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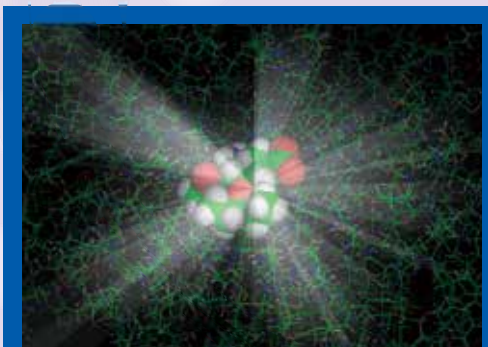
Oseltamivir in complex with Influenza B Neuraminidase

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EDITORIAL

7巻1号をお届けします。新しいプログラムとプロジェクトが始まり、今号ではアフリカからの投稿もあり、充実し、36ページとボリュームも増えました。本号記載のADCの事業は下記になります。

【研究プロジェクト、感染症制御研究】

1）研究ブランディング事業：パンデミック感染症の短時間で病原体を解析特定するプログラムは、倫理委員会の承認が得られ（帝倫19－214号, 2019.12.3付）、ベトナムとの共同研究を通じて遺伝子解析がスタートしました。

2）医学研究科大学院　国際感染症・危機管理学：医学博士の輩出

（1）国費留学生2人目となるTran Huu Dat君の学位授与式が2019年9月17日（火）、帝京大学板橋キャンパスで挙行されました。帰国後、ベトナム国立小児病院（ハノイ）SCIUにて活躍中です。（p.7参照）

（2）新大学院生：ベトナム国立小児病院感染症科医師 Ngo Thi Huongさん（写真中央）が、帝京大学大学院医学研究科博士課程に入学しました。（2019.10.1付）

New PhD Student: Ngo Thi Huong

【先端総合研究機構】

「第2回帝京大学研究交流シンポジウム」が開催され、ADC研では9題のポスターを発表しました。（p.7参照）

【アジア諸国医療機関との研究交流】

1）2019年度医学部5年生「ベトナム感染症実習」6名（4期生）が参加（p.8～参照）

2）医学部6年生の海外BSC：2019年度2名（2期生）：笠井健司君（米国ボストン）、長久大介君（英国ケンブリッジ）が研修終了、2020年度（3期生）より1名30万円奨学金：2名応募（審査中）

3）「さくらサイエンスプラン」JSTのプログラム（4期生）（p.15～参照）

【Stem Cell Therapy Consortium：SCTC】

ステムセル治療コンソーシアムがADC研のブランチとして2019年7月1日に発足し、いよいよ本格的に稼働の準備が始まる。基礎研究を進め、臨床試験を準備中で、先端総合研究機構とも連携を予定。また米国NIH/NICHD Dr. Keiko Ozatoおよびベトナム Vinmec国際病院附属研究所長Liem教授（元、国立小児病院長）とも共同研究。この再生医療は脳性麻痺患者の自家骨髄細胞を培養せずに髄腔内投与する方法で、Liem教授が70例に施行され有意な結果を論文報告しています。

We are pleased to issue ADC Letter Volume 7 No. 1. New programs and projects have been started. We also have various ongoing studies. Particularly, collaboration with investigators in not only Southeast Asia, the United States, and European countries has been active too.

The followings are ongoing studies in the ADC:

【Research projects: infectious disease control study】

1) Research of Blanding: Study on the pathogens of the pandemic infectious disease to be able to do gene analysis through collaborative investigation with Vietnam is in progress.

2) Medical graduate student fourth grader, Dr. Tran Huu Dat: Acceptance of his research article in Journal Antibiotics, and patent application are accomplished, then he obtained his thesis, following Nguyen Thuy of last September.

【Advanced Research General Institute Organization】

The 2nd symposium for research communication will be held on August 27, 2019.

【Exchange program with medical institution in the Asian countries】

1) Six students from medical department fifth grade experienced “Vietnam infectious disease training 2019: 4th period”. Six students visited National Children’s Hospital (NCH), Hanoi Medical University, the public health center of the Hanoi suburbs from August 18 to 25th, 2019.

2) Overseas BSC of the sixth grade Medical Student 2019 (2nd period): Kenji Kasai (Boston, USA), Daisuke Chokyu (Cambridge, UK). 2020 (3rd period): Scholarship was opened for all sixth grade students, and then high rank three students will be accepted.

3) Training program in Teikyo University “Sakura Science Plan 2019: 4th period” from Monday, October 28 to Wednesday, November 6: programs categories are “Safety management”, “infection control”, “crisis control”, “simulation.”

【Stem Cell Therapy Consortium】

SCTC Branch in ADC in ADC was established on Jun. 1st, 2019. A plan for basic sciences has been prepared, followed by a clinical trial associated with the “Advanced Research General Institute Organization”. This project plan has been in collaboration with Dr. Keiko Ozato in NIH/NICHD, USA and Prof. Nguyen Liem in the Vietnamese Vinmec Research Institute of Stem Cell and Gene Technology, Hanoi.

編集長：鈴木和男 Editor-in-Chief : Kazuo Suzuki, Director　　**事務局：伊藤吹夕** Editorial Office : Fuyu Ito, Ph.D.

表紙写真：B型インフルエンザではA型に比べてタミフル等のノイラミニダーゼ阻害剤への耐性が頻繁に報告されている。図は、B型インフルエンザウイルス由来のノイラミニダーゼにタミフルが結合した状態の構造である。加藤有介先生（徳島大）ご提供。

第28回日本バイオイメージング学会／第 6 回国際バイオイメージングシンポジウム

September 21-23, 2019

日本バイオイメージング学会では、2019年 9 月21日～23日、帝京大学板橋キャンパスにて、帝京大学薬学部 鈴木 亮先生を大会長に第28回日本バイオイメージング学会／第 6 回国際バイオイメージングシンポジウムを開催した（詳細については、以下のReportを参照）。今回も鈴木 亮先生やスタッフの方々、運営委員や参加者の皆様の協力により、数多くのバイオイメージングに関する最先端の技術や研究成果の発表があり、大変刺激を受けた 3 日間となった。

The 28th Annual Meeting of Bioimaging Society - the 6th International Symposium for Bioimaging (ISB). The meeting and symposium were held by Char Prof. Ryo Suzuki, Teikyo University, Pharmaceutical Sciences in Teikyo University below.

Prof. Kazuo Suzuki and Prof. Paul Matsudaira

【加賀サイエンスルート：プロローグ】

帝京大学のある「板橋区加賀」は加賀藩松平家の江戸下屋敷があったところ。

加賀藩：松平家の家系のProf. Paul Matsudairaとは、2012年第21回日本バイオイメージング学会と併催の第 4 回国際バイオイメージングシンポジウム（京都）で交流が始まり、2017年に第 5 回国際シンポジウムがProf. Paulのオーガナイズでシンガポールで開催され、今年 9 月に帝京大学にて第 6 回開催（大会長：鈴木 亮先生）につながっている。次号から「加賀サイエンスルート」の連載を開始予定。

【Kaga Story for Science Roots】

Matsudaira Family of Kaga Domain located at Kaga town in Itabashi-ku in Edo Era. Prof. Paul Matsudaira, who is a descendant of the family, presented his work in the 4th ISB in Kyoto and also organized the 5th ISB in Singapore in 2017. This time, he was a co-organizer with Prof. R. Suzuki, Teikyo University.

“Report of the 6th International Symposium on Bioimaging”

September 21-23, 2019

大会長：鈴木　亮、事務局長：小俣大樹（帝京大学薬学部）

2019年 9 月21日（土）～23日（月）にThe 6th International Symposium on Bioimagingを第28回日本バイオイメージング学会学術集会とのジョイントで帝京大学板橋キャンパスにて開催しました。本大会には、171名（海外から13名含む）の方々に参加をいただき、盛況で終了いたしました（写真 1 ）。本大会の主催は日本バイオイメージング学会で、共催は帝京大学およびシンガポール大学（National University of Singapore: NUS), Mechanobiology Institute（MBI）で開催いたしました。帝京大学およびNUSには、会場のご提供や演者の派遣など多大なるご協力を賜りましたこと、衷心より感謝申し上げます。また、本大会開催にあたりまして、多くの皆様にご協力いただきましたことを心よりお礼申し上げます。

本大会は、「Leading to the Future with Bioimaging（バイオイメージングで未来を拓く）」をテーマに、様々な研究分野で利用されているバイオイメージングに関する最先端の研究を発表していただきました。特別講演 1 では、ADC研所長の鈴木和男先生に座長をお務めいただきまして、NUS MBIのPaul Matsudaira 教授から「Imaging the Mechanics of Early Zebrafish Development」と題し、個体発生におけるメカニズム解析についてご講演をいただきました。また、特別講演 2 では、日本バイオイメージング学会会長（東京大学）船津高志先生に座長をお務めいただき、帝京大学薬学部の丸山一雄教授から「Ultrasound Theranostics (Imaging and Therapy)」と題し、医薬分野における超音波を利用した診断・治療システム構築に関するご講演をいただきました。研究の背景から最新の研究成果まで、研究分野の異なる参加者にもわかりやすくお話いただきました。ご講演終了後には、専門分野を超えた多角度の質問があり、ディスカッションの時間が足りなくなってしまうほど活発な議論が行われました。このほか、招待講演として「Women in Science」、「The Joint Session with Japanese Society for Molecular Imaging」、「Bioimaging Technologies from Benchtop to Clinic」、「Cutting Edge Technologies for Bioimaginig」、「The Joint Session on Bioimaginig between Singapore and Japan」、「Bioimaginig in Drug Deliver Research」、「Bioimaginig in Brain Science」、「Frontiers in Plant and Food Imaging」の 8 つのシンポジウム、日本バイオイメージング学会奨励賞受賞講演（東北大学・小和田俊行先生）、ランチョンセミナー（帝京大学・川戸佳先生）を開催いたしました。27名の招待演者から各分野での最先端の研究成果や今後の展望についてご講演いただきました。この中で、通常の研究シンポジウムと異なる内容で企画させていただいたのが、「Women in Science」です。本セッションでは、シンガポール大学、トロント大学、東京大学から、第一線で研究を精力的に進められている女性研究者をお招きし、最先端のバイオイメージング研究の成果についてご紹介いただきました。また、本学の女性医師・研究者支援センターにもご協力いただき、日本、シンガポールおよびカナダにおけるダイバーシティー研究環境実現に向けた課題などを議論しました。本セッションの詳細に関しては、座長をお務めいただきました洲崎悦子先生が執筆された報告を参照いただければと思います。

写真１：大会の様子


大会長挨拶


Plenary lecture 1 (Dr. Matsudaira)

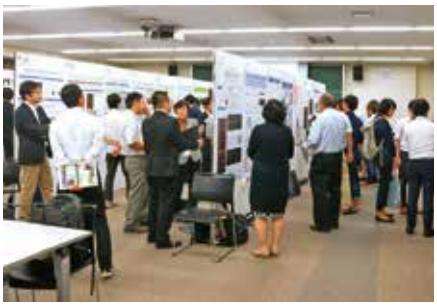

Plenary lecture 2（丸山先生）


質問風景:Dr. Klibanov (University of Virginia)


質問風景：鈴木和男先生（ADC研所長）


講演会場風景


授賞式風景：左から大会長、小俣先生（事務局長）、荒井氏（オリンパス）


ポスター会場風景

本大会では、47件のポスター演題があり、このポスター発表者から参加者全員投票により、以下の優秀発表者賞が選考されました。

・ベストイメージ賞（HAMAMATSU Award）澁谷仁寿さん（理化学研究所）
・ベストイメージング賞（OLYMPUS Award）小俣大樹さん（帝京大学薬学部）
・ベストイメージング賞（NIKON Award）田邉瑠里子さん（長浜バイオ大学）
・ベストイメージング賞（Carl Zeiss Award）三谷智樹さん（理化学研究所）
・ベストイメージング賞（Bioimaging 2019 Award）公文優花さん（名古屋大学大学院工学研究科）

本大会では多くの参加者の皆様から活発に建設的なご議論をいただき、異分野国際交流ならびにバイオイメージングの未来を語ることができました。また、懇親会にも多くの皆様にご参加いただきまして、和やかな雰囲気で国際交流ができたものと考えております（写真２）。本大会を通じ、バイオイメージング技術が様々な研究分野の発展につながればと願っております。

本大会の一部は、科学研究費助成事業 研究成果公開発表（C）（19HP0304）、加藤記念バイオサイエンス振興財団、永井記念薬学国際交流財団、テルモ生命科学振興財団の助成を受けました。

Chair: Ryo Suzuki, Secretary general: Daiki Omata (Teikyo University, Faculty of Pharma-Science)

The 6th International Symposium on Bioimaging was held at Teikyo University (Itabashi campus) on September 21-23, 2019. This symposium was co-hosted with the 28th Annual meeting of Bioimaging Society. Organizer was Bioimaging Society and co-organizers were Teikyo University and National University of Singapore (NUS), Mechanobiology Institute (MBI). The main theme was “Leading to the Future with Bioimaging”. We discussed about the future of Bioimaging technologies and their applications. In this symposium, there were two plenary lectures (Dr. Matsudaira (NUS), Dr. Maruyama (Teikyo Univ.)), 8 sessions, Young Researcher Award lecture (Dr. Kowada (Tohoku Univ.)), Luncheon seminar (Dr. Kawato (Teikyo Univ.)) and 47 poster presentations. Total attendees were 171 who were from domestic and foreign affiliations. In all sessions and poster presentations, we could actively discuss and build a good relationship with the researchers who were from various backgrounds.

写真２：懇親会風景


日本バイオイメージング学会会長（船津先生）ご挨拶


左から橋本先生（千葉工業大学）、Dr. Isabelle（University of Tronto）、洲崎先生（就実大学）


歓談風景

The 6th International Symposium on Bioimaging における”Women in Science”を終えて

日本バイオイメージング学会男女共同参画委員会：洲崎 悦子[1]、田中 直子[2]、橋本 香保子[3]、朽津 和幸[4]、樋口 ゆり子[5]、加藤 有介[6]

The 6th International Symposium on Bioimaging 大会長：鈴木　亮[7]

帝京大学女性医師・研究者支援センター室長：金子 希代子[7, 8]

[1]就実大学薬学部; [2]大妻女子大学家政学部; [3]千葉工業大学先進工学部; [4]東京理科大学理工学部; [5]京都大学大学院薬学研究科; [6]徳島大学先端酵素学研究所; [7]帝京大学薬学部; [8]帝京大学女性医師・研究者支援センター

“Women in Science” session at The 6th International Symposium on Bioimaging

Gender Equality Committee in the Bioimaging Society (Etsuko Suzaki, Shujitsu Univ.; Kazuyuki Kuchitsu, Tokyo Univ. of Sci.; Naoko Iida-Tanaka, Otsuma Women’s Univ.; Kahoko Hashimoto, Chiba Inst. of Tech.; Yuriko Higuchi, Kyoto Univ.; Yusuke Kato, Tokushima Univ.)
Chair, The 6th International Symposium on Bioimaging (Ryo Suzuki, Teikyo Univ.)
Director, Teikyo University Support Center for Women Physicians and Researchers (Kiyoko Kaneko, Teikyo Univ.)

“Women in Science” session was held on September 21st at The 6th International Symposium on Bioimaging. The first “Women in Science” took place at The 5th International Symposium in Singapore two years ago. It is a great honor for this second session to be held in Japan as the first symposium after the Opening Remarks. Taking advantage of the location that Teikyo University has Support Center for Women Physicians and Researchers, Dr. Kaneko, the director of the center, gave a lecture introducing its activities as S1-1. The other three presenters were Dr Kamiya (S1-2) from The Univ. of Tokyo, Dr. Lok (S1-3) from Duke-National Univ. of Singapore Med. Sch. and Dr. Aubert (S1-4) from Univ. of Toronto, Canada. These four speakers from various fields are all the top scientists in their fields and showed us the latest exciting results. Through the session, all of us gained new information and emotions for our future researches, and these excellent role models would cheer for young female scientists getting some hints to promote their carrier.

