convenience stores. I thank Akari so much for helping me during my visit.

On the first day, we were greeted by the committee and sent to our assigned laboratories. Akari and I were assigned to Haematology Laboratory with Sakata- sensei as my supervisor. I have been interested in cancer topics for a long time, so I found the research project there exciting. Nhan-san and Chihiro-san, researchers in the Haematology Laboratory, guided Akari and me. They taught us about the research project from scratch, and their explanation piqued my interest in research and critical thinking. We were allowed to do immunofluorescence staining in tumor cells under the guidance of Nhan-san. The process was long; it took around 310 minutes to finish. Yet, it was satisfying to see the results under the microscope. We saw CD8+ cells stained by special staining immunoglobulins and TOX genes inside of the exhausted CD8+ T cells. Nhan-san highlighted that this diagnosis technique is prominent in cancer diagnosis because it is particular to one gene. That explanation inspired me to contribute more to the cancer diagnosis method that still has a lot of potentials. On the last day, we presented our results, and that experience boosted my confidence in scientific presentations. It is an honor for me to be able to research in this laboratory and deliver the results of our research. Other than that, we also tried DNA extracting, a research experiment conducted by Chihiro-san. Unfortunately, it was only a side project for us, so we did not see the results. Yet, I learned a lot from our short encounter with Chihiro-san, from the purpose of this research to insights as fellow researchers. This research experience ignites my spirit to encourage research in Indonesia since research in Indonesia still needs to be addressed, either by students or the government.

Besides research, this program provides many activities, such as a culinary tour of various Japanese restaurants, a hospital tour, and The Japanese Aerospace Exploration Agency (JAXA) tour. The Indonesian delegates' partners always take us to different Japanese restaurants with affordable prices, such as soba, tsukemen, miso, ramen, and sushi. I like ramen the most for its warmth because Japan was so cold when I was there. The hospital tour was also a fascinating experience because we saw some sophisticated technology with patient comfort as their top priority. I have never heard of proton therapy before. When I saw how Japanese technologies consider patients' comfort the most, such as children's sense of safety from treatment, I was so moved that I almost shed a tear. I hope Indonesia's future leaders, including myself, will be able to make those kinds of technology. The abundance of inspiration did not stop on proton therapy as we continued our journey to JAXA. As long as I know, observing outer space is an astronaut's only job. My perspective was broadened when I learned that astronauts are conducting medical experiments outside the earth to see potential therapies, which made my jaw drop. Ultimately, that day was a day that I got inspired and enlightened by abundant knowledge.

Throughout my trip, I learned much, even outside the activities provided. Walking in the Tsukuba campus area made me think a lot about Japan's different environments compared with Indonesia, such as proper pavements, healthier lifestyles by walking to campus, and safer public spaces. Moreover, spring's breeze made me experience the coldest temperature my entire life: – 5 degrees Celcius. It was indeed a place for me to adapt mentally and physically. I also read that Tsukuba is Japan's program for making a research city. It would be awesome if Indonesia had a research city, too. I contemplated how I could apply Japan's positive culture to Indonesia and wish to change my beloved country.

I want to thank everyone involved in this project, such as the University of Tsukuba and the Sakura Science Exchange Program. Due to their generosity, my dream to travel to my dream destinations and learn their dream job can come true. I will never forget everything I experienced in that precious one week.



By Ung Dang Hong Ngoc, University of Science (Biology)

I have long been an admirer of the human brain, an incredible three-pound package of tissue that creates and shapes all of our emotions and behaviors. Thus, I have a passion for the study of the brain — neuroscience. Neuroscience, however, is not a popular field of study, and there is barely any research on neuroscience or neuroscience laboratories here in my country, Vietnam. Therefore, when I got the chance to participate in the SAKURA Science Exchange Program 2023 and join the lab of Professor Masashi Yanagisawa, I was extremely blissful. Throughout the entire trip, I was utterly and completely in awe of almost everything: the nature, the weather and climate, the culture and people, the laboratory training sessions, the advanced technologies and equipment, and even the traffic condition in Japan.

