徳島大学 薬学部 国際シンポジウム 2014

International Symposium 2014

地域からはじまる創薬と薬学教育

～生薬と生物多様性、そして地域医療への展開～

Developing drugs and pharmacy awareness and education from a regional viewpoint:
Herbs, biological diversity and expression of rural community healthcare.

於　徳島大学　長井記念ホール

at Nagai Memorial Hall, The University of Tokushima

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徳島大学 薬学部

Faculty of Pharmaceutical Sciences, The University of Tokushima

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はじめに

ヒトは古来より様々な地域において、長年の暮らしの知恵に基づいた、植物や天然物由来の生薬・伝承薬の恩恵に浴してきました。しかしそれらの価値ある資源は経済大国による搾取対象になりかねず、近年は生物多様性保全の観点からも、国際間で容易に取引できない仕組みづくりが進んできました。今後は、生薬資源保有国と、研究開発知識および技術保有国との間で、互恵関係を調整・構築する必要があります。一方、生物資源を供給している地方に目を向けてみると、多くの地域は過疎化や高齢化をはじめとする様々な問題を抱えており、特に次世代地域医療の仕組み構築と担い手の育成は喫緊の課題です。

本シンポジウムでは、こうした課題に関わる６ヵ国の薬学研究教育者らが集い、地域を基盤にした新しい創薬研究と薬学教育の今後について、講演と討論を行います。参加者の皆様とともに、知識や情報、そしてアイディアの共有と交換をしながら、このような課題に対する解決策のヒントが見つかることを期待します。

Introduction

Since ancient times, different people and cultures worldwide have received benefits from keeping alive traditional knowledge and techniques in cultivating and using botanical, herbal and naturally derived medicines. Unfortunately, these valuable resources are easily falling victim to exploitation of chemical technologies, used by economically strong countries, such as isolating the active ingredients and developing them into new therapeutic reagents. In order to avoid such unfair or possibly illegal situations, as well as keep alive biological diversity and resourcefulness, the Convention on Biological Diversity (CBD) has been established. In addition, international transfer of such biological resources is now restricted. International understanding and mutual agreement are now crucial in taking steps towards a beneficial relationship between “Biologically Resource-Rich” and “Technologically Resource-Rich” countries.

Aside from these international issues, many “Biologically Resource-Rich” rural areas now face other urgent concerns such as rapid aging and decrease in population. Novel and effective community-based health care with well-trained young professionals now need our urgent and immediate attention.

In this symposium, we will discuss these types of issues with 6 researchers invited from 6 foreign countries. We expect to share and exchange knowledge, ideas and information with all the attendees.

プログラム

10:00 - 10:10	開会宣言　　大髙 章　学部長（徳島大学・薬学部）
10:10 - 11:05	**ウズベキスタン産伝統薬物：その天然物研究と医薬品開発** ニルファー ママダリーバ 博士（ウズベキスタン科学アカデミー）
11:05 - 12:00	**カリマンタンの森からの生物活性物質探索** スバガス ワユオノ 博士（インドネシア・ガジャマダ大学）
12:00 - 13:00	昼食・休憩
13:00 - 13:55	**伝統薬・生薬のグローバル化に向けた統合的アプローチ** プロク ムケルジー 博士（インド・ジャダプール大学）
13:55 - 14:50	**EU における植物由来成分を含む製品の法的規制枠** パトリツィア レスターニ 博士（イタリア・ミラノ大学）
14:50 - 15:00	休憩
15:00 - 15:55	**薬物の有害/特異体質反応に関する作用機序に基づいた橋渡し的研究戦略** ニコ バーミューレン 博士（オランダ・アムステルダム自由大学）
15:55 - 16:50	**地域健康教育拠点 (AHECs) との協力による、薬学生の実地教育** フィリップ ロジャース 博士（アメリカ・ノースカロライナ大学）
16:55 - 17:00	休憩
17:00 - 17:50	総合討論
17:50 - 18:00	閉会宣言