去る令和元（2019）年９月21日～23日に、第28回日本バイオイメージング学会学術集会とのジョイント開催として、帝京大学薬学部教授である鈴木 亮先生を大会長に、The 6th International Symposium on Bioimagingが帝京大学板橋キャンパスにおいて開催されました。この大会のスタートセッションとして“Women in Science”が行われたことは、大会長の鈴木 亮先生はじめ帝京大学女性医師・研究者支援センター長の冲永寛子先生のご理解とご協力のほか、多くの先生方のご支援とご尽力のお蔭であり、この場を借りて厚くお礼を申し上げます。

日本バイオイメージング学会男女共同参画委員会は、当時、鈴木和男先生（現、帝京大学アジア国際感染症制御研究所（ADC研）所長）が学会長であった2006年に２名の委員でスタートし、以来、学会の規模に見合った無理のない、しかし継続した活動を行ってきました。2017年５月には、鈴木和男先生や早稲田大学理工学院の石渡信一先生、National University of Singapore（NUS）のPaul Matsudaira先生のご尽力によりThe 5th International Symposium on BioimagingがSingaporeにおいて実現し、その時に初めて“Women in Science”セッションを企画・実行し、成功裡に終えることができました。今回は、第２回ということで、まずは前回のNUSとの連携を大切に継続し、かつ、帝京大学板橋キャンパスにおける男女共同参画の先進的取り組み例といえる女性医師・研究者支援センターに協力をお願いし、開催の地の利を活かした特色あるセッションにすることを目指しました。

大会開始後一番の10：00～12：00というすばらしい時間帯を頂き、４名の先生方のご講演が行われました。

S1-1　Teikyo University Support Center Activities for Women Physicians and Researchers Kiyoko Kaneko, Yoko Nakayama, Haruko Sekiya, Hiroko Okinaga from Teikyo University

S1-2　Rapid cancer imaging by rationally designed fluorescence probes Mako Kamiya, Yasuteru Urano from The University of Tokyo

S1-3　Capsid protein structure in Zika virus reveals the flavivirus assembly process Shee-Mei Lok, *et al*. from Duke-National University of Singapore Medical School

S1-4　Therapeutic strategies using image-guided focused ultrasound for neurodegeneration Isabella Aubert from University of Toronto, Canada

女性医師・研究者支援センター室長の金子希代子先生（S1-1）は、センターの6年間の活動についてご紹介下さり、センターのサポートにより託児施設が充実し、また研究支援やセミナー開催により女性研究者の科研費獲得率が倍増し、上級職の女性割合が5.2%も増加したとのことでした。大会が開催されたキャンパスに男女共同参画活動を推進する先進的センターがあることを、参加者みんなが認識し、また活動内容を情報共有できたことは非常に意義が大きく、今回のセッションならではの特色を出すことができたと思っています。

S1-2の神谷真子先生は、男女共同参画委員全員で検討して選出した若き女性研究者です。S1-3のShee-Mei Lok先生は、NUSで活躍されている女性研究者であり、前回からの継続として一緒に座長も務めて下さいました。S1-4のIsabella Aubert先生は、大会長である鈴木亮先生ご推薦の演者です。薬物送達に関する最先端の成果のみならず、お願いしていた女性研究者としての内容として、研究者の妻であり2人の娘の母というご家庭のことについてもご紹介下さり、家庭を大切にしつつ研究活動を無理なく両立しておられる様子に勇気をもらった若い研究者や学生は多かったと思います。Scientificな講演をして下さった3名の先生方のご発表は、がんを迅速にイメージングできる蛍光プローブの開発、ジカウイルスにおける核酸とカプシドの微細構造と会合様式の解明、超音波バブルを用いた薬物送達と神経の可塑性の誘導による神経変性疾患治療、と分野は様々でしたが、全員がまぎれもなく最先端で活躍中の研究者であることを示す内容で、いずれもすばらしいご講演でした。これらの先生は、非常にすばらしい研究を行っておられる研究者であり、私達が抱きがちである「女性で家庭があると、第一線での研究は難しいのではないか」というバイアスを、見事に打ち砕いて下さったと思います。

いずれもすばらしい4名の女性研究者というロールモデルを、実際に身近に知る機会を提供することができた今回の“Women in Science”は、前回と同様に意義深い会であったと思います。参加者の皆様が、女性であるから、男性であるから、というバイアスを払拭する、また、若い方々が、互いに協力して研究にも家庭にも力を注げる社会となることを考える契機となったことを確信しております。

ご講演中の先生方（左上：金子先生、右上：神谷先生、左下：Lok先生、右下：Aubert先生）

The Graduation Ceremony of Medical Doctor Ph.D.

September 17, 2019

4年にわたりベトナムから文科省の国費留学生として帝京大学大学院医学研究科およびADC研で研究したTran Huu Datさんが2019年9月に医学博士を取得し、修了式が行われました。Datさんは、9月末にベトナムに帰国し、国立小児病院（ハノイ）で医師として働いています。とても忙しい毎日のようです。今後の活躍が期待されます。

園生雅弘 医学研究科長より修了証を授与

（左から）菅又龍一、鈴木和男、Tran Huu Dat、園生雅弘

Ph.D. student Mr. Tran Huu Dat from Vietnam has been studying in Teikyo University Graduate School of Medicine and ADC, supported four years by a scholarship of the Ministry of Education, Culture, Sports, Science and Technology in Japan, took degree of Medical Doctor Ph.D. Now he works as a doctor at National Children's Hospital in Hanoi. We are hopeful for his success.

Dien副院長、Lam MOSTVice Director、Tu小児健康研究所所長、Dr. Thuyとの打ち合わせや、SICUでの様子（2019.11.20-21）

Message from Dr. Tran Huu Dat

I had studied in a Ph.D. course at Teikyo University Graduate School of Medicine from Oct. 2015 until Sep. 2019. It was supported by the MEXT scholarship of the Japanese Government. My work was successfully published in the Journal of Antibiotics and passed the presentation defense in Sep. 2019. I feel really proud of myself and very happy once graduated from Teikyo University.

I would say thank you very much to my Supervisor-Professor Kazuo Suzuki for great supports, my Advisor-Dr. Ryuichi Sugamata for directly excellent guides in the research and other ADC members who also gave me plenty of supportive ideas to accomplish my research.

I appreciate Professor Masakazu Mimaki and Dr. Naoki Ito for supporting me during the clinical training course at the Pediatric Ward in the Teikyo University Hospital.

I am grateful to the Japanese Government Scholarship Monbukagakusho (MEXT), e-ASIA Joint Research Program, Japan Agency for Medical Research and Development (AMED), and Japan Science and Technology Agency (JST) that supported me during my training program.

2019年7月13日に第26回マクロライド新作用研究会が、北里大学薬学部新2号館で開催されました。ADC研からは、留学生のTran Huu Datさんが発表を行いました。帰国前最後の学会発表となり、これまでの研究の集大成となりました。

■Azithromycin, a 15-membered macrolide antibiotic, inhibits influenza A (H1N1) pdm09 virus infection by interfering with the virus internalization process
Tran Huu Dat

第2回帝京大学研究交流会シンポジウム

August 27, 2019

2019年8月27日（火）帝京大学板橋キャンパスにて、第2回帝京大学研究交流会シンポジウムが開催されました。昨年末の第一回研究交流会に引き続き、全キャンパス合同で研究交流を行いました。ADC研からも9件の発表を行い、議論を行いました。

【発表ポスター】

- 鈴木和男
  - ・骨髄単核球髄腔内移植による脳機能回復機序の解明
  - ・幹細胞髄腔内移植による脳機能回復治療法の開発
  - ・グローバルな視点からの危機管理：パンデミック感染症対応のマルチウイルス検出・解析システムの構築
  - ・海外交流：アジア・欧米との連携プログラム
  - ・世界に羽ばたく医療人の育成プログラムの研究
- 鈴木章一
  - ・各種臓器におけるラクトペルオキシダーゼの発現意義の解明
- 菅又龍一
  - ・16員環マクロライド・ジョサマイシンによる抗インフルエンザAウイルス活性機序の解析
- 伊藤吹夕
  - ・抗インフルエンザ薬が不良なインフルエンザウイルスの原因解析
- Tran Huu Dat
  - ・The inhibitory effect of azithromycin on influenza A virus infection by interfering with internalization process

TAVP PLAN　Records of TAVP Training for 6 Medical Students

帝京大学とベトナム国立小児病院および国立ハノイ医科大学との単位互換協定による

医学部５年生
公衆衛生学実習【ベトナムでの感染症】

August 19-24, 2019

実習概要・目的　　**コーディネーター：鈴木和男**

2016年７月に「帝京大学とベトナム国立小児病院および国立ハノイ医科大学との間で単位互換協定」を締結して、帝京大学とベトナム国立小児病院および国立ハノイ医科大学間での連携の強化をすすめています。この背景から、医学部５年生の「ベトナム感染症実習」を「衛生学公衆衛生学実習」の班に組み入れ、感染症の医学教育を推進してきました。本年度は、第４回目となり、６名の学生が参加しました。

主目的は、

・世界やアジアで発生している感染症の実状を視察今後の医療活動に役立てる
・国際的視野にたった医療人をめざす
・臨床実習、国際保健・予防医学、医療システム・アクセスの観点も含めての学習

です。

Training of the Medical Students in Vietnam　　**Coordinator: Kazuo Suzuki**

In July 2016 we signed a “unit compatibility agreement between Teikyo University and the National Children’s Hospital of Vietnam and the National Hanoi Medical University.” At the same time, it was incorporated into the fifth grade medicine “public health practice.” This year, six fifth graders participated in the course.

Main Objectives of this training are

- To observe the actual condition of infectious diseases occurring in the world and Asia
- To become medical person with an international perspective
- To learn clinical practice, international health and preventive medicine, medical system, and access point

参加学生：田中秀弥、永松夕佳、平野　零、岩瀬りん子、梶田萌絵、金　祐三

Coordinary：
鈴木 和男（アジア国際感染症制御研究所　所長）Kazuo Suzuki
河内 正治（アジア国際感染症制御研究所　副所長）Shoji Kawachi
鈴木 章一（ADC研　准教授）Shoichi Suzuki
高橋 和浩（ADC研、小児科　講師）Kazuhiro Takahashi
玉井 大地（救命センター　医師）Daichi Tamai

Local Staff in Hanoi：
NCH：Hai 病院長、Dien 副院長、Thuy ラボチーフ、
Phuc 国際部長、病棟スタッフ
HMU：Thuong 准教授（感染症科）

研修先：
National Children’s Hospital：
ICU、呼吸器、循環器、感染症、救急、臨床疫学、他
Hanoi Medical University：感染症疫学
Vinmec International Hospital、Duc Giang Hospital、National Obsterics and Gynecology Hospital
日本大使館（The Japanese Embassy)、JICA

Acknowledgements：
冲永 佳史　学長 President Yoshihito Okinaga
冲永 寛子　副学長 Executive Vice-President Hiroko Okinaga
塚本 和久　教務部長 Prof. Kazuhisa Tsukamoto
大久保 孝義 衛生学公衆衛生学 教授 Prof. Takayoshi Ohkubo

実習スケジュール

	19Mon	20Tue	21Wed	22Thu	23Fri
AM	8:00-8:30 Opening Ceremony	10:00-11:30 Cardiac intervention, Cardiology Dept	9:00-11:30 Infectious Dept	9:00-12:00 [Province Hospital] Duc Giang Hospital Director Dr Thuong	9:00-9:30 Closing Ceremony
	8:45-9:30 Laboratory visit				10:15-11:45 Obstetrics and Gynecology
	10:00-11:45 NICU				
	12:00 Lunch			Late lunch outside	Lunch outside
PM	13:30-16:30 Emergency Dept	13:30-16:30 ICU	13:05-14:00 Embassy Dr. Tsuneoka	14:00-16:00 Vinmec Hospital	13:30-14:30 JICA
			15:00-16:45 Respiratory Dept		16:00-17:00 HMU Lecture Infectious Dis

受講証授与などの集合写真

国立小児病院にて Hai病院長と
National Children's Hospital (NCH) with the head, Prof. Le Thanh Hai

日本大使館にて 常岡 豊 医務官兼参事官
Embassy of Japan, Hanoi with Dr. Yutaka Tsuneoka

Vinmec International HospitalにてLiem先生と
With Prof. Nguyen Thanh Liem

Duc Giang Hospialにて

National Obstetrics and Gynecology Hospitalにて

JICAにて 高島恭子企画調査員と岡崎優実様と
JICA Vietnam with Ms. Takashima and Ms. Okazaki

ハノイ医科大学にて
Hanoi Medical University

報告 衛生学公衆衛生学実習「ベトナムにおける感染症」

帝京大学医学部医学科５年
平野 零, 金 祐三, 田中秀弥, 永松夕佳, 岩瀬りん子, 梶田萌絵

衛生学公衆衛生学実習の一環として今年度もベトナムで実習を行う貴重な機会を頂きました。2016年から続くベトナム実習は今年度で４回目の開催となり、本実習が関係者の皆様のご厚意のもと継続されていることに心より感謝申し上げます。例年に比べ参加人数は６人と少なくなりましたが、アットホームな雰囲気で実習に専念することができました。今回の実習で学んだことの概要を以下に紹介致します。

（1）ベトナムの環境

私たちは１週間のベトナムにおける感染症実習を通して、多くのことを学ぶことができた。私たちが滞在した期間、ハノイは雨期であったため、気温も湿度も高く過ごしにくい日が続いた。白や茶色などの壁が多くエキゾチックな雰囲気の町並みには、人やバイクや車があふれており、その交通量の多さに驚いた。バイクに乗る人の多くはヘルメットを着用せず、２人、３人乗りが当たり前のように走っており、日本との違いを実感した。ハノイの街には多くのビルや家や店が立ち並び、活気に満ちていた。道路は舗装が不十分なところが多く、電線もその多くは処理されずに洗濯物が干されているものさえ見かけた。街にはゴミがあふれ、あまり分別もされている様子がなかった。ベトナムは今まさに新興国として発展している途中であり、街は人々の賑わいや活気に満ちていた。

（2）国立小児病院 救急科見学

国立小児病院の救急科は30床有しており、そのうち隔離室は３室設けられている。救急科の病室では、１人の患児に対して家族のうちの誰かがベッド横に常に付き添い、患児の面倒を見ることが要求されていた。日本とは違い、子どもの数に対して医療従事者の数が足りない発展途上国ならではのシステムであると感じた。また、家族との繋がりを大切にしている国だからこそのシステムであるとも考えることができるが、患児の家族が外から様々な病気を持ってきてしまうことや、患児の病気を家族が居住している地域でばらまいてしまうことに対しての対策、加えて公衆衛生に対する人々への教育はしっかりとなされていないように感じられた。また保険については、日本と同様で政府が運営する国民保険と、民間保険の２種類がある。国民保険は原則として国民全員が加入しているが、カバーできる治療が限られるため民間保険に入る人もいる。この点は日本と同じである。

（3）国立小児病院 ICU見学

ICUは２ブロックに分かれている。重症患者のブロックには重症肺炎が最も多く来て、その他、気管支肺異形成症（BPD）、心筋炎などもあるとお話を伺った。また交通外傷や事故が多いらしく、池に落ちる子どもが１カ月に７人もいるというのが印象的だった。心筋炎に対する、人工心肺の機械を用いた治療（CRRT）を見学することができた。

（4）国立小児病院 NICU見学

NICUには200床のベッドがあり、現在100人以上の新生児が入院している。20人の医師と100人の看護師が在籍しており、医師１人につき約10人程度の新生児を受け持つ。スタッフは全員女性で、母親にとっては安心できる環境だと思われる。３つのフロアがあり、重症患者フロアにスタッフが集中している。ベッド数が足りない場合、異なる疾患を持つ新生児が同じ場所に混在する場合があり、2014年には院内で麻疹のアウトブレイクが発生した。このお話を伺い、ワクチン接種の重要性について実感した。

（5）国立小児病院 循環器科見学

外来、Pre & Post-operation ICU（PICU）、血管造影室、病棟の４部門を見学させて頂いた。病棟のある９階は、全部で110床あり、軽症から重症まで様々な子ども達が入院していた。病棟では、肺高血圧症を合併した重症動脈管開存症や、膜性部欠損型心室中隔欠損症、完全大血管転位症、総肺静脈還流異常症など、日本でも珍しい複雑な病態を持つ症例について教えて頂いた。国立小児病院では、このような複雑な病態を抱えた子ども達が日々地方か

ら搬送されており、個々に高度な医療が提供されていると知ることができた。また軽症の子ども達の部屋には、母親と一緒に泊まることができる設備があり、子ども達にとって安心できる空間となっていた。この病院が母親との触れ合いを大切にしていることがよく感じ取れた。

(6) 国立小児病院 呼吸器科見学

呼吸器科病棟は慢性期、急性期、その中間にあたる病棟の３つに区分されており、それぞれ病床数は55床となっている。その中でも特に重症患者が多いユニット１を見学した。ユニット１には１歳以下の子どもの重症肺炎患者や、日本ではあまり見ることのできない疾患の患者が多く入院していた。特に印象に残ったのは肺形成異常や先天性肺気道奇形などの患者が多いことだ。肺形成異常は日本ではあまり見かけない疾患だが、国立小児病院には10人もの患者が入院しており、その患者数の多さに驚いた。今回見学中にいくつかの症例を紹介して頂いたのだが、その中で気が付いたのは肺炎に用いる抗菌薬の種類や投与期間が日本と比べて大きく異なることだ。国立小児病院では肺炎に対しバンコマイシンが第一選択薬となっており、このような広域スペクトラムの抗菌薬を長期間投与しており、この背景に多剤耐性菌の増加が問題となっていることを改めて実感した。

(7) 国立小児病院 感染症科見学

感染症病棟では、脳炎、肺炎、結核、麻疹、破傷風、流行性耳下腺炎、百日咳、デング熱、水痘などの患者が多いそうで、日本ではあまり出会えない疾患をたくさん見ることができた。病棟に入る際にはサージカルマスクとキャップを身につけ、手指消毒を行った。しかし病棟に入ってみると、患者家族が何の感染対策もせずに患者と接触しており、マスクを大きくずらした状態で患者と接触している医療従事者も多数見受けられた。まずは医療従事者が適切な感染対策を理解し､そして患者と患者家族に感染対策の重要性について指導することが必要だと感じた。またベトナムでは多剤耐性菌が多く、非常に問題となっている。ベトナムでは処方箋がなくてもお金さえ払えば自由に抗菌薬を購入できるため、抗菌薬の適切な使用方法を理解していないまま多くの人が抗菌スペクトラムの広い薬剤を濫用し、多剤耐性菌の蔓延に繋がってしまっているようである。国立小児病院は改築時にスウェーデンからの援助を受けており、重症患者の病室にはスウェーデンで多く使われている「エアロック」という空気の流入を遮断する前室が設けられていた。

(8) 国立小児病院 臨床検査室見学

国立小児病院の研究室には最新の設備が導入されており、研究室の環境は大変整っていた。そのため設備の不十分な地方の病院から、日々沢山の検体が送られてきていた。国立小児病院ではそれらの検体を解析し、迅速に結果を地方病院へ送り返していた。また、我々がベトナム滞在中に流行していた感染症の発生状況や耐性菌への対応について、普段検査を行っている先生に教えて頂いた。