Firstly, the laboratory training sessions were super intense and exciting. The general research topic that I was assigned was “Assessment of mouse’s sleep-wake behavior and memory through optogenetics”. I only read about optogenetics through papers and articles before and have never had the chance to carry out an experiment using that technique. Our supervisor for this research topic was Professor Deependra Kumar, who specialized in neuroelectrophysiology. As a scientist, he is brilliant, meticulous, and conscientious. As our instructor, he is extremely kind and patient toward young minds. The research question that he gave us was “Can sleep wave stimulation boost memory?”. And to find a potential answer to that fascinating question, what we did was optogenetic manipulation of cholinergic neurons in the medial septum of mice’s brains during REM sleep to activate theta waves and see if stimulating theta waves strengthens fear memory in mice. Just solely on the first day in the lab, we already learned a plethora of things: from designing electrodes for measuring EMG and EEG signals, designing optic fiber to transmit light, to performing surgeries on the mice’s brains for implantation. The surgery was extremely exhilarating and also terrifying at the same time since I have never got the chance to perform a brain surgery on a mouse before! Moving on to our second day, we learned how to manipulate the activity of neurons using optogenetics, and test for the memory of mice using the fear conditioning paradigm. On our third day, we learned how to analyze the memory data and received surprising results that exceeded our expectations. On our final day, we tried to spend some time learning a little bit more about the process of sleep scoring. Professor Deependra had a lot of other plans for us but since our time is very limited, we could not carry out more experiments. Besides the experiments that we did with Professor Deependra, we also joined a journal club on the second day and I got to meet Professor Masashi Yanagisawa for the first time. He is intelligent, wise, erudite, and he asked a lot of great scientific questions during the journal club. I look up to him and I am aspired to be a brilliant scientist like him, one day.

During this program, my assigned partner, my teammate, was Ryusei Kagawa. He was such a smart and kind person. He introduced to me a lot about the culture and cuisine of Japan. I have a very bad spatial memory and I am very bad at finding directions, therefore, every morning and every night, we walked to the WPI-IIIS building and returned to the guest house together. Other students from the University of Tsukuba that are partners of Vietnamese students are also very sweet and kind: Sayako, Somi, Risa, and Nei. When we have free time, they took us shopping and took us to Japanese restaurants to explore and try out new Japanese foods: ramen, sushi, sashimi,

okonomiyaki, etc. Among all of the foods and drinks that I tried, my favorite of all time was okonomiyaki and Starbucks sakura soy latte. In addition, the place that we stayed in, the Global Guest house, was very cozy and convenient. The night before the final presentation, all of the Vietnamese students and the partner students from Tsukuba University all gathered in one room to prepare and practice for the presentation together. That night was such a lovely night filled with happy memories! It has been a couple of days since we came back to our home country, Vietnam, and we already missed them, the Tsukuba students. Aside from the happy memories that we spent with the Tsukuba students, we also met and connected with international students from Taiwan and Indonesia. They are such smart and awesome people!

The nature in Tsukuba, Ibaraki, was mesmerizing. Every morning, on the way to our lab, we took some time to observe and admire the beauty in simple little things such as the ombre shades of trees, the wildflowers and weeds, the convoluted patterns of pines falling on to the ground, and even the black mysterious crows. Moreover, we got to experience the extremely cold weather in Tsukuba, and it adds a whole new dimension to our experience throughout this trip. In my country, in the south of Vietnam where I came from, we only have 2 seasons which are dry and wet seasons, and the temperature is hot all year long. Therefore, I was thrilled to bits when I got to enjoy the cold weather in Tsukuba. Additionally, the traffic situation here is so great, the cars always patiently wait for us to pass the street, which is opposite to where I came from.

On the last day before our departure, Professor Ohbayashi spent his precious time taking us to go sightseeing in Tokyo. We went to Asakusa temple, the Tokyo skytree, the golden poo, and the Shibuya streets. Tokyo, crowded and bustling, is the opposite of Tsukuba, quiet and peaceful. I do love and cherish the differences and the beauty in both.

Before ending, I want to express my gratitude towards Professor Ohbayashi, Miss Cohen, and all of the organizers of this program. Thank you for all of your time and support.

No amount of words could encapsulate my feelings and experience throughout this whole journey. Tsukuba, Japan, you have my heart!

Undergraduate Medical Science Course in Tsukuba 2020

Aya Fukuda, Kazuya Morikawa, Kiong Ho, Norihiro Ohbayashi,
Keiko Ookawa-Chinzei, Yukari Okita, Thomas Mayers,
Makiko Takahashi, Tomoko Katsumata, Kayoko Morishita, and Koji Hisatake

* 2020 年に実施した SAKURA program の報告です

The 6th Undergraduate Medical Science Course was held in Tsukuba from February 16 to 22, 2020. We invited 17 foreign students from some of our partner universities in Indonesia, Vietnam, and Taiwan.