Program

10:00 - 10:10	Opening Remark:　Dean. Akira Otaka (Univ. Tokushima)
10:10 - 11:05	Uzbekistan: traditionally used medicinal plants, natural product research and drug development Dr. Nilufar Mamadalieva (Academy of Science, Uzbekistan)
11:05 - 12:00	Searching bioactive compounds from Kalimantan forest Dr. Subagus Wahyuono (Gadjah Mada Univ., Indonesia)
12:00 - 13:00	Lunch Break
13:00 - 13:55	Integrated approaches for globalization of traditional/herbal medicine Dr. Pulok Mukherjee (Jadavpur Univ., India)
13:55 - 14:50	The Regulatory framework for products contaning botanicals in the EU Dr. Patrizia Restani (Univ. Milan, Italy)
14:50 - 15:00	Break
15:00 - 15:55	Towards Mechanism-based Translational Strategies for Adverse/Idiosyncratic Drug Dr. Nico Vermeulen (Vrije Univ. Amsterdam, Netherlands)
15:55 - 16:50	Partnerships and AHECs: Educating Pharmacy Students in Practice Dr. Philip Rodgers (Univ. North Carolina, USA)
16:55 - 17:00	Break
17:00 - 17:50	Discussion
17:50 - 18:00	Closing Remark:

講演

Lecture

講演は、英語で行われます。

Speakers’ talks are in English.

ニルファー ママダリーバ 博士

Dr. Nilufar Z. Mamadalieva

ウズベキスタン科学アカデミー

植物性物質化学研究所・グリコシド化学研究室・シニア研究員

ドイツ・DAAD 研究スカラー

Senior Research Scientist, Lab. Chem. Glycosides,

Inst. Chem. Plant Substances, Academy of Science, Uzbekistan

Profile of Dr. Nilufar Z. Mamadalieva

Educations and Degrees:

18.07.1997 – Msc; Department of the Chemistry, Fergana State University, Fergana, Uzbekistan. Thesis: "*Alkaloids of the plant of Artemisia serotina*". Advisor: Prof. A.A. Ibragimov

29.09.2005 – PhD; Laboratory of Chemistry of Glycosides, Institute of the Chemistry of Plant Substances, Tashkent, Uzbekistan. Thesis: "*Phytoecdysteroids plants of Silene viridiflora, S. wallichiana, S. linicola and synthesis of silenosterone*". Advisor: Prof. Z. Saatov

Employment:

2005- to date – Laboratory of the Chemistry of Glycosides, Institute of the Chemistry of Plant Substances, Tashkent, Uzbekistan. Senior Scientific Researcher

1998-2005 – Laboratory of the Chemistry of Glycosides, Institute of the Chemistry of Plant Substances, Tashkent, Uzbekistan. Junior Researcher

International Fellowships:

15.09.2013 – 15.12.2013 – DAAD Research Grant for Former Scholars, Heidelberg, Germany

5.02.2013 – 5.03.2013 – Fujii Otsuka Fund for International and Research Exchanges, Tokushima, Japan

1.03.2011 – 28.02.2013 – UNESCO-L'ORÉAL International Fellowship for Young Women in Life Sciences - 2011, Viterbo, Italy

1.10.2009 – 31.12.2009 – DAAD Research Grant, Heidelberg, Germany

1.05.2008 – 31.07.2008 – Tuscia University Research Fellowship, Viterbo, Italy

ママダリーバ博士は、1997 年にウズベキスタンのフェルガナ州立大学にて、ヨモギに含まれる植物アルカロイド研究で修士号を取得され、2005 年に、現在も所属するタシケントの科学アカデミー・グリコシド化学研究室にて、植物性エクジステロイドの研究で博士号を取得されました。1998 年から 2005 年まで同研究室のジュニア研究員、そして博士号取得後から現在はシニア研究員として活躍されています。またウズベキスタン国内のみならず、本学部の生薬学分野、ドイツ・ハイデルベルグの研究所や、イタリア・トゥーシャ大学などにおいても、研究員としての経験を積まれ、数々のスカラーシップやフェローシップを授与されています。

Uzbekistan: traditionally used medicinal plants, natural product research and drug development

ウズベキスタン産伝統薬物：その天然物研究と医薬品開発

Nilufar Z. Mamadalieva

Institute of the Chemistry of Plant Substances AS RUz, Tashkent, Uzbekistan

ABSTRACT

Medicinal plants, since times immemorial, have been used in virtually all cultures as a source of medicine. Sumerians, Assyrians, Egyptians, Jewish, Greeks, Romans and Arabs got the main source of their medicine culture from plants, and in Asia the Chinese and Indian traditional medicine based on plants is still widely used today. Many centuries of herbal use has proven that plants contain substances that have healing power. There are about 35,000–70,000 plants used in folk and scientific medicine worldwide.