(9) 国立ハノイ医科大学感染症講義

ハノイ医科大学で、感染症事情について貴重なお話を伺うことができた。感染症の爆発的な流行を引き起こす要因として、病原体の変異、地域間の移動の増加、不衛生な環境での生活が挙げられる。この実習中、ベトナムでの多剤耐性菌の問題は何度も話題に上っていた。ベトナムでは処方箋がなくても自由に抗菌薬を手に入れられることが原因の一つとなっているが､耐性菌の出現を抑えられるよう､医療システムの是正を行うべきだと感じた。また､ベトナムでは道端に屋台が立ち並び、多くの人が低い椅子や直接路上に座り込んで食事を取っている。私たちから見ればあまり衛生的ではないように思える光景だが、ベトナムの人々からすれば当たり前のことである。普段からこのような環境で生活していると､ほかの場面においても衛生に対する意識が薄れてしまうのではないかと感じた。ハノイは人口密集地であり、病院にも多くの人が集まる。その影響で麻疹の院内感染が起き、ベトナムの中でも流行地となってしまっているそうである。ベトナムで病棟を見た際に、医療者がマスク・ガウン・手袋などをせずに患者と接触している場面に遭遇することが多く、麻疹に対してはもちろんだが、そのほかの感染を防ぐためにも、より徹底した対策を行う必要があると感じた。

(10) ハノイ産婦人科病院

本院を１つと３つの分院を持つ。本院には、３つの５階建ての建物と、１つの９階建ての建物がある。1475人のスタッフがおり、850床のベッドを管理している。日本と異なり、産婦人科医の90%は女性である。男性医師は男性の不妊治療を行っており、これを行っているのはベトナムでこの病院だけと伺った。１日に100件の分娩を行っており、帝京大学医学部付属病院の分娩よりも断然多く、その数に大変驚かされた。

(11) Duc Giang病院見学

ベトナムの医療水準は先進諸国からの援助も多く急速に改善されつつあるが、近隣アジア諸国と比べても未だ低い状況にある。医療施設においても、一部の都市部を除き近代的な医療設備はほとんど整備されておらず、地域間の格差が目立つ状態だ。さらに患者数に対する慢性的な医療スタッフ不足が、医療サービスの低下を招いているこ

とも問題である。一方で欧米諸国や日本へ留学する医師も増えており、最先端の医療技術指導を積極的に受け入れている病院も増え、ごく一部ではあるが専門的な医療も受けられるようになっている。

我々が訪問したDuc Giang病院は郊外にある病院ではあるが、日本に引けを取らない最新の設備が整っている病院の一つである。この病院では今年の７月にロボット手術を成功させており、日本と同水準の治療が行われている印象を受けた。また病院内はとても清潔で、衛生に対しての啓蒙ポスターが様々な所に貼ってあり、人々を疾病から予防しようとする姿勢が感じ取られた。しかしながら、このような設備を有する病院がベトナム全土に広がるためにはかなりの時間を要するであろう。今回の実習を通じ、まだまだ発展途上の国ではあるが、ベトナムの人々のエネルギーや未来への可能性をひしひしと感じた。ベトナムの医療、社会はこれからどんどん発展していくであろう。一人の日本人としてその未来に携わり、ベトナムの人々と共に未来を築いていきたいと思う。

（12）Vinmec国際病院見学

国立小児病院と違い、地べたに座る人やタバコを吸っている人は全くみられなかった。患者の数も少なく、とても落ち着いている印象だった。全部で７階建て、３階には自閉症センターがあり、集団療法、作業療法、理学療法、音楽療法などを行う部屋がある。6階には幹細胞移植病棟がある。自閉症や脊髄損傷による脳性麻痺などに対する幹細胞移植治療について勉強することができた。脊髄損傷は治らないものだと思っていたので、非常に驚いた。自閉症に対しても効果があるのはなぜか疑問に思ったが、まだメカニズムは解明されていないためわからない。

（13）在ベトナム日本国大使館訪問

在ベトナム日本国大使館の医務官である常岡先生から、医務官のお仕事に関わる貴重な講義を受けることができた。講義の内容は医務官の主な仕事内容や、ベトナムを含めたアジア・アフリカなど多くの発展途上国で問題となっている感染症、そしてその背景となっている衛生問題などについてだ。感染症には、環境、文化、教育、支援の４つのファクターが大きく関与しており、この４つのファクターに今現在世界でどのような問題があるのかについて経験に基づき詳しく教えて頂いた。感染症が蔓延する背景にある深刻な衛生問題や金銭的な問題について深く学ぶことができた。

（14）JICA訪問

JICAは日本の政府開発援助（ODA）を行う機関として発展途上国への国際協力を行っている。私たちはJICAに所属している高島さんと岡崎さんに講義をして頂いた。JICAの活動はベトナムからの要求が基本となっており、その主な仕事内容は無償資金協力、有償資金協力、技術協力だ。提供した機材の不適切な使用や売却・著明な少子高齢化社会の進行・アルツハイマー病や生活習慣病の増加・看護師の不足・福祉と公共事業が進んでいない、など今ベトナムには多くの問題があり、JICAの介入が求められている。

今回のベトナムでの１週間の実習を通じて、私たちは貴重な経験をさせて頂き、感染制御や国際医療、ベトナム医療事情について学ぶことができました。この場を借りて、帝京大学アジア国際感染症制御研究所（ADC研）の先生方、ベトナムで指導して下さった先生方に心より御礼申し上げます。

5th year -medical students at Teikyo University, Tokyo, Japan
Rei Hirano, Usam Kim, Hideya Tanaka, Yuka Nagamatsu, Rinko Iwase, Moe Kajita

It is an honor to have a precious opportunity to visit Vietnam again this year as a part of public health training. This is the fourth visit ever since this program started in 2016, and we would like to appreciate that we had a chance to participate in the program lasting for four years thanks to all project members. Compared to last year, we had the smallest number of participants with six students, and the students are spent time in Vietnam in a very friendly atmosphere. The summary of our experiences is as follows.

(1) The environment of Vietnam

We learned many things about not only medicine but culture through this 1-week training in Vietnam. During our visit, it was the rainy season in Hanoi so the extremely high temperature and humidity made us feel uncomfortable. Exotic cityscape with white or brown walled houses, a flood of people and motorcycles, and the heavy traffic congestion all surprised us. In addition, we fully realized that there is a cultural difference from our experience that almost all people ride on bikes without helmets and two or three people ride on one motorcycle. In Hanoi, there are a large number of buildings, houses and stalls, which make us feel the city is full of energy. Road paving work seems not to be sufficient, and electrical wires are not maintained and people hang their laundry on them. We saw scattered garbage along the streets over the entire area of Hanoi and it seems that there is no rule to

separate garbage. Vietnam has experienced an astonishing development as one of the emerging countries recently, and we believe that Vietnam has so much potential to go forward.

(2) National Children's Hospital Emergency Department

Emergency Department in NCH has 30 beds and an isolation room with three beds. At least one of a patient's family is required to stay with their child and to take care of him/her. Compared to Japan, the number of medical staff is not enough to take care of all children in emerging countries, which we realized why that system is applied there. It can be said that it is also because the connection with family members are high-esteemed in Vietnam. We truly felt, however, patients' families may bring various diseases from outside of the hospital, and precautions for the cases where they may bring diseases back to their hometown and may spread diseases, and public health education for public people, seem not to be enough. As for health insurance, there are two types of insurance; national health insurance and private insurance. Basically, most people in Vietnam have national health insurance, but some people buy private insurance because the range of therapy that the national insurance covers is limited, which is the same as that in Japan.

(3) National Children's Hospital: ICU

ICU has two units; severe and stable unit. The most common disease seen in the severe unit was severe pneumonia, and also bronchopulmonary dysplasia and myositis are often seen. In addition to the variety of infectious disease cases, traffic injuries and other accidental traumas are the main reason for hospitalization. We were impressed to hear that seven children drowned in ponds in a month. Also, we learned a case of myositis on continuous renal replacement therapy (CRRT).

(4) National Children's Hospital: NICU

NICU has 200 beds and more than 100 neonates are hospitalized in the ward. 20 doctors and 100 nurses are in charge of the ward. The ward is comfortable for mothers as the staff members are all women. The ward has three floors, and more staff members are responsible for the severe case unit than any other units in NICU. In case of the shortage of beds, neonates with different diseases are hospitalized in the same section. In 2014, a measles outbreak took place in the ward because of the mixed allocation of the beds. I realized that getting immunized of measles is important to prevent such an outbreak.

(5) National Children's Hospital: Cardiology Department

We visited four departments; outpatient clinic, pre & post-operation ICU (PICU), angiography suite, and ward. The ward, located on the ninth floor of the hospital building, has 110 beds altogether, and the cases vary from mild to severe. In the ward, the doctor gave us a lecture on rare and complicated cardiovascular diseases such as severe patent ductus arteriosus (PDA) with pulmonary hypertension, membranous ventricular septum defect (VSD), complete transposition of the great artery (TGA) and total anomalous pulmonary venous return (TAPVR). Children with the complicated diseases are daily transferred to NCH from province hospitals. We came to realize that NCH provides them with advanced medical services. The rooms for patients with mild cases have accommodation for their parents accompanying with them overnight, which creates relaxing and comfortable atmosphere for them. It was impressing that NCH places much value on interactions between patients and their parents.

(6) National Children's Hospital: Respiratory Department

The respiratory department is divided into three units; chronic, middle and acute stage, and each area has 55 beds respectively. We visited Unit 1 this time, where severe patients are admitted. There had been many cases which are rare in Japan, including under-1-year-old severe pneumonia. What was the most memorable for us is that we saw many patients suffering from bronchopulmonary dysplasia (BPD) or congenital pulmonary airway malformation (CPAM). These diseases are uncommon in Japan, so we were surprised to hear that there had been 10 BPD patients there. We studied some cases this time and we realized that the application and duration of antibiotic therapy against pneumonia are totally different from those in Japan. In NCH, they administer wide-spectrum antibiotics against pneumonia for a long period, and we realized again that an increase of multidrug-resistant bacteria has been brought about with that background.

(7) National Children's Hospital: Infectious Disease Department

In the infectious disease department, we saw varieties of infectious diseases which are uncommon in Japan, such as encephalitis, pneumonia, tuberculosis, measles, tetanus, mumps, pertussis, dengue fever, chicken pox and so on. When entering the ward, we wore surgical masks and caps and sanitized hands as we normally do in Japan. Once we entered the room, however, patients' families had had contact with the patients without any infection prevention, and we saw most of medical staffs wearing masks over their jaws when touching the patients. We strongly thought that medical staffs need to understand the importance of appropriate infection prevention and education for the patients and their families. Moreover, there is a large number of multidrug-resistant bacteria, which has been controversial. In Vietnam, people can purchase antibiotics as they like without prescriptions if they have enough money to buy them, and a majority of people abuse wide-spectrum antibiotics because they are ignorant of the appropriate use of antibiotics, which might lead to expansion of multidrug-resistant bacteria. We also viewed the unique structure called "Air Lock". NCH received supports from Sweden and adopted air-blocking layout called "Air Lock", which is common in Sweden, for severe patients' room when they renovated the building.

(8) National Children's Hospital: Laboratory Department

NCH laboratory has the state-of-art equipment for examination. NCH analyzes specimens sent from province hospitals with insufficient laboratory system and reports the results to the clients as soon as possible. Dr. Thuy gave us a lecture on what infectious disease is widespread in Vietnam and how to tackle with drug-resistant bacteria.

(9) Lecture on infectious diseases at Hanoi Medical University

We had a precious opportunity to take a lecture on recent clinical situation of infectious diseases. The following issues are

considered as factors causing pandemic; pathogenic mutation, increased transportation among areas and unsanitary environment. During this program, we heard about multidrug-resistant bacteria so many times. People can purchase antibiotics as they like without doctor's prescription, which is one of the factors related to the problem, so we supposed that there is a need to improve the medical system in order to control emergence of multidrug-resistant bacteria. In addition, there are many stalls along the street and many people sit on stools or sit on the ground to have a meal in Vietnam. It looked insanitary to many Japanese people but it is ordinary for Vietnamese people. We felt that significance of sanitation fade away because of getting used to that circumstances. Hanoi has a large population and so many people gather in a hospital. This background led to nosocomial infections of measles, turning Hanoi into an epidemic area. When we visited hospitals in Vietnam, we saw medical staffs having contact with patients without wearing surgical masks, gown and gloves many times, which we made us think that it is necessary to take complete countermeasures to prevent not only measles but other infectious diseases.

(10) Hanoi Obstetrics and Gynecology Hospital visit

Hanoi Obstetrics and Gynecology Hospital has a main building and three annexes. The main hospital building consists of three 5-story buildings and a 9-story building. The hospital employs 1475 medical staffs and manages 850 beds. Unlike the situation in Japan, 90% of obstetricians are women. Most male obstetricians are responsible for fertility treatments for male patients, which are performed in this hospital only in Vietnam. The hospital experiences 100 deliveries per a day, and the number of cases is much more than that in Teikyo University Hospital, which made us surprised.

(11) Duc Giang Hospital visit

The medical standard in Vietnam has been improving dramatically thanks to a lot of support from developed countries. Compared to Asian neighbors, however, its level still has been low. In medical facilities, modern medical equipment is hardly ever maintained except for a part of large cities, which makes inequality among regions. In addition, chronic shortage of the number of medical staffs for patients has led to decline of medical service, which is a serious social problem. On the other hand, as the number of doctors who study abroad in Western countries or Japan has been increasing, there have been many hospitals which actively accept the latest medical technique. The opportunity for specialized medical care is limited, but it has been available for people. Duc Giang Hospital we visited this time is located in the suburb, but it is one of the hospitals which have the latest facilities as many Japanese hospitals have.

In this hospital, they succeeded in a robot-assisted surgery in July this year, which we realized that they perform the advanced treatment like Japan. Also, that hospital looked clean and there were some enlightening posters around the hospital, which we felt that they have been working hard to prevent people from diseases. However, it can be said that it will take long time to increase the number of hospitals like Duc Giang Hospital throughout Vietnam. Vietnam still has been one of the emerging countries, but we surely felt Vietnamese energy and possibility in the future from our experience. We believe that medical service and social landscape in Vietnam are going forward. As one of Japanese, we would like to engage in that future and to face a bright future.

(12) Vinmec International Hospital visit

Unlike NCH, we saw not a single person sitting on the ground or smoking in the hospital. The number of patients was fewer than that of NCH, and the hospital is not crowded or busy. The ward is a 7-story building, and autism center is located on the third floor, where patients are treated with group therapy, occupational therapy, physiological therapy, and music therapy. The stem cell transplantation (SCT) department is located on the sixth floor of the hospital, and we learned about SCT on autism, spinal injuries, and cerebral palsy. We were surprised to hear that spinal injuries can be cured by SCT. We felt curious about why SCT is effective on autism, but its mechanism has been still unknown.

(13) Embassy of Japan visit

Dr. Tsuneoka, a medical officer working at Embassy of Japan in Hanoi, gave us a lecture on the responsibility of medical officers, sanitation problems and subsequent infectious diseases widespread in developing countries such as Asia including Vietnam and Africa. Dr. Tsuneoka emphasizes that four factors; environment, culture, education, and support. He explained what problems there are regarding to the factors in a global society based on his experiences. We had a great opportunity to learn the backgrounds of the outbreaks of infectious diseases such as sanitation problems and poverty.

(14) JICA visit

JICA is in charge of Official Development Assistance (ODA) supported by the Japanese government for developing countries. Ms. Takashima and Ms. Okazaki working for JICA Vietnam gave us a lecture on JICA's activities. The main activities of JICA are gratuitous financial aid, loan assistance, and technical aid, which are carried out based on the requests from the Vietnam government. Vietnam is facing with many social problems that JICA needs to work for such as inappropriate use of aided equipment including selling out the aid supplies, the remarkably aging society, increasing the number of patients of Alzheimer's disease and life-style diseases, shortage of nurses and insufficient public undertakings and welfare system.

Through this 1-week hospital training in Vietnam, we had valuable experiences and learned infection control, international medicine, and clinical situations in Vietnam. We would like to take this opportunity to show the greatest gratitude for the members of Asia International Institute of Infectious Disease Control (ADC), Teikyo University and local staffs in Vietnam.

日本・アジア青少年サイエンス交流事業「さくらサイエンスプラン」
Japan-Asia Youth Exchange Program in Science
ベトナムから帝京大学へ

October 28-November 5, 2019

研修参加者　Visitors for TASP Training Supported by SAKURA Science Plan of JST

ベトナム８名（ハノイ国立小児病院３名、ハノイ医科大学１名、ベトナム国家大学ハノイ校１名、ホーチミン第一小児病院３名）

Hanoi Vietnam National Children's Hospital
Hieu Trung Do (Mr), Infectious Disease Dept.
Dr. Van Tran Thi (Ms), Cardiology Intensive Unit.
Dr. Dao Nam Huu (Mr), Infectious Disease Dept.

Hanoi Vietnam National University
Bui Son Nhat (Mr), Dept of Pharmacology

Hanoi Medical University
Dr. Doan Thu Ha (Ms), Emergency Dept.

Ho Chi Minh Children's Hospital 1
Dr. Chau To Uyen (Ms), Gastroenterology Dept.
Dr. Pham Quynh Mai Trang (Ms), Neonatal ICU.
Dr. Tran Van Cuong (Mr), Emergency Dept.