Participants:

University of Indonesia (Medicine):	2 students
University of Indonesia (Pharmacy):	4 students
National Taiwan University (Clinical Laboratory Sciences and Medical Biotechnology):	2 students
National Cheng Kung University (Medicine):	1 student
National Cheng Kung University (Medical Laboratory Science and Biotechnology):	1 student
University of Medicine and Pharmacy at HCMC(Medicine):	2 students
University of Medicine and Pharmacy at HCMC (Pharmacy):	1 student
University of Science HCMC (Biotechnology):	2 students
International University, VNU HCMC (Biotechnology):	2 students
University of Tsukuba (School of Medical Sciences):	7 students

This program was supported by “Japan-Asia Youth Exchange Program in Science” (SAKURA Exchange Program in Science), Japan Science and Technology Agency (JST). <http://ssp.jst.go.jp/EN/index.html>

Schedule

	Date	AM/PM	Schedule
Day 1	Feb. 16 (Sun)	PM	arrival (Narita -> Tsukuba) Ichinoya short stay house: check in 19:30~ Welcome dinner
Day 2	Feb. 17 (Mon)	AM	9:30~ Orientation (Igaku Gakkei bld, Room 483) (course introduction, self introduction etc.)
		PM	Laboratory Experiments
Day 3	Feb. 18 (Tue)	AM	Laboratory Experiments
		PM	Laboratory Experiments
Day 4	Feb. 19 (Wed)	AM	Laboratory Experiments
		PM	12:20 @ Matsumiguchi (Bus) Tsukuba Science City Tour (JAXA, NIMS) 18:00~ Proton beam therapy center (UT hospital)
Day 5	Feb. 20 (Thu)	AM	9:00~ room checking (@ dormitory) Laboratory Experiments
		PM	Laboratory Experiments (preparation for presentation)
Day 6	Feb. 21 (Fri)	AM	9:00~ Final Presentation (Health and Medical Science Innovation bld. 8th floor)
		PM	Mt. Tsukuba
Day 7	Feb. 22 (Sat)	PM	9:00~ Check out Farewell lunch (Health and Medical Science Innovation bld. Room 105) 14:00 departure (Tsukuba -> Narita)

Welcome party, Orientation, and Self-introduction



Welcome to Tsukuba !

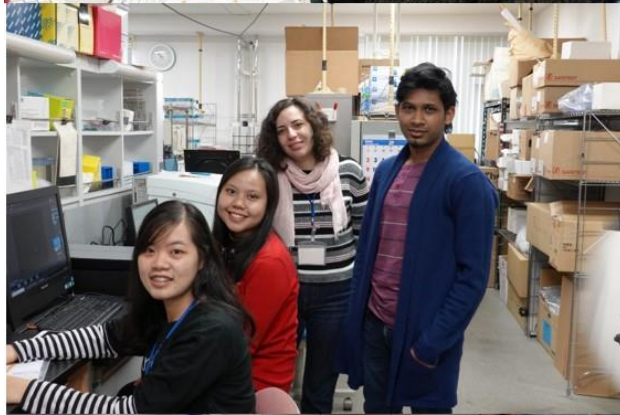
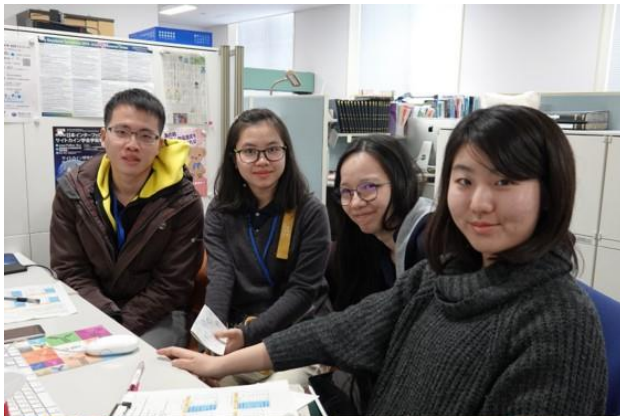


Laboratory Experiments

One Tsukuba student made a group with one or two overseas students, and each group stayed in different laboratories to have research experiences.