The traditional use of medicinal plants in Central Asia is widespread with over 70% of Uzbek households using medicinal plants for centuries. The flora of Uzbekistan includes more than 4500 species of higher plants and plants endemic make up 20% of all plants; and a majority of these grow in mountains. However, about 110 of them are used in medicinal practice and over 1154 plants are used in traditional or conventional medicine. The most species-rich plant families include Asteraceae (600 species), Fabaceae (450 species), Poaceae (>250 species), Brassicaceae, Lamiaceae, Rosaceae, Boraginaceae and Apiaceae. Currently, more than 400 wild and cultivated medicinal plants in Uzbekistan have been studied and described.

Many of the specific activities of plant remedies used in traditional medicine have been confirmed by modern research conducted at the Institute of Chemistry of Plant Substances, Institute of Bioorganic Chemistry of the Academy of Sciences of Uzbekistan and Pharmaceutical Institute of the Ministry of Health of Uzbekistan. Applied laboratories of these institutes have the task of studying the pharmacological activity of compounds; to determine the possibility of introduction into medical practice; to study the natural habitat of the medicinal plants; to organize long-term plant collecting; to maintain the safety of natural populations; and to organize the development of medicinal formulations and their production. As a result of the research on plant substances in Uzbekistan, the preparations Panoferol, Tefestrol (from *Ferula* species), Ecdysten (*Ajuga turkestanica*), Allapinin (*Aconitum soongaricum*), Desoxypeganine (*Peganum harmala*), Lagochilin (*Lagochilus inebrians*), Galantamin (*Ungernia victorii*), Oligvon (*Artemisia leucodes)* and others were introduced into medical practice.

スバガス ワユオノ 博士

Prof. Dr. Subagus Wahyuono

インドネシア・ガジャマダ大学・薬学部長・教授

インドネシア薬科大学協会（APTFI）事務局長

アジア薬科大学協会（AASP）薬学部長会員

Dean of Faculty of Pharmacy, Gadjah Mada University, Indonesia

Secretary General of Association of the Indonesian School of Pharmacy (APTFI)

Board member of Deans, Association of Asia School of Pharmacy (AASP)

Profile of Dr. Subagus Wahyuono

Dr. Wahyuono finished his B. Pharm in 1977 from the Faculty of Pharmacy, Gadjah Mada University (GMU), Yogyakarta, Indonesia, and he awarded as a pharmacist (1979) degree from the same University above. Both his Master (M.Sc.) (1986) and Doctorate (Ph.D.) (1991) degrees were obtained from the Col of Pharmacy, University of Arizona, Tucson-Arizona, USA in Pharmaceutical Chemistry. After back to Indonesia, several colaborative researches were done Nationally and Internationally. Nationally, he had opportunity to collaborate with the Faculty of Forestry GMU and Ministry of Forestry of the Republic of Indonesia, to search bioactive compounds from Kalimantan Rain Forest, Northern Maluku, Merapi National Park and Batam Island (2002 – 2007). Internationally, he was the Person in Charge of Indonesian side in the Collaboration with LACDR-Amsterdam on ARTIM project (Structure Activity relationship antiasthmatic compounds from Indonesian Traditional medicines) (1996 - 2005). He had opportunity to collaborate with the school of Pharmacy, Univ of Missisippi, University-Miss, USA, to search bioactive compounds from marine samples collected from Manado, Makassar, and Lombok island and developing Manzamine for antiamalaria (2003 – 2007).