2019年10月28日（月）～11月５日（火）、科学技術振興機構（JST）の採択事業である2019年度 日本・アジア青少年サイエンス交流事業 さくらサイエンスプランが実施され、帝京大学アジア国際感染症制御研究所（ADC）は、ベトナムから医師６人と研究員２人の計８人の研修生を受け入れました。本事業は、科学技術を通してアジアと日本の青少年が交流を深めることを目的としており、招聘対象となるのは、高校生・大学生・大学院生・ポストドクター・教員など、日本に初めて滞在する40歳以下の青少年です。今回は、「感染症」「安全管理」「バイオセキュリティ」をテーマに、帝京大学医学部附属病院安全管理部での医療安全に関する講演会、小児科・感染制御部・ME部による病院内ラウンド、薬剤部での研修、薬学部でのセミナー参加や実習見学、中央機器室の見学など本学の研究施設見学を実施しました。また、最新のウイルスや細菌検出技術の実習体験や医療技術学部救命士コースの実習風景、３学部１学年共通科目「世界に羽ばたく医療人」の英語でのグループディスカッションでのファシリテーターをするなど、授業への参加などを通して本学の教員や学生との交流を深めました。今年は特筆すべき事として、医学部シミュレーションセンターでアメリカ心臓協会（AHA）による心肺蘇生シミュレーション講習後にテストを受け全員がAHA受講証を得ることができたことです。そして、ADCと連携している結核研究所（東京都清瀬市）および聖路加国際大学（東京都中央区）への訪問も行いました。

これからもADCは、産官学の緊密な連携により、未来を担うアジアと日本の青少年が科学技術を通して交流を深める架け橋となるべく努めてまいります。

We organized SAKURA Science Plan supported by JST from Oct. 28 to Nov. 5 in 2019 in ADC Teikyo University. Main objectives are "Biosecurity" "Infection" and "Safety Control" in hospital. As the first attempt, we held a cardiopulmonary resuscitation simulation workshop by American Heart Association. After the training, they took the test and was able to get the certificate.

Contents of the Training

1. **ADC研での自己紹介**
   Introduction of Professors in ADC and ADC Staff
   鈴木和男所長、ADC研スタッフ、医学研究科大学院生（ADC研）
2. **講習会：バイオセーフティ（感染研　棚林先生）、医療安全**
   Trainings and Lectures: Biosafety and Safety Control in Hospital
3. **実験室研修：ADC感染症研究室、シミュレーション実技**
   Trainings in ADC Laboratories and healthcare simulation
4. **講義：微生物学講座、公衆衛生学、シミュレーション、薬学部**
   Lectures: Microbiology, Public Health, Healthcare Simulation and Faculty of Pharmacy
5. **医学部附属病院ラウンド：病院長、小児科、感染制御部、薬剤部、臨床工学センター、滅菌室の視察**
   Tour of Teikyo University Hospital
6. **学部１年生の授業「世界に羽ばたく医療人」の中での討論会：ベトナムでの感染症事情**
   Joining with Medical Students in Teikyo University 1-year's lecture
7. **学外：ADC研と連携している結核研究所および聖路加国際大学訪問、JST未来館見学**
   Visiting RIT and St. Luke Hospital-University and Tour of Miraikan
8. **研修修了証授与および歓送会**
   Certificate Celebration and Farewell Party

謝辞 Acknowledgements

冲永佳史学長、冲永寛子副学長、ADC教授会メンバー（斧 康雄、古川泰司、槇村浩一、唐澤 健、山下 純、井上まり子、高橋和浩、松永直久の各先生方）、医学部、薬学部の教員のみなさま、病院スタッフ（坂本哲也院長、高田眞二准教授）、安全管理部、感染制御部、薬剤部および臨床工学センターのみなさま。

■研修スケジュール　Schedule of TASP

	AM	PM
October 28th（Mon）	成田着　Arrive at Narita 帝京大学へ	13：30 病院薬剤部（安野） 17：30 歓迎会
October 29th（Tue）	10：00 大学棟ツアー 11：00 病院小児科、NICU（三牧、高橋、伊藤）	14：00 ADC Laboratory（菅又） 15：00 医学研究科公衆衛生学研究科（井上）
October 30th（Wed）	10：00 ADC Laboratory 11：00 病院安全管理部（河内）	13：05 授業「世界に羽ばたく医療人」自己紹介、グループワーク（鈴木 和） 15：00 講義「バイオセーフティー」（国立感染研 棚林室長）
October 31st（Thu）	10：00 病院感染制御部（松永）	13：30 薬学部 薬物送達学研究室（鈴木 亮） 15：30 病院ME部（川崎）
November 1st（Fri）	10：00 医学部微生物学講座（斧、祖母井）	13：00 医療技術学部 救急救命士実習（横山） 15：00 薬学部 薬学実習（唐澤）
November 2nd（Sat）	10：00 シミュレーション研究センター（金子、竹内）	13：00 シミュレーション研究センター（金子、竹内）
November 3rd（Sun）	10：00 JST 未来館（鈴木 章）	
November 4th（Mon）	Sightseeing	
November 5th（Tue）	10：00 結核研究所（鈴木 和）	13：30 聖路加国際大学（鈴木 和） 17：30 修了証授与、歓送会
November 6th（Wed）	帰国　Return to Vietnam	

帝京大学 医学部附属病院
Teikyo University Hospital


小児科　Pediatrics


新生児集中治療室　NICU


薬剤部　Pharmacy Dept.



安全管理部　Safety Control Dept.



感染制御部　Infection Control Dept.


ME部　Medical Engineering Dept.

帝京大学 医学部、薬学部、医療技術学部
School of Medicine, Faculty of Pharma-Science and Faculty of Medical Technology, Teikyo University


微生物学講座　Microbiology Dept.


衛生学公衆衛生学研究科　Public Health Dept.


救急救命士コース　Emergency Training Course


薬学部 薬学実習 Pharmaceutical Practice


薬物送達学研究室 Drug and Gene Delivery Research

実験室研修
Trainings in Laboratories


シミュレーション教育センター
Simulation Education Center


ADC研究所 ADC Laboratory

講義
Lecture and Discussion


1 年生授業「世界に羽ばたく医療人」グループワークと発表
Class “World wide Researchers and Medical Staffs” Group Work and Presentation


感染研 棚林先生によるバイオリスク講習会
Biorisk Management

学外：連携施設訪問　結核研究所、聖路加国際大学
Visiting St. Luke’s International University


結核研究所（RIT）副所長の慶長先生と


聖路加国際大学 St. Luke’s International University

研修終了証授与および歓送会
Completion Certificates and Farewell Party

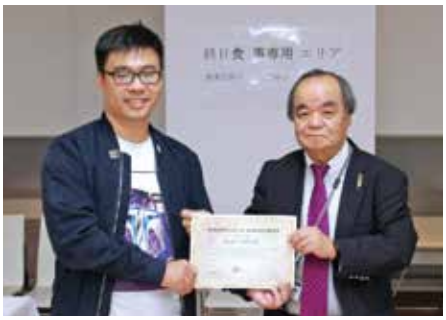

研修生から鈴木所長へ
記念品贈呈


河内ADC副所長からの挨拶

Reports of Visitors

SAKURA Science Plan

Name: DO TRUNG HIEU
Country: Vietnam
Department: Biomolecular research of Infectious Diseases Department, Vietnam National Children's Hospital.
Position: Researcher at Biomolecular research of Infectious Diseases Department.



My job:
I have been working as a researcher in Vietnam National Children's Hospital since 2012. Im a researcher at the Biomolecular research laboratory. My main job is to perform different types of molecular test to detect various pathogens in our patient samples in the hospital and also in another medical center. I also am in charge of our laboratory equipment management.

Benefits from the SAKURA Sience Program:
I felt very proud and happy when I was chosen to join the SAKURA Sience Program which was organized by Asia International Institute of Infectious Disease Control, Teikyo University. Everybody was so nice and friendly.
During my ten days course, I had a chance to visit a lot of departments in the Teikyo Hospital, such as: Pediatric Department, Pharmacy Department, Nursing Department, Clinical Laboratory and Microbiology Department. I was so impressed about the facilities and medical equipments, all were so modern and well operated, especially with the system to control all over the hospital. We found a lot of new things here that can help to improve our work in our hospital like the risk control management. As a researcher working in a lab, I was so excited to visit your hospital laboratory system. Everything was so clean and tidy. I had chances to attend a lot of presentations about the current research in the laboratory which I think can open the potential opportunity to collaborate between our labs. I also attented in a meeting with the students of the Teikyo University. They were all so young and enthusiastic. I had a good discussion with them about some medical problems in Vietnam and they shared with me their opinions.
It was very lucky that I had a chance to join the BLS training course from Dr. Kaneko and received the certificate. It was a very important skill that everybody should learn. I also received a lot of guidance and valuable advices by many dedicated Professors and M.D in the time I was here.
Besides of all the intensive training lessons, I was so excited to visit so many places in Tokyo like walking through the Shibuya scramble crossing, eating sushi in Shinjuku, shopping in Akihabara and visiting the Sensoji Temple. We also had a nice trip to visit Mount Fuji and enjoyed the beauty of the Hakone Lake. All are unforgettable events and memories. Thank you so much.
Future Collaboration:
I believe that this program will continue to strengthen the bond between Vietnam National Children's Hospital and Teikyo University. I hope that in the future we will have more opportunity to collaborate with you to investigate infectious diseases, as well as to find better diagnosis and treatment for patients.

Name: TRAN THI VAN, M.D.
Country: Vietnam
Department: Cardiac Intensive Care Unit (CICU), Vietnam National Children's Hospital, Ha Noi City
Position: Pediatrician

Job description:
I have been working as pediatrician in Vietnam National Children's Hospital, Hanoi City from 2015 until now. My work is to deal with very severe patients. I had been training in Emergency Department, Pediatric Intensive Care Unit (PICU), Cardiology Department and Cardiology Intensive Care Unit; and then, I have been working in Cardiac Intensive Care Unit since then.

Summary of the 10 days training course in SAKURA program:
This is the first I come to Japan with the eagerness and admiration. Everything in each place was very modern, logical and punctual. We have had a very busy schedule in our course to visit many departments and places such as: Pediatric department, NICU department, ADC laboratory, Pharmacology department, Safety Control department, Infectious Disease Control and Prevention department, Clinical laboratory department, Medical Engineering sterilization center, Microbiology department, Simulation center laboratory, Public health department, Faculty of pharmaceutical, JATA (Tuberculosis hospital) and St. Luke's International University Hospital.
We found many new things, and above all, we admired the modern city and especially the way of automatic working everywhere we visit. Devices and equipments may be almost the best ones, especially, vending machines were everywhere. Japan's way of working is very precise, detailed, and professional. The cooperation between departments and other parts and throughout the whole medical system was great. Especially, training with PLS course is the amazing class. This course is truthfully interesting and Dr. Kaneko is a great teacher.
We also had time in weekend to visit Mount Fuji - considered the symbol of Japan, and enjoyed very beautiful landscape there, with yellow and red leaves at beginning of autumn, which was so great. We visited the Miraikan museum with impressive developed technology exhibition. We experienced Japanese culture, with very nice people that ready to help us from heart; delicious food; cool and cold weather but really comfortable... All are unforgettable events and memories.

Benefits from SAKURA Science Program:
My work, always taking care of critically ill patients was relevant to many fields including clinical and laboratory ones. Congenital heart disease patients, usually require a long time for treatment, so a careful strategy is very important. Every day, I also contacted the laboratory department, the pharmacists, microbiology department... to solve some problem in treating my patients. Knowing the way other departments work and what devices and equipments be operated in those departments helped me a lot in solving problem when treating patients.
Especially, regularly in my working, I have realized more and more important role of the controlling for all risks in the department when treating and giving care for severe patients. Without this, everything we try all our best to cure and treat the patient will be in vain. For examples, a very difficult surgery of Norwood operation for hypoplastic left heart syndrome (HLHS) patient that all the team rush into the hospital at midnight to do and successfully operated, but after 7 days patients collapsed and could not recover because of CLABSI (central line - associated blood stream infection), regretfully and so disapointedly. Fortunately, we have now tried to raise the quality of taking care of patients and do the programs in controlling infection, safety...
Besides, I also take part in some training courses for my staff in the hospital and other hospitals, and the way of training I have seen and have had chance to participate in Japan's hospital and university. It is a promising way for training and improving the effectiveness of training.

Potential collaboration:
The visit at Japan in SAKURA Science Program definitely fruitful for our hospital, especially with the place I have visited at Teikyo University, Teikyo Hospital, JATA and St. Luke's Hospital. I would like to say many thanks to Prof. Kazuo Suzuki, all the staff members in ADC laboratory, Teikyo Hospital and University as thanks to every place and unit I visited in Japan, and SAKURA Science Program. It is very kind of Dr. Kaneko for giving our opportunity to take part in PLS course and I will always cherish this special gifts from you. I hope that the program will continue to give chance for more persons in our hospital to visit Japan, to be able to approach a modern and professional medical system, to help develop the quality of health care and maintain the relationship between Japan and Vietnam.

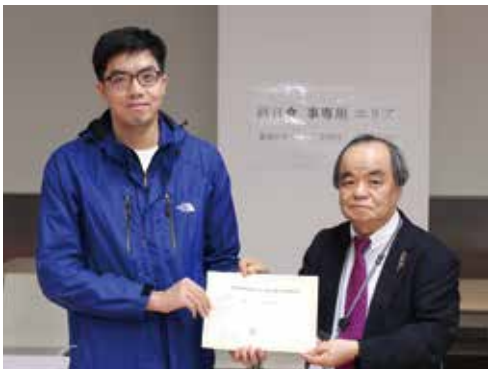
Name: Dao Huu Nam
Country: Vietnam
Department: Infectious diseases Intensive Care Unit - Center for Tropical Diseases, Vietnam National Children's Hospital, Hanoi, Vietnam
Position: Doctor - Head of Infectious diseases Intensive Care Unit

My job:
I had been working as pediatrician in PICU for 9 years and since 2018 to now I am working at Infectious diseases Intensive Care Unit - Center for Tropical Diseases. I have 3 missions: treatment for critical illness children such as encephalitis, Bacterial Meningitis, septic shock, PCP pneumonia, Pertussis, Measles complication, Influenza pneumonia etc…; training for local hospital Basic Pediatric Life Support, Advanced Pediatric Life Support, etc…; and research about critical care medicine such as severe Bordetella pertussis, Influenza, meningitis due to Parasites, CRRT was treated acute crisis of inborn errors of metabolism.

Summary of SAKURA Exchange Science Program:
During 10 days in Japan I visited Teikyo University - Hospital, Research Institute of Tuberculosis and St Luke's International University, I have more experiences and knowledges about your health care system. I see everything better than Vietnam and I learn from your modernity system digistal medical record, Hospital safety control management, especial infection control, hard working and punctuality. This is the first time I have visited hybrid operation room, I also really impressive with pharmacology department preparing medicines for patients. I learnt something about researchers of your hospital, they had amazing idea. I had taken part in BLS training courses. It is an interesting and professional course. When I come back home, I hope to change something to make my department better.
We also have some scocial events to visit Miraikan and I like AI techniques which change the world life in near future. I also visited to wonderful Japanese Mt. Fuji by Bus and Train. I have experience Japanese foods, Japanese cultures and made more friends as well.
I would like to say thanks so much to Japan Science and Technology Agency, Prof. Kazuo Suzuki, A/Prof. Shoichi Suzuki, Prof. Kawachi, Prof. Ichiro Kaneko, and others in ADC helped us during this training course.

Future collaboration:
I will support for Japanese students who will become SAKURA Exchange Science participants in Hanoi, Vietnam.
Furthermore, I would like to promote research collaboration between Vietnam National Children's Hospital and Teikyo University, especially infectious diseases, hospital safety control.

Name: Bui Son Nhat
Country: Vietnam
Department: Pharmacology and Clinical Pharmacy School of Medicine and Pharmacy, Vietnam National University
Position: Researcher



About my job:
I have been working as a researcher for 2 years in the Department. My job is to take part in research projects, as well as assisting the professors of my department in lecturing classes. My main focus is clinical pharmacy and pharmacokinetic/pharmacodynamic.

Benefits from SAKURA Science Program:
Part of my interest is how hospitals operate in terms of clinical treatment and what part pharmacists play in it. During the program, I had a chance to see how things operate in the field and I must say that I was impressed with the quality and punctuality. Meeting Japanese physicians and pharmacists also helped me see the situation of medical practice in Japan and how they might differ from that of Vietnam. In addition, I also had the chance to see how a modern Japanese medical institute trains its future physicians, pharmacists, etc. and how Japanese scientists conduct their research.
During my 10-day stay in Japan, I saw the wonders of technology in Miraikan, saw the symbol of Japan in Mt. Fuji and learned a bit about Japanese culture. I am really grateful for the experience.

Potential collaboration:
I hope that in the future our school and Teikyo University may develop further bilateral research projects, given that Vietnam is a very good place to study tropical medicine as well as other models of disease. I also hope that a chance for further education, Master or PhD courses will be available between the two institutes.

Name: Doan Thu Ha M.D.
Country: Vietnam
Department: Emergency and Intensive Care Department, Hanoi Medical University Hospital, Hanoi
Position: Physician

My job:
I've worked as a doctor in Emergency and Intensive care department since 2018 after finished resident program in Hanoi Medical University, the oldest Medical university in Vietnam. My responsibility is:
- Treating patient with serious illness such as septic shock, severe pneumonia, MI, stroke, pancreatitis, severe trauma, neuromyopathy disease ex grave, GBS…
- Taking care of basic life support for patient, taking part in poisoning control team of my department.
- Taking care of students, practise in my department.

About 10 days of SAKURA Science Plan:
Joining the program gives me the opportunity to visit Japan, a beautiful, clean and modern country. The program focuses on Teikyo University and Teikyo University Hospital. At Teikyo University, I participated in the lecture of Professor Suzuki with the first-year students of the university, in the practical lecture at the pharmacy department where the second-year students learned about preparation medicine administration and inspection, in the Paramedic class at stimulation center, this was really very interesting. At Teikyo University Hospital, we were able to visit some departments. What really impressed me was the hospital infection alerted to the whole hospital with machines and alarms to every employee. The Biosafety and Infectious control program has provided a lot of new and useful things to apply in my hospital, in addition to drug control, pharmacy security, pharmacy alarms which have been applied to each department, each patient both inpatient and outpatient. The BLS class is an opportunity to train all the members of the group with a certificate to strengthen the BLS knowledge not only in hospitals and communities. The trip is an opportunity to help me expand my knowledge of molecular research, learn disease and epidemiology in your country and I look forward to having an opportunity to become a student of the school. Finally, I want to give many thanks to Prof. Suzuki and ADC center members for your helping us a lot.