List of participating laboratories

	Laboratory	Supervisor	Research theme
1	Immunology	Akira Shibuya Kazuko Shibuya	Functional analysis of immune receptors
2	Internal Medicine (Endocrinology and Metabolism)	Hitoshi Shimano Yoshimi Nakagawa	Elucidation of nutrient metabolism regulation mechanism in lifestyle diseases
3	Yanagisawa/Funato Lab	Masashi Yanagisawa	Neuroscience of Sleep
4	Experimental Pathology	Mitsuyasu Kato	Role of stemless in tumorigenic cancer growth
5	Animal Science	Fumihiko Sugiyama	Bioresource development for elucidating the gamete formation mechanism
6	Molecular and Developmental Biology	Makoto Kobayashi	Evaluation of the antioxidant activities of food phytochemicals using zebrafish
7	Medical Genetics	Emiko Noguchi	Learning the basics of human genome research
8	Bacteriology (Infection biology)	Kazuya Morikawa	Molecular Biology of Pathogenic Bacteria
9	Molecular Cell Biology	Yasuyuki Suda Kenji Irie	Yeast Genetics, Molecular Biology, and Cell Biology Post-transcriptional regulation of gene expression in yeast



Tsukuba Science Tour and Hospital Visit

This program provided us an opportunity to introduce some of the research institutes in Tsukuba city, such as Japan Aerospace Exploration Agency (JAXA) and National Institute of Materials Science (NIMS). We also had a chance to visit the proton beam therapy center at University of Tsukuba hospital.



Presentation

All participants presented the results of experiments which they have done in each laboratory during this program.



Japanese Culture Tour

We went to Mt. Tsukuba to enjoy plum blossoms, and visited shrine to worship gods.



Farewell Party

We thank all of you for participating this program. We hope that we can see you again somewhere around the world!



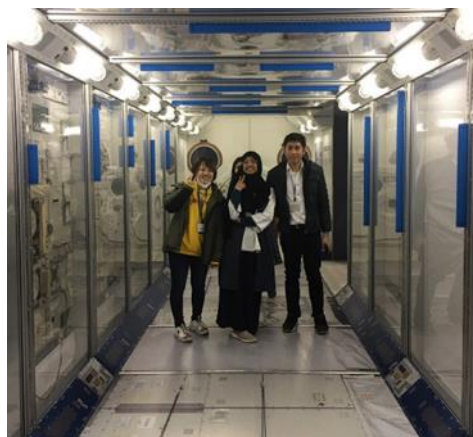
Letters from participants

By Maaya Sasaki, University of Tsukuba

It was third time for me to join such a program that we communicate with foreign in English and do experiments together. However, everything was a new discovery to me, and I could learn many things from this program.

I did a small research with Wafa from Indonesia and Thinh from Vietnam at internal medicine laboratory. We have different backgrounds, Wafa usually studies medicine, Thinh studies biotechnologies, and I am a student of medical science department. So it was good experience for me to cooperate with students from different backgrounds because I could learn different points of view to a problem. Also, I could realize my progress from last year in the point of knowledge in medical science.

When I joined this program last year, I had a difficulty in understanding about the research because I was a freshman and I had less knowledge. However, in this year, I could easily understand what and why we were doing on our experiments. So I recognized the importance of what we are learning in our daily classes. In addition, our mentors told us many things, not only they taught me how to do our experiments, but also they gave me some advices about my future plan. I really appreciate their kindness.



We had a presentation session on 6th day. On the 5th day, we got the class about how to give a good presentation. This class was very helpful to us and we tried to do many things we learned from the class in our presentation. I especially tried to make complex things easy to understand for everyone. Thanks to our efforts, our presentation was very successful, and I was very happy about that.

After our presentation, we went to Mt. Tsukuba and the shopping mall together. In Mt. Tsukuba, they have a plum festival and we enjoyed to see plum flowers and view from the mountain. I was happy to tell my friends from overseas how beautiful the Japanese natures are.



This program stimulates my motivation to the research, and it reminded me of my friend's passions I met in SAKURA program last year and summer program at HCMC. So I decided to keep on studying hard in order to be an expert of medical science treating with international issues. I hope we can work together for the progress of medicine and science in the future.