ワユオノ博士は 1977 年にインドネシア・ガジャマダ大学薬学部を卒業され、1979 年に薬剤師資格を得ました。その後渡米され、アリゾナ大学薬学部にて 1986 年に修士号を、1991 年に博士号を取得されました。インドネシアに帰国された後は、インドネシア森林省やガジャマダ大学森林学部などと共同で、カリマンタン島の熱帯雨林、北マルク州、メラピ国立公園、バタム島などで生物活性物質の探索研究をされています。国際的には、オランダ・ライデン大学薬物研究所との共同研究 ARTIM プロジェクト代表者として、インドネシアの伝統医薬品から得られる抗喘息物質の構造活性相関研究を遂行されました。またアメリカ・ミシシッピ大学との共同研究で、インドネシアのマナド湾やマカッサル、ロンボク島などの海洋で得られた生物活性物質から、抗マラリア薬 Manzamine の開発に成功されました。天然物に由来する生物薬理活性物質研究においては、世界的な第一人者です。

SEARCHING BIOACTIVE COMPOUNDS FROM KALIMANTAN FOREST

カリマンタンの森からの生物活性物質探索

Subagus Wahyuono

Faculty of Pharmacy, Gadjah Mada University, Yogyakarta 55281, Indonesia

ABSTRACT

Indonesia is an archipelago country, located in tropical area, consisting about 18.000 islands. This country is blessed by the rich of living organisms, plants, animals etc., that has been considered as number second biodiversity on the world. Moreover, there about 3000 ethnic groups live in this country and each of them has their own language, culture and traditional medication using traditional medicines consisting plant materials collected from surroundings. The later was incredibly priceless information and it remained secret, to show how those people keep them alive and stay healthy. Unfortunately, rain forests are diminishing slowly-uncontrolably parallel to the unequal economic growing among people. Before everything's gone, genetic materials have to be saved by collecting material data and studying those materials for the people profit. There were 105 species of 2 Pterydophyte and 42 Spermtophyte families were collected from the heart of Borneo island. Collection process was guided by medicine man who apply medicinal plants with their method of medication to his/her patients.

Initially, collection was concentrated for searching new anticancer compounds. Cancer was not recognized by most local people, then collection was emphasized on plants used to treat swollen cases. Brine Shrimp Lethality test (BST), a simple-cheap Bioassay Guided Isolation method was used to determine/isolate the active compounds from the collected samples, then the isolated compounds were tested for their further potential compounds by human cancer cells lines. This study was a complicated work, a collaborative work among various field of study is necessary in order to have an optimum results. There several options concerning with isolation of these active compounds. In future, these compounds can be used as a starting template in the drug discovery, as a marker for phytopharmaceutical products, and or as a marker for supplemental products. In this symposium, we are going to present our journey in finding active compounds, determining the potential compounds in future.

プロク ムケルジー　博士

Prof. Dr. Pulok K. Mukherjee

インド・ジャダプール大学・薬工学部

天然物研究所・研究所長・准教授

アメリカ薬物情報協会・天然健康品特別委員会（委員長）

Director, School of Natural Product Studies, Jadavpur University, India

Profile of Dr. Pulok Kumar Mukherjee

Dr. Pulok K. Mukherjee is working as Director, School of Natural Product Studies, Department of Pharmaceutical Technology, Jadavpur University, Kolkata, India. He has been working on traditional medicine inspired drug discovery and development. His research work highlights on screening, evaluation, formulation and standardization of herbal drugs with their validation to ensure quality, safety and efficacy. He has made innovative, outstanding and original contributions both in education and research in the area of natural products. He worked as the Chairman of the Natural health product special committee of the Drug Information Association, USA.

Dr. Pulok Mukherjee is a pharmacist and completed his master and PhD in pharmacy from Jadavpur University and post doctoral research from Leiden/Amsterdam Center for Drug Research, The Netherlands. He has been admitted as Fellow of the Royal Society of chemistry [FRSC], UK.

His research career has been outstanding, including globally acclaimed contributions to development from natural resources including Ayurveda, ethnopharmacology, herbal drug technology. His pioneering work has led to many important national and international projects in the filed of Natural Health Products. Based on these works, he has to his credit above 140 publications in peer reviewed journals, several patents, 16 books and chapters on evaluation of botanicals. He has worked as visiting scientists in several renowned universities abroad including The School of Pharmacy, University of London; King's College, University of London; Leiden/Amsterdam Center for drug Research, Netherlands; School of Health science, Tokushima University, Japan; Medical Research Council, Cape Town, South Africa; School of Oriental Medicine, Korea and others.