Potential Collaboration:
Hopefully, the links of the two universities Teikyo University and Hanoi Medical University will be strengthened and further developed through learning, research exchange and training especially SAKURA Program.

Name: Chau To Uyen, M.D.
Country: Vietnam
Department: Gastroenterology department, Children's Hospital 1, Ho Chi Minh City
Position: Pediatrician

My job:
I have been a doctor in the gastroenterology department of the Children's Hospital 1 since 2011. My daily job is to examine patients with gastrointestinal pathology such as diarrhea, enteritis, constipation, hepatobiliary pathology, cow's milk protein allergy. I also participated in some scientific researches of my department and many social activities.

Summary of my training course:
The SAKURA Science Program gave me the opportunity to visit beautiful Japan. Here there are fresh air, clean streets, friendly and polite people. I see that public transports such as bus, tramcar are very popular in Japan. They are very convenient, safe, and limit a congestion of the traffic. In 10 days of the course, I visited many places in Tokyo like Teikyo University and Hospital, St. Luke's International University, Research Institute of Tuberculosis and I was really impressed with everything here, all are in order. The medical equipments and the facilities are very modern, tidy. All the staff members are friendly, kind, work punctually.
I'm particularly interested in the training course Basic life support (BLS) at Stimulation Center Laboratory. It's very helpful, easy to understand, easy to practice. It helps us react rapidly with similar cases.
We also had time to visit The National Museum of Emerging Science and Innovation, known as the Miraikan - "Future museum", is a great place to explore Tokyo's high-tech side and go to Shizuoka at the weekend to appreciate famous Mount Fuji - considered the symbol of Japan, which is the highest volcano in Japan. It's very beautiful and majestic.
Once again, I would like to say many thanks to Prof. Kazuo Suzuki, all the staff members in ADC laboratory, Teikyo Hospital and

University for supporting us during this training course. I will miss forever the image of the honorable Prof. Kazuo Suzuki who always walked very fast, smiled gently, leaded us enthusiastically to visit many locations. I love all of you.

Potential Collaboration:
I hope that the program will continue to give more persons in our hospital a chance to visit Japan, to be able to approach the modern and proffesional medical systems.


Name: PHAM QUYNH MAI TRANG, M.D.
Country: Vietnam
Department: Neonatal Intensive Care Unit (NICU), Children's Hospital 1, Ho Chi Minh city
Position: Pediatrician

Job description (7 year-working experience):
- Performing clinical examination and reviewing literature search in treatment for neonatal problems: respiratory distress syndrome, sepsis, bronchopulmonary Dysplasia (BPD), necrotizing enterocolitis, Retinopathy of prematurity (ROP), Hypoxic Ischemic Encephalopathy (HIE).
- Updating current practice: attending hospital rounds, patient care conferences, participating in educational lectures, procedures.
- Management and follow-up programs of NICU: premature babies, especially discharged extremely low birth weight (ELBW) infants.
- Guiding and standardize staffs from remoted hospitals in clinical skills and stimulation scenarios in NICU.
- Collaboration between NICU and Perinatal and Neonatal Association of Ho Chi Minh City (PANAH) in researches, database and annually reports.

Summary of the 10 days training course in SAKURA program:
Firstly, during the scheduled course, I am particularly impressed by the delivery of cutting-edge therapies and the comprehensive outpatient follow-up clinic which are being developed in Itabashi campus and Teikyo University Hospital. Throughout visiting departments such as: Pediatric, NICU, ADC laboratory, Pharmacology department, Safety Control department, Infectious Disease Control and Prevention department, Clinical laboratory, Medical Engineering sterilization center, Microbiology department, Simulation center laboratory, Public health department, Faculty of pharmaceutical, JATA (tuberculosis), St. Luke's International University Hospital, it would be a great chance for me to observe, review to these highly sophisticated treatment and apply these improvement in an international standardization.
Secondly, we had an opportunity to be introduced the latest research and clinical trials in bedside units and laboratory center. Teikyo University Hospital with advanced technology and modern equipment provided new insights into hospital operations including coordinating between standard medical practice and scientific research. Furthermore, risk management and infection control issues had already worked systematically with useful manual handbooks and adequate consultant with severe cases through well-trained staff in any areas. Because the nosocomial control and iatrogenic preventing in Vietnamese hospital was not well-prepared even though implementing many training courses. This system is a role model to develop and apply in Children's Hospital 1 in order to achieve the goals in managing and operation.
Finally, the chance to be able to participate in the BLS training course for the first time of SAKURA Program would undoubtly push myself forward in awareness of emergency cases everywhere, everytime. Those days might be my favourite day because I learnt most from the specialist of Stimulation Center Laboratory, from real clinical experience to academic knowledge with AED tools.

Benefits from SAKURA Science Program:
I worked extensively in the field of premature infants and newborns in NICU, which helps me have a fundamental material. However, Vietnam is a developing country and rate of the pre-termed and termed neonates are dramatically high and so does the death rate. Applying all the updated knowledge and skills for clinical practice everyday will be my first priority. Sometimes, we focus on treating patients and inadvertently lack of managing the infection and risk control which can reduce the outcomes of patients. By joining in this program, I can share and review my knowledge and experiences with colleagues in the Teikyo University Hospital. This is very good solution to enhance medical care service in Vietnam. Therefore, we will erase a gap between regions, human resources, facilities and widespread awareness so the babies everywhere can be taken care in better and safer medical standards.
Besides learning from the staffs, I made friends with Japanese students by attending lectures and joining group discussion self-

study. Everyday after working day-time, my friends and I went sightseeing around the city (Odaiba, Shinjuku, Shibuya, Mt. Fuji …) and tasted wonderful local food. I loved ancient buildings with majestic landscape and beautiful temples. I fell in love straight away with the peace of Tokyo. Japanese people are so friendly. They always say "Thank you" and "Sorry" all the time to express their politeness. We also have time at weekend with Mr. Soichi to visit Miraikan Museum - considered the House of Future, enjoying impressive developed technology exhibition. Experienced Japanese culture are unforgettable memories to me.

Potential collaboration:
Doing research is very necessary in contributing to the improvement of health outcomes in Vietnam and to support for clinical application. Researching is a key to discover all aspects of figures about disease in Vietnam which could be an important factor to provide a suitable treatment for patients in Vietnam's condition. For the positive things, SAKURA Science exchange program gives an opportunity for management knowledge and keeping up with day by day updating medical world.
Besides, equipped with the hands-on working experience gained in Vietnamese Hospital, soft skills such as team working gained from this observation time will benefit every doctor a lot in continuously challenged working time, especially the fields in Safety and Infection Control. Having seen such a broad spectrum of view in medical managements has broadened my knowledge of hospital operation.
We enter medicine with a passionate interest in global health, I believe that SAKURA Science exchange program will nurture this commitment and encourage its expression in our career of taking care of neonates and children.

Name: TRAN VAN CUONG, M.D.
Country: Vietnam
Department: Emergency Department of Children's Hospital 1, Ho Chi Minh City
Position: Pediatrician

Job Description:
I have been working at Emergency Department as pediatrician since 2012. These are my some responsibilities:

- Receiving patients from another hospitals in provinces with a lot of infectious diseases as hand foot mounth disease, dengue hemorrage fever shock (very common in Vietnam), pneumonia, sepsic shock…
- Assessing patients that enter the Emergency Department. Then, I have to recognize severe patients that require proper intervene immediately.
- Conducting follow-up visits to monitor the patient's condition carefully.
- Requesting the appropriate medical tests and based on them, follow a treatment plan.
- Referring patients to the appropriate specialists and sometimes we have meetings to discuss about the patients condition.
- Ensuring that patients are stable before transferring them to proper departments for further evaluation.

Summary of the 10 days training course in SAKURA program:
It was the first time I came to Japan. That was absolutely amazing and wonderful. After a 10-day trip through the SAKURA Science Program, I discovered many things in Japan from the weather, the people, the faculties at Teikyo University to Japanese culture. Fortunately, we came to Japan in autumn and the weather in Japan was cool and fresh with a lot of beautiful scenery to take wonderful photos there. Communicating with Japanese, I found out that people here were so kind, responsible, friendly, professional and some good characters that I spent much time to think about. One of the most impressive things to me is that Japanese are always on time. It was my big honor for making friends with them.
It was a big mistake if I would not refer to Japanese cuisine. Japanese food is so delicious whenever we have meals here. Walking around and enjoy street food in Japan was really one of the best memories I have ever had in my life.
We had a very busy schedule in Japan with 10 days and I had chance to visit many places as Pediatric Department, NICU, Safety Control Department, Infection Control Department, Pharmacy Department, Medical Engeneering Department, Microbiology Department, Central Laboratories, Public Health Department, JATA (Tuberculosis)… and one of the most exciting places to me was Simulation center where I attended PLS course that was really impressive and we were really interested in that course. There were lots of things that made me think we should follow them like the way Japanese people work, their warm and enthusiastic welcome. I really admired people here with how they deal and fix natural disasters as typhoon, earthquake, volcano… There seemed nothing happen at the time we came to Japan even though they just suffered one of the most dangerous typhoons in decades in Japan, Hagibis. Everything in places I visited was very modern, neat, operated, and properly decorated. I was deeply impressed with some departments like how Safety Control Department worked to find and control infectious diseases. By visiting Research Institute of Tuberculosis in Japan, I learned more the history, how to control tuberculosis efficiently in developing countries like Vietnam. We also had chance to visit St. Luke's International University Hospital that was really beautiful and attractive. Besides spending time in the university and hospital, we were very lucky to take some outdoor activities to Miraikan museum and Mount Fuji. The National Museum of Emerging Science and Innovation (Miraikan) is definitely a must-see for all of us. Until now I can not stop thinking about the tour that teacher Shoichi came with us to Mount Fuji. It was really a fascinating feeling at Mount Fuji that has a mix of spectacular and romantic beauty in Japan with autumn leaves surround it in the afternoon. Mount Fuji is really one of the most famous landmarks of Japan, and seeing it in autumn makes it seem much more majestic. That must be one of the most interesting experiences that I will never forget. After all, I sincerely appreciate the SSP, Professor Suzuki and all his colleagues for giving us this chance to explore culture and people in Japan and practise in Teikyo University.

Potential Collaboration:
I really hope in the future we will have more exchange programs between our hospital and your university in Japan. We expect that you will support us to develop systems like yours. We look forward to see some our researchers can come to your country to study through SAKURA Science Program.

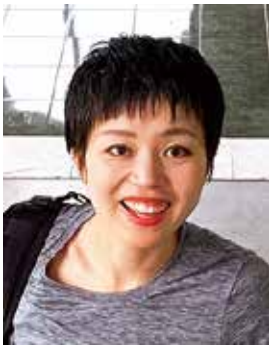
看護/助産教育の質改善に向けた国際協働の実際：ミャンマー マンダレー看護大学との連携

東京医療保健大学 千葉看護学部 教授　小黒　道子
静岡県立総合病院 助産師　渡辺由佳子

An international collaboration for the quality improvement of nursing/midwifery education: Working with university of nursing, Mandalay, Myanmar

Michiko Oguro, RN, RMW, PhD
Professor, Tokyo Healthcare University, Chiba Faculty of Nursing, Japan
Yukako Watanabe, RN, RMW, MSN
Shizuoka General Hospital, Shizuoka City, Japan


小黒道子


渡辺由佳子

Since basic nursing education in undergraduate degree programs (hereinafter referred to as nursing education) began in the US in 1889, it subsequently became general practice in the 1950s, and in the 1980s, similar trends expanded in a number of countries in the western Pacific and in Europe. The WHO (2009) stated that university education relating to nursing/midwifery remains problematic with great disparities between programs provided in different global regions.

In Myanmar, situated in South East Asia, the first nursing university in the country was opened in 1991, and there are currently 3 schools that offer nursing education in undergraduate nursing courses. The Myanmar Nurse and Midwife Council (2015), the Myanmar regulatory agency of nurses and midwives, issued guidelines on the standards for Myanmar nursing and midwife education courses and certification standards, presenting regulations in line with 8 frameworks with which nursing and midwife education organizations should comply. Today, in Myanmar, we are witnessing to build basic foundations in baccalaureate nursing education.

One of the author, Oguro was involved in concluding an academic exchange agreement with the University of Nursing, Mandalay, (UoNM) Myanmar, in March 2018 at my former place of work (St. Luke's International University). At the same time, the plan was adopted by the 2018 Core-to-Core Program in the Japan Society for the Promotion of Science (B. Asia-Africa Science Platforms), and both universities are planning to conduct joint research, hold seminars, and exchange researchers in the 3 years leading up to 2021, focusing on the research exchange topic of "Development of Nursing and Midwifery Program to Train Leaders and Promote Quality in Antenatal, Intrapartum and Neonatal care." As part of this, the seminar on Quality Improvement of Nursing Education was conducted on 30th September and 1st October 2019 at UoNM. Dr. William L. Holzemer (Dean of Rutgers University, NJ) from the USA, Dr. Shigeko Horiuchi (Dean of St. Luke's International University, Tokyo), Dr. Hiromi Eto (Prof. of Nagasaki University, Nagasaki),Yukako Watanabe (Registered Midwife of Shizuoka General Hospital, Shizuoka), and I from Japan visited there and there were lively lectures and traffic in ideas among the participants.

Objectives of the Seminar

1. To renew the awareness of duties and responsibilities as nursing educators
2. To consider the academic career as a teacher in Myanmar
3. To find out how to strengthen the competencies of nursing educators and researchers

Participants

60 nursing leaders; 25 are the members of the faculty of UoNM, 25 are the nursing managers and the clinical trainers of the practicing hospitals in Mandalay, and 10 are the teachers of the nursing or midwifery schools in Mandalay; were participated in the seminar.

Day 1: Lectures

We had three lectures on Day1. Dr. Holzemer delivered a lecture "Developing the Competencies of Nursing Educators and Researchers". It was about the global standards of nursing educator and nursing researcher, which contents had been requested by Myanmar side beforehand. Many participants asked questions about the lecture. For example, "What is the difference between

nursing educator and nursing researcher?" "How do you evaluate the faculty staffs in your university?" and so on.

Dr. Horiuchi presented a lecture "Good Linkage of Education, Research and Practice". She explained the importance of linking the education, the research and the practice, and necessity of the research in nursing. Then, she showed her 3 cases of the collaboration between the research and the practice. They were interested in the lecture. This could be a good opportunity for them to think about the evidence-based practice and the collaboration with each other.



Dr. Holzemerによる講義と質疑応答

At the last of day 1, Dr. Oguro talked about "Participation-Based Education for Nursing Students". A video material was introduced as a participatory teaching by patients/ people. The video "Please tell us your birth experience", which is about Asian women's storytelling of their childbirth experience, was shown as an example. After watching the video, one faculty teacher of nursing of women's health said, "I was impressed by the women's voice. This is my first time that I know women feel so anxiety and alone when delivering and they remember their experiences for a long time. And I am sorry that I could not care for them. I want my colleagues and students to watch this video. "


ビデオ教材を視聴する参加者

Day 2: Lectures and Group Work

Participants heard two lectures and had a group work on Day2. Dr. Holzemer delivered a lecture "Building a Clinically Focused Academic Career". He explained how to build academic career and introduced the outcome model to reflect the program of the research/ scholarship.


長崎大学の江藤教授によるOSCEの講義

Dr. Eto gave a lecture "OSCE -A Evaluation Method to Assess Clinically Needed Skills-". She explained what the OSCE is. To have the image of OSCE's contents and evaluation, the participants tried the role-play in pairs; each played a role of a nurse and a patient in the measurement of the vital signs and the venous blood-sampling. The participants asked a lot of questions like "how to choose the evaluator and the SP (Standardized-Patient)?" and "how to evaluate the student's attitude specifically?" and so on.


OSCEのペア・ワーク

Group work and Presentation: Creating Student-Centered Learning

Participants were divided into 11 groups among the same affiliation and had a group work to discuss creating "Student-Centered Learning". At first, they had a few minutes to think about their teaching scenes or classes which they would like to increase student's motivation to learn by themselves. After that, they shared each ideas within a group. Secondly, they chose one situation and discussed how they can make a change concretely in that situation. After the group discussion, each group presented what they discussed and their action plans. They participated in the group work hard. Both clinical area and the faculty want to change student's learning situation much better and presented a lot of ideas. Dr. Holzemer advised that it should be separated into what we can control and what we cannot control. It is so hard to change the out-of-control things, but if it is what we can control, we can change the situation immediately.




グループワークと発表の様子

Closing Remarks

Each participants received the certificates of the seminar from the president of UoNM and all lecturers hand by hand. The seminar was successfully completed.

マンダレー看護大学学長による修了証の授与

Acknowledgment

We express the deepest gratitude for all of the faculty members of UoNM and the participants. We also wish to thank the timely help given by Thu Zar Myint, an assistant of the seminar. Funding from the Japan Society for the Promotion of Science (B. Asia-Africa Science Platforms) is gratefully acknowledged.

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マンダレー地区の他大学学長および堀内教授（聖路加国際大学）と。中央が著者（小黒）


マンダレー看護大学のセミナースタッフと。右から3番目が著者（渡辺）


opening ceremony終了後の集合写真。マンダレー地域の大臣・各大学の学長・保健省管轄の病院長をはじめ、セミナー参加者、講師陣、スタッフが一同に会した

主要な抗菌薬における供給停止の危機

クワラ大学　医学生物化学＆薬理部門・クワラ大学　先端軍事研究所　今村　攻

Crisis to supply of key antibiotic halted

Osamu Imamura
Institute of Advanced Military Studies, Kwara State University Department of Medical Biochemistry & Pharmacology, Kwara State University, Malite, Nigeria

Abstract: Drug shortages are a complex global problem, therefore, to solve this issue with the drug shortages, all of stakeholders; pharmaceutical companies, hospitals, government and others needed to participate in managing the drug shortages and also, the stakeholders have to quantify and identify the underlying causes and actual impact of the drug shortages. However, there are a few original articles only to show specific solution for the drug shortage. Therefore, this study endeavors to evaluate some issues which are focused on antimicrobial.