By Nguyen Nhat Thinh, International University, Vietnam National University - Ho Chi Minh City

It has been almost a month since I finished Sakura program in Tsukuba. I still cannot believe that the time flies so fast, I still feel that it was just happened yesterday. I miss all of my friends, professors, and people in Japan. I was happy to visit Japan this time since I was born in Japan and was raised in Kobe city, I was familiar with Japanese tradition and culture. Yet, I was still nervous because the environment was different from Vietnam, especially the weather. Thanks to the Japanese member, they supported me for everything throughout the program. I had no trouble from the first day in Japan until when I came back to Vietnam. (Except for the cold temperature, I am still not comfortable with Japanese winter)

I was assigned to the Internal Medicine lab of Professor Shimano. Our main purpose of the research was to elucidate the mechanism in the regulation of metabolism involving the specific gene. I was worried since the first day because I had no knowledge about endocrinology. However, my professor and mentor supported our team very kindly, and they taught us about the basic concept of their research topic. Thus, it was easy to follow up with the experiments that we had done. The research topic was interesting for me, and I have learned a lot of things from experimental skills to the tips for presentation. I also learned a lot from my teammates. They were outstanding and had a great passion for medical science.



Apart from academics, I really enjoyed the sightseeing. It was a good opportunity to feel the difference between Tsukuba and my hometown in Japan “Kobe”. Although we could not visit Tokyo due to the threat of coronavirus, I had a great experience at Mount Tsukuba. I was astonished by the beauty of cherry blossom flowers. The view from the top of the mountain was magnificent, it was better than any other place. I felt the elegance of Japanese culture when we visited the shrine. Its atmosphere was incomparable to any location in the world. The food in Tsukuba was amazing. It has now become one of my favorite food in the world.

Overall, it was one of the best experiences that I had. I am very glad that I could join this program. I am now planning to study in Japan for graduate school. The University of Tsukuba became one of my options to choose from. I still have several years to graduate from my university and I have time to brush up my knowledge and skill. I wish I could study in Tsukuba in the near future.

By Farhana Ibrahim Syuaib, University of Indonesia

Believe me, I never imagine myself being a participant of this program. I did apply in my own willing, but never believe that I'll be the one that get accepted. The day of the announcement was really surprising yet pleasing. I got the feeling that this short course will be fun. Little that I know that It's so much fun.

Traveling to Japan is a new experience for me. Gladly the program gave us a really helpful guide so we don't get lost while taking the bus. Arriving at Tsukuba bus station at night was really cold but the professor and Japanese students welcome us really warmly. They accompany us to our dormitory so we don't get loss, welcome us with a dinner feast, and help us buy breakfast for the next day.

I was placed in Medical Genetics laboratory with professor Emiko Noguchi and Hiromu Tanaka as the lab assistant. Really glad can be part of the laboratory researcher even though for only a while. I was placed there with Tran Le Mai Tram from Vietnam and Kyoka Katabami from Japan. I learned various method of sequencing there. The class started with a short lecture from Noguchi sensei and the laboratory class that was assisted by Hiromu-san.

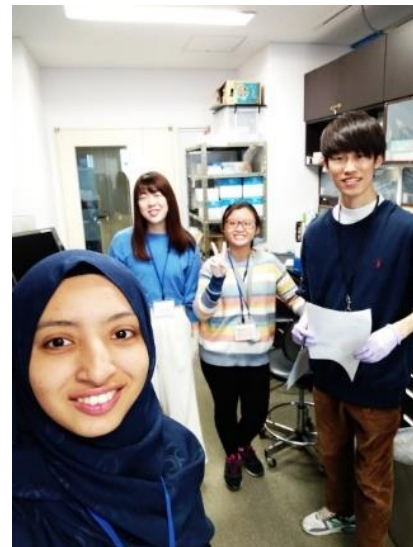
The fun part was that I can learn new method of sequencing and try it in the laboratory. There are variety of machines that I never seen before in my university. Even though I tend to do mistake in the lab, I'm really glad that those mistakes make me able to learn new things. Both of my friends helped me a lot in the class. When we were waiting for the PCR

mixture, we will exchange story about our university and talk about ourselves. There's also a time where Hiromu-san perform his magic trick in front of us and it was really magical!

Noguchi sensei is a really nice teacher. None of us are english native yet she kept the explanation as simple as possible so it was easy to understand. She always insert illustrations so we can imagine better. When lunch time come, she will invite us to eat together to a delicious restaurant. I have couple of food restrictions yet she always make sure that I can eat food in that place.