For his excellent research career he has been awarded with so many laurels from Govt of India and abroad; to name a few, he has been awarded with the prestigious Commonwealth Academic Staff Fellowship from Association of Commonwealth Universities [ACU], UK; Out standing Service Award from Drug Information association [DIA], USA; Career Award for Young Teacher from All India Council for Technical Education (AICTE), Govt. of India; Overseas Award from Department of Biotechnology (DBT), BOYSCAST Fellowship from Department of Science & Technology (DST), Govt. of India; Young Pharmacy Teacher Award from Association of Pharmaceutical Teachers of India; IPA Fellowship Award from the Indian Pharmaceutical Association [IPA] and many others.

Dr Mukherjee was the organizing Secretary of the 12th International congress of the Society for Ethnopharmacology [ISE] 2012, for the first time in India on "Traditional Medicines and Globalization– The Future of Ancient Systems of Medicine". Dr Mukherjee is serving as Associate Editor of the Journal of Ethno pharmacology, Elsevier Science. He is the member of the editorial board of ten other Indian and international journals and associated as advisor to different organizations and administrative bodies of government of India and abroad.

ムケルジー博士は、インドのジャダプール大学にて 1997 年に薬学の博士号を取得後、インド、オランダ、アメリカ合衆国およびイギリスにて、主として生薬・伝承薬と、それを基盤にしたスクリーニング・安全性評価・および製剤と標準化に関する創薬研究をきわめて精力的に展開されています。また、アメリカ薬物情報協会において天然健康品特別委員会の委員長も務めておられます。これらの活動はインド国内のみならず、世界中で高く評価されており、各国で様々な賞を授与されています。

Integrated approaches for globalization of traditional/herbal medicine

伝統薬・生薬のグローバル化に向けた統合的アプローチ

Pulok K. Mukherjee, PhD, FRSC

Director, School of Natural Product Studies, Jadavpur University, Kolkata - 700 032, India

Biodiversity of natural products have served not only for the primary human needs but also for health care, since time immemorial. The Indian subcontinent, with the history of one of the oldest civilization, harbours many traditional health care systems. Their development was supported by the diverse biodiversity in flora and fauna due to variations in geographical landscaping. The development of traditional systems of medicines with the perspectives of safety, efficacy and quality will help not only to preserve this traditional heritage but also to rationalize the use of herbal medicine in health care. Until recent past, the nature was considered as a compendium for templates of new chemical entities (NCEs). The plant species mentioned in the ancient texts of these Ayurveda and other Indian systems of medicines may be explored with the modern scientific approaches for better leads in health care. Authentication and scientific validation of medicinal plants is a fundamental requirement of industry and other organizations dealing with herbal drugs. Quality control of botanicals, validated processes of manufacturing, costumer awareness and post marketing surveillance are the key points which could ensure the safety and efficacy of herbal medicine.

In order to rationalize the use of herbal products in different forms more particularly the extracts/marketed product in therapy as is being used nowadays, a need-based and novel concept of chemo-profiling is getting momentum. For the globalization of traditional medicine, there is required to develop standardization, quality control and regulatory guidelines of herbal medicine, which can dictate the quality, safety and efficacy of the phyto-constituents present in natural products. Therefore the utmost attention is necessary for the promotion and development of traditional medicine through international co-ordination and harmonization.

パトリツィア レスターニ　博士
Prof. Dr. Patrizia A. Restani
イタリア・ミラノ大学・薬学部
毒性学-食品安全性学・准教授
PlantLIBRA コーディネーター
イタリア小児アレルギー喘息協会 副理事長
Associate Professor
Department of Pharmacological and Biomolecular Science
University of Milan, Italy
Coordinator of PlantLIBRA (EU project)
Vice President of Association of Infant Allergy and Asthma

Profile of Dr. Patrizia Restani

DEGREE

1977 Bachelor in Pharmaceutical Chemistry and Technology, University of Milan
1985 PhD, Specialist in Toxicology, Faculty of Pharmacy, University of Milan

PROFESSIONAL EXPERIENCE

1978 Scholar in Institute of General Biochemistry, Faculty of Agriculture, University of Milan
1981 Research Associate, Faculty of Agriculture, University of Milan
1984 Research Associate, Faculty of Pharmacy, University of Milan
1998 Associate Professor of Food Chemistry, Faculty of Pharmacy, University of Milan

Professor Restani is an expert in toxicology, food chemistry and food allergies. She obtained her Specialization in Toxicology from The University of Milan in 1985. Her primary area of interest includes: 1) Food allergy and intolerances; 2) Safety of foods and food supplements.