Key words: AMR (Antimicrobial Resistance), drug shortages, Cefazolin, a complex global challenge.

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1．はじめに

毎年、世界中で少なくとも約70万人もの人が薬剤耐性（AMR: Antimicrobial Resistance）菌感染症により死亡していると考えられている。このまま対策が取られなければ、2050年には年間死亡者数は1,000万人にまで上昇するとの予測もある[1-2]。昨今、抗菌薬の供給が不安定となり、薬剤不足になると感染症治療や周術期感染の予防などの基本的な診療行為に問題が生じている。さらに、抗菌薬については、市場性や採算予見性の低さゆえ、国内外で市場が崩壊しており、現状のままでは新たな抗菌薬の研究開発はもとより、既存の抗菌薬の安定供給という使命さえ果たすことが難しいとの状況の下で、抗菌薬の安定供給に向けた４学会：公益社団法人日本化学療法学会、一般社団法人日本感染症学会、一般社団法人日本臨床微生物学会および、一般社団法人日本環境感染学会の提言により、生命を守る薬剤を安心して使えるようにするための提言が行われた[3]。その背景は2019年３月にセファゾリンという抗菌薬が１つの企業から供給困難となったことである[3]。これにより代用可能な他の抗菌薬も不足する状態を招き、多くの医療機関で適切な感染症の治療に問題が生じている[3]。すなわち、現在、日本の感染症診療は、１つの企業の１つの薬剤が供給停止となれば、その影響が予想以上に拡大するような危うい状況に立たされており、この問題は、医療の問題を超えて、安全保障上の問題を呈していると４学会から指摘を受けている[3]。さらに、グローバル化を受けて製薬産業も製造原価を考慮し、製造工場を世界各地に拡大している状況もある。さらに、抗生物質（抗菌薬）の使用量は2000～15年の16年間に世界規模で増大し、所得が少ない国々の経済発展が主要な押し上げ要因になっている。抗菌薬の安定供給は、複雑なグローバル課題を抱えている[1-2]。そこで、本論文では抗菌薬の安定供給に関して抗菌剤を例として、その問題と解決策に関してグローバルな視座から言及したい。

2．セファゾリン

セファロスポリン系の抗生物質で、細菌の細胞壁合成を阻害することにより、殺菌的な抗菌作用を示す。通常、血液感染症、皮膚感染症、呼吸器感染症、尿路感染症、胆道感染症、婦人科感染症、耳鼻咽喉科感染症など広い範囲の感染症の治療に使用される。

3．セファゾリンの製造体制を考慮した4学会からの提案

セファゾリンは中国で原料が製造され、イタリアで原末が作成されている。この原料は世界の中でも中国の１社でしか現在、製造していない[3]。このような一部の企業に極端に依存する現在の生産体制では、急に供給が途絶えるリスクが大きく、海外の状況によって、国内の感染症患者の命が容易に左右される安全保障上の問題に陥っているとも考えられるとの指摘が４学会からで出ている[3]。さらに、現在、抗菌薬の原料の大半が、中国を始め諸外国で製造されており、そのため、何か有事の際に、セファゾリンに限らず多く種類の抗菌薬が一度に入手困難になる可能性が考えられるとし、このような事態を避けるためには、製造過程の一部でも国内で対応できるようにすることが望まれると４学会は言及した後、抗菌薬の製造許認可の条件の見直し、国内生産でも利益を生み出せるような薬価の設定などの取り組みが必要と訴えている[3]。例として、現在、ペニシリン発酵工場の国内からの撤退から20年以上が経過しており、国内においてペニシリン系抗菌薬の生産体制を再構築するとしても、現時点で早急に手を打たなければ、技術的にも手遅れとなることが懸念される[3]。安定供給の観点から、6-アミノペニシラン酸（6-APA）等の主要な原料に関し、国内で生産した原料を用いて国内製造する抗菌薬については、新たな設備投資の費用を含めても採算割れとならない薬価とする制度の早急な構築するという更なる提案を４学会は提示している[3]。

4．薬価を変更する仕組みの構築

４学会によると、医療費の増大を抑える必要性は４学

会においても理解しているが、医療現場で広く用いられている重要な抗菌薬であっても採算まで薬価が切り下げられているのが現状であり、現在の薬価のままでは、製薬企業の多くが海外での製造に依存せざるを得ない状況に追い込まれており、さらには薬剤の販売そのものを中止する企業も出てきているとの指摘がある[3]。そして、国内でも肺炎を始め、感染症によって多くの命が失われている現状を踏まえて、生命を守る薬剤を安心して使えるように、一律に薬価を切り下げるのではなく、既存の抗菌薬、特にkey drugを選定し、これらに対しても薬価上での評価の見直しを行うことが必要であると述べられている。特に、感染症対策の観点からも、薬価を上げるべき抗菌薬について有識者による議論が行われるよう、厚生科学審議会感染症部会等においてkey drugとして選定すべき抗菌薬を審議し、その結果を基に薬価を変更する仕組みの構築が提案されている[3]。

5. グローバルの抗菌薬使用量把握し不適切な使用を抑制する

抗菌薬の大量使用は、薬が効きにくい薬剤耐性菌を増やすとして大きな問題になっている。米国や欧州の共同チームが米科学誌に発表したデータによると、76カ国の抗菌薬販売量のデータを入手し、世界保健機関（WHO）が示した薬の集計基準を基に使用量を算出している[1-2]。その結果、これらの国の抗菌薬使用量の総計は16年間で65%増加。人口千人当たりの１日使用量は39%増えていた。76カ国を国の所得によって３グループに分け、使用量との関係を見たところ、所得が高い国々では、千人当たりの１日使用量は16年間で４％減ったが、所得が中ぐらいの国と低い国ではいずれも78%増と急激に伸びていた。ただ使用量自体は依然として、高所得国の方が多かった[1-2]。抗菌薬使用量に影響する要因を調べると、所得の低い国では、１人当たり国内総生産（GDP）の増加と相関があった。高所得国ではそうした関係はみられなかった。この結果から、抗菌薬の不適切な使用を減らす努力は大切だが、必要な薬がまだ行き渡っていない貧しい国々で、抗菌薬の適正な利用をどう実現するかについての対応策が重要と考えられる[1-2]。

6. 複雑なグローバル課題への挑戦

複雑なグローバル課題への挑戦を、すでに具体的な解決策を要し実行させ成功を納めたビジネスモデルがあるので紹介する。米国初の非営利製薬会社Institute for One World Healthである。この企業のホームページのトップには、We Want to Contribute to World Health!という記載があるが、利益よりも、世界の人々のニーズを追求する非営利製薬会社であると理解できる[4-5]。C.E.Oのヴィクトリア・ヘイルの博士が最初に着目したのは、内臓リーシュマニア症を治療できる可能性の高い抗生物質である[4-5]。ヘイル博士の戦略は民間製薬企業が採算性を問題にして、市場の拡大を見送りがちな発展途上国へ、安価で効果がある薬剤を普及させることであり、発展途上国の地域性を考慮しているので、民間製薬企業との市場での競争は基本的に生じない[4-5]。さらに、発展途上国に特異的な疾患の選択、過去の合成された新薬候補の化合物のリスト化、化学合成や分子病理学なども良く考慮されている[4-5]。資金のパートナーとして、ビル・ゲイツの慈善団体、ビル・アンド・メリンダ・ゲイツ基金と提携している[4-5]。日本でもラパマイシンという抗生剤が、細胞増殖抑制をする分子病理学的な見地を踏まえて、臨床試験の結果から肺リンパ脈管筋腫症の承認を取得しているが、ヘイル博士の戦略は複雑なグローバルな課題へ世界の誰よりも早く着手し、その上、結果も着実に出している。

7. 結論

この産業構造を含めた世界共通の危機的状況を打開する糸口を見つけることは、薬剤耐性（AMR: Antimicrobial Resistance）対策の観点からも喫緊の課題と言える。そこで、日本の国民の健康と同時に発展途上国の人々も含めた複雑なグローバル課題への挑戦を試みるとことが必要と考え以下の項目を提示することにする。

1）生産において中国などの海外諸国に全面的に依存することを、できるだけ少なくし、機関技術である発酵生産技術は、小規模でも日本の伝統技術として継承できるようなシステムを検討する
2）key drugとして選定すべき抗菌薬を審議し、その結果を基に薬価を変更する仕組みの構築を検討する。
3）抗菌薬の不適切な使用を減らす努力は大切だが、必要な薬がまだ行き渡っていない貧しい国々で、抗菌薬の適正な利用をどう実現するかについての対応策を検討する。
4）既存の主要な抗生剤の分子病理学における検討を加え、適応拡大の可能性を検討する。
5）日本政府以外の、ビル・アンド・メリンダ・ゲイツ基金などの海外民間機関にも、主要な抗生剤の開発についてアプローチすることを検討する。

利益相反

開示すべき利益相反はない。

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PEER-REVIEWED ORIGINAL ARTICLE

Simulation of leukopenia developed with influenza A/H5N1 and its recovery with treatment of an antibody to influenza A/H5N1 virus

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Abstract

For highly pathogenic avian influenza A/H5N1, white blood cell count rapidly decreases after onset and then engender leukopenia. To elucidate the pathogenesis of leukopenia associated with highly pathogenic avian influenza A/H5N1 infection, simulations were conducted using a mathematical model of mice. Those simulation results suggest the possibility that therapy with an antibody to influenza A/H5N1 virus showed better improvement from leukopenia than neuraminidase inhibitor therapy.

Keywords: Highly pathogenic avian influenza A/H5N1, Leukocytes, H5-specific antibody therapy, mathematical model

Introduction

Innate immune response plays an important role in influenza A/H5N1[1]. In cases of seasonal influenza, counts of leukocytes, i.e. macrophages, neutrophils and lymphocytes in peripheral blood, increase slightly. By contrast, these leukocytes decrease rapidly in cases of influenza A/H5N1. Kawachi *et al*[2]. reported that patients infected with influenza A/H5N1 show leukopenia, but patients infected with rhinovirus, adenovirus, or bacteria in Vietnam do not. Numerous apoptotic leukocytes have been observed in lung tissues of a patient who died of avian influenza A/H5N1[3]. Furthermore, their possibly major role in destroying alveolar epithelial cells of lung has been pointed out, but apoptosis of infiltrating leukocytes into the lungs alone might not be sufficient to cause leukopenia. Because lung lesions might engender acute respiratory distress syndrome (ARDS), both leukopenia and severe ARDS are characteristic symptoms of avian influenza A/H5N1[2].

In addition, the rapid decrease of leucocytes in peripheral blood has been demonstrated in experiments of mice infected with A/H5N1[4]. Moreover, leukopenia associated with the pathogenesis of highly pathogenic avian influenza A/H5N1 (HPAI A/H5N1) has been reported from experiments conducted with mice[5,6].

One method to investigate the influenza A pathogenesis is simulation using a mathematical model. Several mathematical models are proposed to simulate the innate and adaptive immune responses to influenza A infection[7-11]. Especially Handel model is developed to understand quantitatively the whthin-host dynamics of seasonal influenza infection, and revealed both an innate and an adaptive immune response play an important role to explain adequately the experimental data[9]. On the other hand, the mathematical model without immune response is used to estimate the effect of therapy using NA-inhibitor based on the data in vitro[12]. We modified Handel model to apply the case of HPAI A/H5N1, and estimate the effect of therapy to HPAI A/H5N1 using the modified model involving immune response.

For simulation, one apparent difficulty is ascertaining the parameters to apply to the pathogenesis[13,14]. Frequently, no other avenue is available to identify parameters than using data from different experiments or reports of the patients. However, consistency of the parameters should be kept in mind.

In this study, simulations were conducted with a mathematical model to elucidate the leukopenia associated with the HPAI A/H5N1 infection. Model parameters for leukopenia were adapted from experimental data of mice. The model was applied to estimate therapies with neuraminidase (NA) inhibitor or an antibody to HPAI A/H5N1. It should be noted that although the model is not mouse specific, the parameters of model are determined by the experimental data of mice.

Methods

Mathematical models

We modified the model reported by Handel *et al* [9]. developed for quantitative investigation of the pathogenesis of seasonal influenza A in mice. The Handel model was developed to simulate seasonal influenza, and the parameters were set using the experiment of Iwasaki and Nozima (IN experiment) [15]. The proposed Handel model for influenza A including immune response is explained below.

$$\dot{U} = \lambda D - bUV \quad (1)$$
$$\dot{E} = bUV - gE \quad (2)$$
$$\dot{I} = gE - dI \quad (3)$$
$$\dot{D} = dI - \lambda D \quad (4)$$
$$\dot{V} = pI/(1+\kappa F) - cV - \gamma bUV - kVX \quad (5)$$
$$\dot{F} = wV - \delta F \quad (6)$$
$$\dot{X} = fV + rX \quad (7)$$

In those equations, U represents uninfected or susceptible cells to influenza. E stands for latently infected cells, I signifies productively infected cells, D denotes dead cells, V represents free virus, F represents innate immune response, and X stands for the active immune response. The units above values follows the Handel model; U, E, I, D are count by cell number and V by PFU. And F, X are shown in the same mode of Handel *et al* [9]. Parameters λ, b, p, κ, γ, k, w, δ, f, and r are all constants and mentioned later.

The model shows that susceptible cells U can become infected cells E by virus V. After some time, productively infected cells I start to produce virions. Virus-producing infected cells die at some rate and new susceptible cells replace dead cells D. Free virus is clarified by non-specific mechanisms, absorbed in cells, or killed by adaptive immune response. The innate immune response F is triggered upon infection and increases proportionally to free virus. Although innate immune response is triggered rapidly, adaptive immune response is assumed to take longer to high levels. For the Handel model, the humoral component of adaptive immune response (antibodies) is modeled assuming antibodies X are activated proportional to free virus load and followed by antigen-independent clonal expansion. Only the expansion phase of adaptive immune response is modeled because the peak and contraction of adaptive immune response occurred days after the virus cleared as described below. Regarding the pathogenesis of influenza A, virus titers had declined to an undetectable level by 10 days post-infection (dpi), but the antibody peak occurred at around 11 dpi in the experiment of seasonal influenza[16]. The peak viral load comes at 4 dpi, but lung damage caused by immune cell infiltration appeared to peak at 11 dpi[17].

To fit the data of the IN experiment, the Handel model used the interpolation formula of the data for innate immune response instead of eq. (6).

$$\log_{10} F(t) = 0.5388t - 0.08429 \text{ for } t \le 5,$$
$$\log_{10} F(t) = -0.7435t + 6.328 \text{ for } t > 5 \qquad (8)$$

Here, t represents the days after infection (dpi). Parameters were fitted with or without time delay τ day in the form of $F(t-\tau)$. Although the case with delay improved the fitting, either is acceptable.

For seasonal influenza, adaptive immune response plays major role. However, for HPAI A/H5N1, innate immune response will become important[1]. For this reason, the Handel model is modified as presented below.

$$\dot{I} = gE - dI - \alpha IL \qquad (9)$$
$$\dot{D} = dI + \alpha IL - \lambda D \qquad (10)$$
$$\dot{M} = zV - \varepsilon M \qquad (11)$$
$$\dot{L} = \xi M - \beta (L - L^*) - \alpha\sigma IL \qquad (12)$$
$$\dot{X} = eM + qX \qquad (13)$$

In those equations, M stands for the stimulated antigen-presenting macrophage, L signifies circulating leukocytes, and L^* denotes a steady state. The units of M and L are adjusted to the innate immune response of the Handel model. Parameters α, z, ε, ξ, β, σ, e, and q are constants mentioned later. The modified equations consist of (1), (2), (9), (10), (5), and (11)–(13). In the modified model, leukocytes kill infected cells in (9). In turn, leukocytes interacting with infected cells are destroyed in (12). Details are discussed later.

Model parameters

The parameters of modified model are set to follow the Handel model as stated below. For the parameters of modified model to IN experiments in (1), (2), (5), (9), and (10), the same values as those used in the Handel model are used for (1)–(5) for g, d, c, b, p, γ, κ, k, and λ. Furthermore, $\alpha = 0$ is assumed, because the destruction of infected cells by innate immune response is negligible in cases of seasonal influenza. Then eq. (12) is separated from the system. In eq. (5), M is used instead of F, assuming that F is proportional to M. The other parameters of immune response are fitted using least-squares method into the result of the susceptible cells U, virus titer V and antibody concentration X of Handel model without delay $\tau = 0$ in eq. (8). The values of parameters of modified model used for seasonal case are listed in Table 1.

Next, the parameters in the equations of virus and innate immune response used for HPAI A/H5N1 case were refitted into the experimental data of virus titer and leukocytes in the experiment of Xu *et al*[6]. The virus used in the experiment designated as Chicken/HB/108 (a strain of HPAI A/H5N1), was isolated from chicken. It is highly lethal to mice. The values of refitted parameters are in Table 2. For fitting, the experimental data were digitized from figures. The other parameters were the same as those for seasonal case. For leukocytes, the data of the leukocyte counts of mice vary in response to genetic and environmental factors, e.g. the range is 5.87×10^3–11.62×10^3 (1/μl)[18] or 11.1×10^3–19.6×10^3 (1/μl)[19]. The circulating blood volume of mice is estimated 1.0 – 2.4ml. The leukocyte count in a steady state L^* is set as 7.57×10^6, as it was in Xu's experiment. The parameter of immune response $\kappa = 0$ was set in (5), considering the effect of immune response by which infected cells are killed by leukocytes in (9). The rate of death of leukocytes interacting with infected cells σ was set as 0.1 with reference to the case of lymphocytes[10]. Life-span of virus 1/c or rate constant of non-specific virus removal c is unclear. The estimated value of c is $c=10^9$, or $c=2^{7,10}$, $c=3^{11}$. Here, c=2 is used for refitting. The recovery rate of leukocytes β=0.005 fitted in the case of HPAI A/H5N1 is lower than that of seasonal cases β=0.05 – 0.5 described in[10] and discussed later.