Tsukuba city is not as crowded as the city where I life, Jakarta. A lot of students use bikes instead of private transportation which is good for the environment. There are a spacious distance between each building and also a huge parking lot, even in convenience store. The best part is there are varieties of ice creams in Japan that make me can't stop from buying! Each day I always make sure to taste different ice cream so I won't regret when coming back home.

I also went to research center which is really amazing. There are abundant competent researchers from around



the world that is studying or working there. A great amount of research has been done and a lot more research that is undergoing. I also went to the mountain to see Japanese Temple and plum tree. It was really beautiful.

During the whole program Professors and Japanese Students really help me a lot in adapting. They always make sure that I am comfortable. Every Time I got confused with the language, they help me to understand. They also help me a lot in finding halal food yet still have Japanese taste in it.

It is clearly a great program to be followed. Even though I have a pile of assignments because skipping class for a whole week, I still don't regret joining the program. It give me a lot of insight and amplified my interest in research. Really thankful for the whole experience that has been given by the whole committee.

By Chen, Ting-An, National Taiwan University

It was such a great honor to be invited to the 2020 SAKURA Program. Upon our arrival, we were greeted with heart-warming Washoku. Maybe it's because of the unfamiliarity or the Washoku is too delicious, everyone sitting around me were savoring the meal quietly. However, as the night went on, we started to share our stories with each other which marked the beginning of wonderful friendships. I still remember what a great first night it was that I couldn't wait to beginning my journey in Tsukuba University.

The laboratory course was productive and invaluable. In Professor SUGIYAMA Fumihiko's Laboratory there is a broad spectrum of research topics associated with Animal Science, therefore I was very excited to know what our research topic is before coming into the lab. On our first day, professor Mizuno Seiya clearly explained that our goal is to test if Amh-Cre mouse specifically express Cre enzyme in the testis sertoli cells, in order to study gene X function in testis. Although the technique used in our experiments are simply PCR and Sanger sequencing (giving that we only have less than a week to perform the experiments), designing a logical experiment for the research aim is challenging. I have learned a lot from this experience thanks to Professor Mizuno Seiya's encouragement, guiding my lambastes and I throughout a fruitful discussion. In addition to the experiments, the Animal Science Laboratory held a welcoming poster party for us. Not only did we enjoyed homemade Japanese cuisine oden, but we also had the chance to know each lab members better. Everyone in the lab gave a presentation on their research interests, including us! It was a challenge to give a presentation in front of so many seniors and animal science experts. Some of the questions asked by them are crucial but my lambastes and I have never thought of. Through this experience, I feel like I have strengthen my logical thinking, and become a more courageous scientist. The final presentation given on the auditorium stage seems less intimidating afterward.

Not only did I had a productive laboratory experience, I also had a wonderful cultural immersion during my stay in Japan. Lots of love and thanks to my labmate Ms. Yuka Murakami and the Japanese attendees Mr. Sosuke Doi, Mr. Reon Yahatabara, Ms. Minori Isaka, Ms. Yuna Oikawa and so on. It was very kind of them to teach me Japanese and show me the sides of Japan from the natives' perspective. We had such a great time after lab hours, trying out delicious perch soup ramen, making our own Okonomiyaki and even having sake at the Izakaya.

During these days, my lambastes Ms. Yuka Murakami, Mr. Minh Dat and I couldn't stop chatting about life and interesting cultural differences between Japan, Vietnam and Taiwan. I feel like I have created very special bonds between us and this is the friendship that I will cherish forever.

Thanks to the attentive arrangement of the organizers I had a deeper understanding of the Tsukuba science city by visiting JAXA and NIMS. Before coming to Japan I was worried about the COVID-19 outbreak, but the organizer respond promptly to the situation by canceling our trip to Tokyo. It was a reassuring and courageous act



to take. Instead of Tokyo we went to Tsukuba mountain. Luckily it was the plum blossom season so we get to enjoy the beautiful scenery. Visiting the Tsukuba mountain shrine was a special experience to me, since I got a great blessing (大吉) Omikuji! Trough these pleasant experiences, I discovered that Japan was not only a tidy, polite country, the people here are also very kind and friendly. Thanks for the 2020 SAKURA Program, I had the opportunity to communicate with students from Japan, Vietnam and Indonesia. If given the chance, I will definitely visit Japan in the future.

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