Models for medical treatment

NA inhibitor reduces the progeny virus yield in the infected cells, as described in an earlier report[12]. The equation of virus (5) is changed to include the treatment effects.

$$\dot{V} = (1-\varepsilon(t))\, pI/(1+\kappa F) - cV - \gamma bUV - kVX \qquad (14)$$

Here, $\varepsilon(t)=0$, $t<T_m$, $\varepsilon(t)=\varepsilon_0$, $t>T_m$, where T_m is the time at which the treatment starts, the efficacy of NA inhibitor is specified as ε_0=0.98[12].

However, H5-specific antibody, inhibits intracellular neutralization rather than yield reduction[20]. Mice cells are protected from HPAI A/H5N1 infection by treatment with H5-specific antibody[21]. Equations (1) and (2) are changed to include the H5-specific antibody treatment effects as presented below.

$$\dot{U} = \lambda D - b(1-\varepsilon(t))\, UV \qquad (15)$$
$$\dot{E} = b(1-\varepsilon(t))\, UV - gE \qquad (16)$$

Here, $\varepsilon(t)$ is the same function as that of eq.(14). The H5-specific antibody efficacy is set as 0.90 – 0.98 based on the experience of other inflammatory diseases studied by one of the authors (SK)[22] and with reference to earlier reports[20,21].

Results

Seasonal influenza

For seasonal influenza, simulated results of the modified model were compared to that of the Handel model. The initial

Table 1. Model parameters for seasonal influenza

symbol	meaning	values	comments
1/g	duration of latent eclipse phase	6 h (g=4 per day)	fixed by Handel et. al.
1/d	lifespan of infected, virus-producing cell	12 h (d=2 per day)	fixed by Handel et. al.
1/c	lifespan of free virus (1/rate constant of non-specific virus removal)	2.4 h (c=10 per day)	fixed by Handel et. al.
b	infection rate	2.1×10^{-7}	fit to IN's experiment by Handel et. al.
p	virus production rate	0.05	fit to IN's experiment by Handel et. al.
λ	rate of regeneration of epithelial cells	1.9×10^{-8}	fit to IN's experiment by Handel et. al.
γ	conversion between infection virons and EID/PFU units	0.00075	fit to IN's experiment by Handel et. al.
κ	strength of innate immune response	0.018	fit to IN's experiment by Handel et. al.
k	kill rate of adaptive immune response	1.8	fit to IN's experiment by Handel et. al.
f	recruitment rate of adaptive immune response (Handel model)	2.7×10^{-6}	fit to IN's experiment by Handel et. al.
r	expansion rate of adaptive immune response (Handel model)	0.3	fit to IN's experiment by Handel et. al.
z	conversion rate of antigen-presention macrophage	0.0001	fit to results of Handel model
ε	reciprocal of life span of antigen-presenting macrophage	0.0744	fit to results of Handel model
e	recruitment rate of adaptive response (modified model)	0.0574	fit to results of Handel model
q	expansion rate of adaptive immune response (modified model)	1.3×10^{-8}	fit to results of Handel model

IN: Iwasaki and Nojima

Table 2. Model parameters for HPAI A/H5N1

symbol	meaning	values	comments
α	rate of destruction infected cell by leukocytes	2.45×10^{-9}	fit to data of Xu's experiment
ξ	migration rate of leukocytes	4.17×10^{-7}	fit to data of Xu's experiment
β	rate of recovery of leukocytes to steady state	0.0054	fit to data of Xu's experiment
1/c	lifespan of free virus (1/rate constant of non-specific virus removal)	12h (c=2 per day)	fixed, see text
σ	destruction rate of leukocytes to infected cells	0.1	fixed, see text
p	virus production rate	0.015	fit to data of Xu's experiment
κ	strength of innate immune response	0	fixed, see text
γ	conversion between infection virons and EID/PFU units	1.91×10^{-5}	fit to data of Xu's experiment
k	kill rate of adaptive immune response	3.31×10^{-10}	fit to data of Xu's experiment

value of uninfected or susceptible cells in simulation for the IN experiment is U_0=7.0×10^9, V_0=3.8×10^4, as used by Handel *et al*[9]. Calculation was performed using the conventional fourth-order Runge–Kutta method. The uninfected or susceptible cells U are presented in Figure 1A. Latently infected cells E and productively infected cells I are presented in Figure 1B. Virus titer V is shown in Figure 1C. The cells in Figures 1A and 1B are correspond originally to the epithelial cells in lungs of IN experiment, and also virus titer in Figure 1C swabbed in lungs of IN experiment. As presented in Figure 1C, the virus titer of the modified model decayed faster than that of the Handel model after 5 dpi. In Figure 1D, the innate immune response F of Handel model and M in the modified model are shown using interferon concentration in the same way as that used by Handel *et al*[9]. At 5 dpi, the interpolation equations for the variable F, i.e. the interferon production from innate immunity of the Handel model were changed. Furthermore, as presented in Figure 1E, the adaptive immune responses X, the neutralizing antibody production of Handel model and the modified model are shown in the same way of Handel *et al*[9]. Because the adaptive response plays an active role in cases of seasonal influenza, variable M is regarded as the equivalent concentration necessary to produce the titer of neutralizing antibody X to fit the result of the Handel model.

HPAI A/H5N1

Simulation of HPAI A/H5N1 was conducted using the modified model. Some parameters related mainly to the virus and innate immune response are refitted into Xu's experiment for mice infected with HPAI A/H5N1 as described above[6]. The calculated pathogenesis of HPAI A/H5N1 is presented in Figure 2. Calculation starts after 1 dpi. The initial values were U_0=7.0×10^9 and V_0=4.17×10^5. Leukocytes were set as L_0=L^*=7.57×10^6. The values of V_0 and L_0 are digitized as the figures of Xu's experiment[6].

As presented in Figure 2A, the number of susceptible cells in epithelial cells decreased rapidly. Latently infected and productively infected cells increased and subsequently decayed. Calculated results of virus titer and counts of leukocytes in the peripheral blood were compared to those obtained from Xu's experiment. For virus titer in Figure 2B, results from simulations in the expansion phase from 1 dpi to 6 dpi well fit the data reported from Xu's experiment. In the contraction phase, the virus titer of the experiment decayed more rapidly than that of simulation. The simulated leukocyte counts in peripheral blood showed coincidence to the experimental data from 1 dpi to 6 dpi in Figure 2C. The decay of simulation after 6 dpi became slower than that of experiment.

Treatments for HPAI A/H5N1

Because leukopenia might be a key role of disease activity in patients with HPAI A/H5N1 infection, the effectiveness of treatments for HPAI A/H5N1 with NA inhibitor or H5-specific antibody was simulated using the modified model. Figure 3 and Figure 4 present a comparison of both therapies to virus titers and leukocytes. Administration of NA inhibitor and H5-specific antibody started on 2–4 dpi. As depicted in Figure 3, both NA inhibitor and H5-specific antibody were effective in the simulation using the modified model. NA inhibitor suppressed the virus titer promptly. H5-specific antibody also achieved suppression with hours of delay in the simulation. By contrast, although both treatments provided symptomatic improvement in leukopenia (Figure 4), H5-specific antibody therapy improved the symptoms to a greater degree than NA inhibitor therapy in the simulation in cases of treatment starting on 3 dpi (Figure 4B).

Discussion

In our simulation of seasonal influenza, the results of the modified model approximate those reported from the Handel model well in the expansion phase. However, in the contraction phase after 5 dpi, when the interpolation equation of innate response is changed at 5 dpi in eq. (8) of Handel model, differences are apparent mainly in the innate immune response. The change of eq. (8) of innate immune response in the Handel model may suggest the mechanism of innate immune response in contraction phase may be different from that of expansion phase. For HPAI A/H5N1, at a glance, the reported simultaneous development of leukopenia and lung lesion in cases of HPAI A/H5N1 infection is strange, because cellular injury in the lung is induced by leukocytes. However, the simulation using the modified model reproduced the simultaneous development of leukopenia and lung lesion in cases of HPAI A/H5N1 infection. The simulated result reproduced the data of Xu' experiment well in the expansion phase, but the difference between the simulated result and the data of Xu's experiment appears in the contraction phase in case of HPAI A/H5N1.

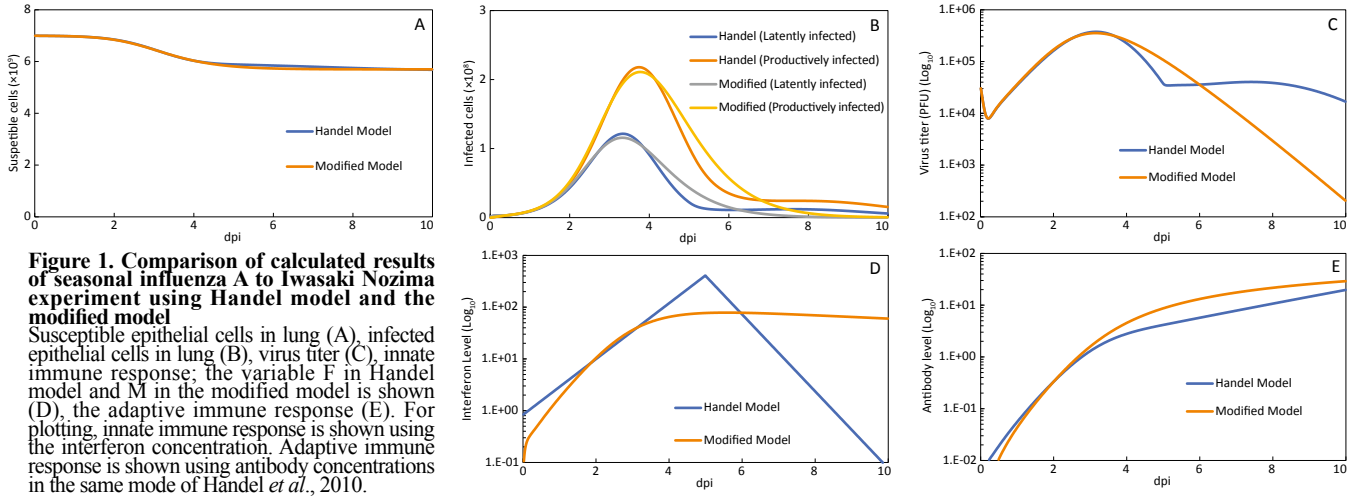

Figure 1. Comparison of calculated results of seasonal influenza A to Iwasaki Nozima experiment using Handel model and the modified model
Susceptible epithelial cells in lung (A), infected epithelial cells in lung (B), virus titer (C), innate immune response; the variable F in Handel model and M in the modified model is shown (D), the adaptive immune response (E). For plotting, innate immune response is shown using the interferon concentration. Adaptive immune response is shown using antibody concentrations in the same mode of Handel *et al*., 2010.

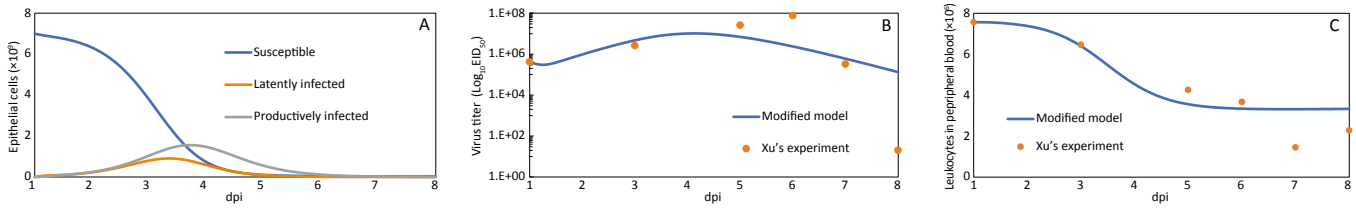

Figure 2. Comparison of calculated results of the modified model and the experimental data of highly pathogenic A/H5N1
Susceptible, latently or productively infected epithelial cells (A), virus titer (B), leukocytes (C). Dots show experimental data reported by Xu *et al*., 2006.

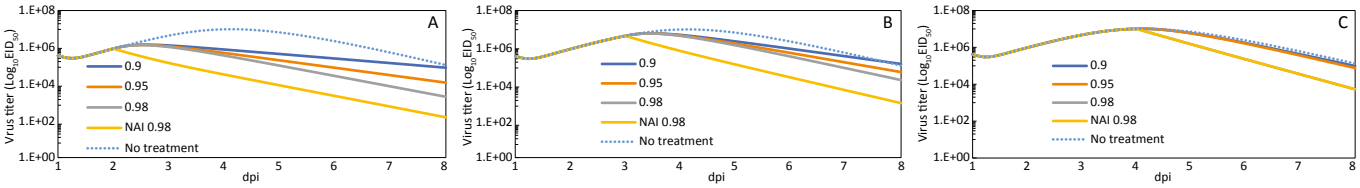

Figure 3. Virus titer during treatment for highly pathogenic influenza A/H5N1 using NA inhibitor and H5-specific antibody. The NA-inhibitor efficacy is 0.98. That of H5-specific antibody is 0.90–0.98
Administration starts after 2 dpi (A), 3 dpi (B), 4 dpi (C).

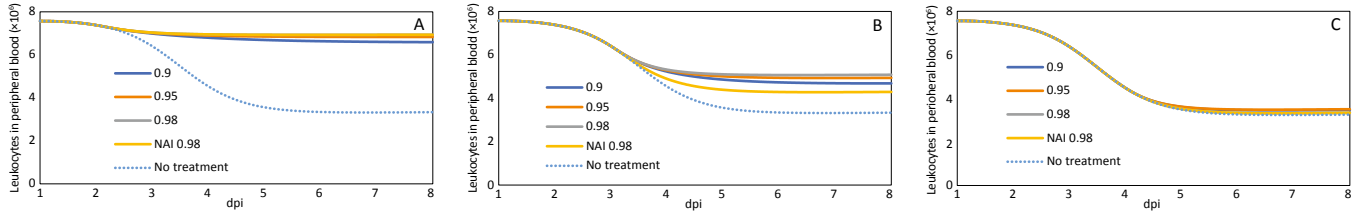

Figure 4. Leukocyte counts during treatment for highly pathogenic influenza A/H5N1 using NA inhibitor and H5-specific antibody. The NA-inhibitor efficacy is 0.98. That of H5-specific antibody 0.90–0.98
Administration starts after 2 dpi (A), 3 dpi (B), 4 dpi (C).

In the contraction phase, the difference between the simulated result and the experimental data appeared both in case of HPAI A/H5N1 and seasonal influenza. For IN experiment, Interpolation of data, i.e. eq. (8) is used for innate immune response instead of the equations of rate law in Handel model. The two interpolation equations in eq. (8) will show the behavior of innate immune response in contraction phase differs quantitatively from that in expansion phase. If so, it might be difficult to describe the model of innate immune response by a single equation like Handel model or the modified model. To estimate the effectiveness of therapies for HPAI A/H5N1, simulated result suggests the expansion phase is more important than the contraction phase.

The simulation for the case of HPAI A/H5N1 using the data reported from Xu's experiment[6] demonstrated that susceptible cells in the lung decreased markedly after viral infection. In fact, the lung is the target organ of infection with A/H5N1 in mice. An experiment examining mice infected with HPAI A/H5N1 demonstrated that most mice showed prominent signs of respiratory distress: approximately 80% of mice (13 of 16) died on 6–8 dpi[6].

For Xu's experiment, the virus peak appears on 6 dpi. It is below the detectable level on 8 dpi[6]. The production of virus titer in the expansion phase was reproduced in the simulation, but no rapid decrease in contraction phase was reproduced. However, in another experiment, the virus titer in case of lethal HK483 maintains a high level during the experiment (7 dpi), although virus titer in cases of nonlethal HK486 (A/H5N1) begins to decrease after 5 dpi[5].

Innate immune response plays an important role in case of HPAI A/H5N1[1]. For killing infected cells by immune response, some models for seasonal influenza include the term the killing infected cells by adaptive immune response, i.e. CTL (cytotoxic T lymphocyte)[7,8,10,11], but no above model has the term of the killing infected cells by innate immune response. For innate immune response, Handel *et al*[9]. pointed out the possiblity of killing infected cells by leukocytes. However, the results of simulation are not presented and the destruction of leukocytes, mainly neutrophils, interacting with infected cells is not considered[9]. Antiviral mechanisms of neutrophils to host defense are considered as below[23]. Neutrophils can phagocytose the virus and produce various antimicrobiral agents that inactivate the virus. However, for producing antimicrobiral agents, neutrophils can become excessively activated, triggering overt immune activation and leading to host tissue damage. The study of mice infected with H1N1 by Sugamata *et al*. demonstrated the important role of neutrophil-derived myeloperoxidase (MPO), a kind of antimicrobial, in exacerbating acute lung damage[24]. And further, the important role of neutrophils on killing infected cells has been reported in the experiments of mice infected with H3N2[25] and H1N1[26]. In addition, it is shown that in vitro model system, although few or no neutrophils adhered to uninfected cells, neutrophils adherence to infected epithelia increased as the number of infected cells increase[27]. And, greatly enhanced infiltration of macrophages and neutrophils into the lung airway has been shown in experiments examining mice infected with A/H5N1[6].

Next, the destruction of neutrophils interacting with infected cells is characteristic for HPAI A/H5N1 as follows. The numbers of apoptotic cells in bronchial epithelial cells and subepithelial layer of mice infected with HK/483 (a strain of HPAI A/H5N1) are high[5]. In the experiment of mice infected with strains of HPAI A/H5N1, leukopenia was reported in cases of lethal HK483[5] and Chicken/HB/108[6]. It is noteworthy that the decrease of leukocytes of the sort does not occur in cases of nonlethal A/H5N1. Comparing data obtained for lethal H483 and nonlethal H486, although virus titers in the lung remained at approximately the same level up to 5 dpi, leukocytes in the case of H483 decreased greatly after 2 dpi, but leukocytes in the case of H486 decreased slightly at 2 dpi and began to recover after 3 dpi[5]. Furthermore, for mice infected with high or low doses of HK483 and HK486, only mice infected with HK483 at either dose showed profound reduction of total leukocytes in circulation[4]. The above braces the modification of the equation for innate immune response to HPAI A/H5N1. The innate immune response of the modified model in case of HPAI A/H5N1 is sketched in Figure 5.

For the therapy of HPAI A/H5N1, NA-inhibitor therapy and immunoglobulin therapy are simulated. NA inhibitor drugs are often the first choice for treatment. However, because of resistance during treatment, anti-influenza antibody is a candidate for alternative therapy. For the treatment of NA inhibitor, therapy is reportedly efficacious when the therapy is initiated after 24 h or 36 h, but all mice die when treatment is delayed to 48 h[28]. However, for the treatment with H5-specific antibody, experiments have demonstrated that the mortality and morbidity of mice infected with HPAI A/ H5N1 were reduced to a marked degree[29]. H5-specific human monoclonal antibodies reportedly show therapeutic benefits in mice. After administering H5N1-specific antibodies derived from chicken eggs to mice, the peak of virus titer in lung was much less than

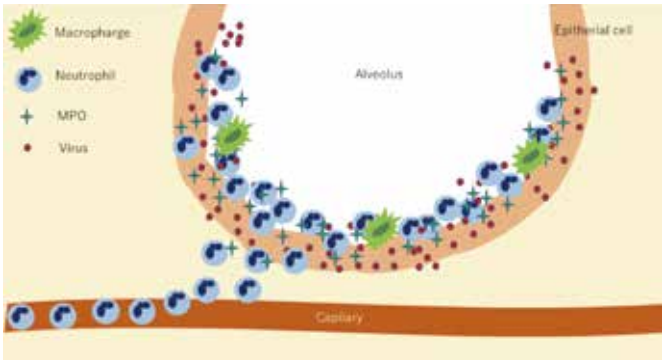

Figure 5. Sketch of innate immune response in case of HPAI A/H5N1
MPO: neutrophil-derived myeloperoxidase

in the case of normal antibodies[30]. Our simulations demonstrate that both therapies were effective, but some differences were apparent. For leukopenia symptoms, H5-specific antibody therapy improves symptoms to a greater degree than NA inhibitor therapy in the simulation using the modified model in case of 3 dpi. In experiments conducted with mice, H5-specific antibody protects cells from HPAI A/H5N1 infection[21]. Consequently, the destruction of leukocytes has been expected to be reduced. However, little recovery occurs after treatment in our simulation, mainly because the fitted recovery rate of leukocytes into Xu's experiment β=0.01 is low compared to seasonal values β=0.05–0.5[10]. The recovery is greater in the simulation for β=0.5. The cause of the low recovery rate might be that widespread apoptosis of leukocytes in lymphoid organs by cytokine dysregulation occurs locally while lymphocytes are circulating through the infected lung[3], although it is not the case in mice. Matters related to the low recovery rate of leukocytes present further difficulties.

Conclusion

Leukopenia associated with HPAI A/H5N1 infection was simulated using a mathematical model. The model follows the experimental data of mice infected with HPAI A/H5N1. The characteristic symptom of HPAI H5N1 is reproduced in the simulation. Furthermore, the effectiveness of therapies with NA inhibitor and H5-specific antibody was estimated through a simulation. Our model simulation results suggest that both therapies are effective and the possibility that H5-specific antibody therapy shows symptomatic improvement from leukopenia that is superior to that of neuraminidase inhibitor therapy.

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Pedagogy in Global Health: Empirical view for basic requirements for teaching Global Health

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Abstract

Global Health (GH) has always attracted the attention of many students in medicine, nursing, related medical services, and even in international studies, policy, and diplomatic studies and economic studies and so on. In this article, the author tries to extract the essential factors of GH education for better understanding and improvement of the contents of the GH education. Throughout the author's experiences in GH training, including a training program for primary health care at Mahidol University, Thailand, workshop-style training, classroom lectures, training thorough filed surveys, the author concludes that we should consider the educatee's experiences in GH activities. For those who have scarce experiences, three common misunderstandings should be corrected, including 1) GH is not a medical doctor's independent business, 2) Emergency aid is not equal to GH, and 3) Medical treatment practice is not essential in on-site GH service. For those who have some experiences and wish to be a professional GH player, we should teach four principal values for GH including 1) Give an excellent advice to community people, but do not practice treatment by oneself, 2) DO NO HARM to community people, 3) Acquire health and medical skills that can work even in their own countries and 4) Always consider action and education with global standards of GH.

Keywords: Pedagogy, Global Health, Community

Introduction

Global Health (GH) has always evolved throughout the 21st century. Furthermore, it has attracted the attention of many students in medicine, nursing, related medical services, and even in international studies, policy and diplomatic studies and economic studies, and so on. GH has a variety of definitions and yet to have a fixed definition. As Koplan *et al*. mentioned, GH is rarely defined and sometimes "a rephrasing of a common definition of public health or a politically correct updating of international health" [1].

GH education is a common international concern for education. Several articles are published in GH education for medical students[2], nursing practitioner students[3], and post-graduate GH professionals[4,5]. These articles commonly lay stress on the importance of field experiences rather than desktop learning. There also exist some discussions on the competency-based approach of GH education[5]. Besides, Liu et al. pointed out several gaps in GH education out of their empirical systematic review including 1) More than 90% of the study on global health education is conducted in North American and European countries, 2) GH curricula developed are not standardized and 3) Medical students, residents and doctors are the main target of GH education rather than other health professionals including nurses. They also concluded that GH education has the potential for "achieving health equity, reducing health disparities, and developing future professional careers" [6]. GH includes broad areas, including community health, emergency assistance, laboratory work, and clinical practices. As Doobay-Persaud et al. pointed out, "the field experience represents one of the key curricular components of global health education" [5]. Thus, reflecting the author's own experiences, the author focuses primarily on community health since it may usually attract the GH beginners.

As a GH worker, the author of this article has a variety of experiences, including Official Development Assistance (ODA), pediatric clinical services for children from abroad, field research in the developing country fields, and bureaucrat activities in the Ministry of Health, Labor and Welfare, Japan and the United Nations. Based on these experiences, the author is currently engaged in education in the GH field and found that there exist some common essential lessons to be given from the global health beginners, including undergraduate students to professional GH trainees, including post-graduate students and even teachers. In this article, the author tries to extract the world-widely available common lessons that are essential in GH education obtained from the empirical educational experiences, for better understanding and improvement of the contents of the GH education.

Author's experiences in GH Training

1. Training program for primary health care at Mahidol University, Thailand[7]

This training program is held every year at the ASEAN Institute for Health Development (AIHD), Mahidol University, Thailand, in August. It is widely open for Japanese students interested in Primary Health Care (PHC) and community health. The ten-day program has been prepared. In the first half of the program, students learn about health issues in urban areas in Thailand, and in the second half, they learn about the implementation status of PHC and health issues in rural Thailand. In both the first half and the second half, the learning structure is almost the same, classroom lecture first, followed by a site visit, discussion for problem-solving on what students experienced, and final presentation and wrap-up lectures. In the second half of the program, students can stay at a rural home and experience villager's life. The author first participated in this program in 1992 during medical student period, and also worked as a program coordinator between 2003 and 2006.

2. GH training in workshop style

This training program was organized for 15 years (2003-2017), led by the Department of Pediatrics, Saitama Medical University, aiming to give early exposure experiences for those who are interested in GH. The author was involved as one of the program coordinators of this program. The targets were mainly medical students who were considering future careers in the field of GH. However, nursing students and others started to participate in the latter part of the program.

The contents of the program were composed of two components. One was classroom lectures given by experienced GH workers. Furthermore, the other was a workshop with a given theme in virtual settings of GH challenges, including immunization service distribution planning, solving cultural conflict/refusal in giving health services, and approach to malnourished children.

As an outcome of this program, participants became a variety of active GH players nowadays.

3. Classroom lectures for students

So far, the author has given a series of lectures on GH at several medical and nursing universities. In some universities, the author conducted a questionnaire survey to improve the contents of the lecture.

4. GH training through filed surveys

At the current graduate school, the author conducted two field surveys in the southern part of Lao People's Democratic Republic (Lao PDR), with the theme of safe delivery. The author supervised everything from the planning stage of the survey, negotiations with the Ministry of Health of Lao PDR and the provincial Department of Health, the practical work of the survey, report of the survey result and policy recommendation to the counterparts in Lao PDR and synthesis and publication of the article[8,9]. Besides, the author supervised several field survey

management, including a nutrition survey in Madagascar.

Based on the experiences mentioned above, the author has extracted some lessons learned on GH education divided by the stage of experiences from early exposure to professional education.

Lessons learned from GH education

First of all, one essential lesson is that a vital misunderstanding for global health is that the idea of GH is to help developing countries by developed countries, the scope of which is too narrow to describe the current practice of global health. GH aims mutual benefit rather than a one-sided benefit.

The author divides the lessons for GH beginners and those who seek professional GH field training.

1. For those who have scarce experience in GH (GH beginners):

It is essential to correct the misunderstandings for GH. The following three points were the most common misunderstanding of GH among the students.

1) GH is a medical doctor's exclusive business

The main actors in the GH field are not necessarily medical doctors, and non-medical professionals are also essential actors.

2) Emergency aid is equal to GH

In GH, not only emergency assistance: rapid response for disasters, infectious disease outbreak response, and medical services for people threatened by war and conflict, but also community health is an essential factor. However, students' understanding and interest seem to be mainly for emergency aid, which should be corrected. This kind of misunderstanding may be mainly due to TV media program highlights only on emergency assistance.

3) Medical treatment practice is essential in on-site GH service

Except for some emergency assistance activities, there are extremely few opportunities for actual medical practice. However, there seem to be not a few students who want to conduct actual medical activities in developing countries. This misunderstanding seems to be because knowledge about activities other than medical practice has not been conveyed throughout medical education.

2. For those who have some experiences and wish to be a professional GH player

It is essential to educate and share the principal values for GH, which can be a philosophy in GH.

1) Give good advice to community people, but do not practice treatment by oneself

This means that in developing countries, giving a treatment by oneself from developed countries is not acceptable at all [10]. Once put one's hand out with sophisticated techniques in developed countries, that would save many lives. However, once she/he retreats from the place, everything will be reversed and go back to the previous situation. That will be meaningless. Instead, what one should do is to develop human resources that have been settled to the place as a native dweller. By handing over technology and ideas to local human resources without taking their own hands, trained human resources can develop a sense of ownership and establish sustainable health services. In other words, this message can be "I should share an idea, you will resolve."

2) DO NO HARM

Martin K recommended ten principles for GH activities.[11] We must also consider the possibility of inconvenience due to involvement with areas and people who need health care. "DO NO HARM," which guarantees your participation/intervention never causes any harm, is an essential principle for GH.

3) Acquire health and medical skills that can work even in their own home countries

There may exist a certain number of students who fail to have an interest in medical care in home countries but a high interest in health and medicine in developing countries. However, the most appropriate advice for those who have such an attitude can be to gain a pretty amount of experiences in their home countries first, then to be involved in GH. The reason is that if one tries to get involved in health care in developing countries with insufficient health and medical ability, it may harm people in target countries and cause ethical problems. Thus, it is necessary to consider actions with the "DO NO HARM" principle.

4) Always consider action and education with global standards of GH

There exist a tremendous amount of discussion in current GH challenges. Persons involved in GH cannot avoid following the global discussion. As of November 2019, the SDGs (Sustainable Development Goals) is one of the global challenges for commitment[12]. We should always keep updated on the discussion of SDGs and share the knowledge with students interested in the GH.

Limitations

We thoroughly discussed the community health aspect of GH. However, we have two limitations. First, the author mainly focused on GH learning in community health only based on the author's own experiences in developing countries rather than another kind of research and learning; laboratory work and clinical practice at the hospital. As the spectrum of GH is quite broad, this issue can be a future theme of discussion. Second, the discussion missed the challenge of health and medical services for inbound foreigners that come from foreign countries. As 2020 is the year of the Olympic Games Tokyo 2020, those issues have been discussed as an essential global health agenda. However, the issue can be another future theme for discussion.

Conclusion

Based on the GH experiences, including education, the author concludes that we should consider the educatee's experiences in GH activities. For those who have scarce experiences, three common misunderstandings should be corrected, including 1) GH is not a medical doctor's independent business, 2) Emergency aid is not equal to GH, and 3) Medical treatment practice is not essential in on-site GH service. For those who have some experiences and wish to be a professional GH player, we should teach four principal values for GH including 1) Give an excellent advice to community people, but do not practice treatment by oneself, 2) DO NO HARM to community people, 3) Acquire health and medical skills that can work even in their own countries and 4) Always consider action and education with global standards of GH.

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海外コミュニケーション

1. 血管炎会議：世界のExecutive研究者会議: Mexico City, June 31 and August 1, 2019
Prof. Peter Merkel (Pennsylvania University, USA), J Charles Jennette, University of North Carolina, USA, Prof. Ulrich Speck (Mayo Clinic, USA), Prof. Luis Felipe Flores Suarez (Mexico City) とともに鈴木和男 Kazuo Suzukiが参加し、呼吸器疾患とANCA関連血管炎研究の今後について討論した。

2. 第11回 Human Peroxidase 会議: Bruno, Chez Republic, September 4-7, 2019
今回の会議の特筆は、MPOが産生するHOClのターゲット分子や疾患に焦点があたり、今後の循環器疾患へのPeroxidaseの関与について討論が進んだ。

Prof. L. Kubala, Brno, W. Nausee, Profs. P. Furtmüller, Vienna, P. Van Antwerpen, Belugy, C. Obinger, Viennaと

3. The Vasculitis Clinical Research Consortium (VCRC) 会議：Atlanta, USA, Nov. 9, 2019
V-PREGなどの日本関与のプロジェクトについて議論を深めた。

Two projects of vasculitis V-Preg and ARAMIS were discussed in VCRC meeting. Japanese investigators organized these projects in Japan.

Dr. T. Ito-Ihara, Prof. Megan Clowse, Duke, Ms. Kalen Young, Prof. K. Suzuki, Prof. H. Kono

From left Drs. Harigai, Kono, Ito-Ihara, Tamura, Yoshifuji, Yoshida, Merkel, Suzuki, Kobayashi.

The 25th MPO Meeting

November 29-30, 2019

Attendee of the 25th MPO Meeting

2019年11月29-30日に第25回MPO研究会が順天堂大学医学部で濱野慶朋先生が世話人で開催されました。ADC研は全員が発表し、例年通り活発な討議がなされました。次回のMPO研究会は、2020年11月27-28日、東京理科大学理工学部で朽津和幸先生が世話人として開催されることが決まりました。

We held the 25th MPO meeting in Juntendo University from Nov. 29th to 30th. Next MPO meeting will be held in Tokyo on Nov. 27th-28th, 2020 with the chair Prof. Kazuyuki Kuchitsu (Tokyo Univ of Science).

INTERNATIONAL MEETING AND SYMPOSIUM

開催したイベント (2019.7.1～2019.12.31)

日程	イベント名	演者など	
2019年12月9日(月)～13日(金)	Antibody Drug	鈴木和男	San Diego, USA
2019年11月29日(金)～30日(土)	第25回 MPO研究会	ADC研	順天堂大学
2019年11月8日(金)	Vasculitis Clinical Research Conference	鈴木和男	Atlanta, USA
2019年10月30日(水)	第1回 バイオセキュリティ講習会 (英語)	棚林清 感染研バイオセーフティ管理室 室長	大学棟
2019年10月28日(月)～11月6日(水)	SAKURA Science Plan 2019	Vietnamから研究生 8名	大学棟、附属病院
2019年10月15日(火)	第4回 Stem Cell Transplantation Consortium会議		大学棟 会議室
2019年9月21日(土)～23日(月)	第28回 日本バイオイメージング学会/ 第6回 国際バイオイメージングシンポジウム	ADC研	帝京大学板橋キャンパス
2019年8月30日(金)	TAVP 報告会 (ベトナム感染症)	医学部5年生 6名、教員	本部棟
2019年8月27日(火)	第2回 帝京大学研究交流シンポジウム	ADC研	大学棟
2019年8月18日(日)～25日(日)	TAVP Training for 6 Students (5-year)	国立小児病院、ハノイ医科大学ほか	Hanoi, Vietnam
2019年7月29日(月)～30日(火)	SCTC共同研究会議	鈴木和男	NIH, USA
2019年7月10日(水)～13日(土)	ベトナム国立小児病院50周年記念シンポジウム	鈴木和男	Hanoi, Vietnam

今後のイベント情報 (2020.1.1～2020.6.30)

日程	イベント名	演者など	
2020年5月16日(土)	ブランディング事業シンポジウム	ADC研	冲永記念ホール
2020年5月	危機管理と防災	板橋キャンパス危機管理委員会、ADC研	臨床大講堂
2020年3月10日(火)～	医学部6年生 (2名) 海外BSC	NIH/NIAID、NIH/NICHD	
2020年2月17日(月)	ADC運営委員会		大学棟 会議室
2020年1月10日(金)	第2回 バイオセキュリティ講習会 (日本語)	棚林清 感染研バイオセーフティ管理室 室長	大学棟 講義室

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