She is a coordinator of PlantLIBRA (acronym of PLANT Food Supplements: Levels of Intake, Benefit and Risk Assessment) in European Union program, a founding member and vice-president of Infant Allergy and Asthma, a member of the Italian Delegation from the Ministry of Agriculture to the International Organization of Vine and Wine (OIV) and is Vice President of the Organization's Health and Safety Commission. She has worked with the Italian Ministry of Health on the analytical monitoring of food supplements that contain botanical ingredients and the Medicine Education Program. She has been teaching in several courses. She is author and co-author of more than 150 scientific publications, and member of several national and international professional organizations and committees.

Restani 博士は、1977 年にミラノ大学の薬学部（薬化学技術）を卒業され、1985 年に毒性学の専門家として学位認定された後は、同大学の農学部にて、食品安全性学の研究者としてのキャリアを積まれました。1984 年に同大学薬学部研究員に着任され、1998 年に現職に就任されました。ご専門は毒性学・食品安全性学（特に食品アレルギー）で、現在 EU における植物性食品サプリメントの安全性評価プロジェクト PlantLIBRA のコーディネーターを務めておられます。またイタリア小児アレルギー喘息協会の設立メンバー・副理事長をはじめ、国内外において、食品安全性に関わる数々の学会や組織のリーダーとして活躍されている、ヨーロッパを代表する研究者の一人です。

The Regulatory Framework for products contaning botanicals in the EU

EU における植物由来成分を含む製品の法的規制枠

Prof. Dr. Patrizia Restani

Dip. Scienze Farmacologiche e Biomolecolari, Università degli studi di Milano

Plants or botanicals are being used in a multitude of products, including foods, food supplements, medicinal products, cosmetics, biocides, etc.
In the food area, plants are used for seasoning and taste. Plants are also used for their health properties, in particular in herbal teas and food supplements. In medicinal products, plants are used for a therapeutic purpose.
It is a general principle in the EU that a plant or botanical can be used both in foods/food supplements and in medicinal products, depending on the purpose (health or therapeutic) and in conformity with the specific rules covering safety.
Because food supplements and medicinal products often share the same form of presentation (powders, pills or tablets) and because of the way Member States have traditionally considered the use of botanicals on their territory, the legal status of products may differ from one Member State to another.

Medicinal products

Medicinal products are products that are either presented with properties for treating or preventing human diseases or for altering the way the human body functions.
Such products are subject to a pre-marketing evaluation of their safety, quality and efficacy and can only be marketed when specifically authorized following an application. Since 2004 the traditional herbal medicinal product Directive 2004/24 covers medicinal products containing herbs.

Food supplements

Since 2007 the Nutrition and Health Claims Regulation is applicable to plant food supplements. This means that any health claim must be pre-approved before it can be used. Approval can be obtained via a submission of a claim in the generic procedure that is intended to produce a list of claims that are based on generally accepted scientific evidence (the so-called article 13.1 list of claims).
It is also possible to submit an application for authorization following one of the two authorization procedures (Article 13.5 for claims based on newly developed scientific evidence or Article 14 for claims referring to the reduction of disease risk or to children's development or health). In all cases the European Food Safety Authority (EFSA) is assessing the scientific evidence and publishes an opinion, upon which the European Commission takes a decision.

The problem of harmonization

The traditional herbal medicinal product legislation present a quite critical problem in that the European Medicines Agency is developing traditional herbal medicinal product monographs and the indications established for medicinal products are often almost identical to health effects that have been considered as beneficial physiological effects by EFSA under the nutrition and health claims Regulation. In this sense, there are several problems in EU for law harmonization, because of the large differences between the Member States' approaches, which would make agreement on common rules virtually impossible. Several meeting and approach are now in progress, including a discussion stimulated by the European Project PlantLIBRA.

Reference

Ainhoa Larrañaga - PlantLIBRA: Plant food supplements, Levels of Intake, Benefit and Risk Assessment. The regulatory framework for plant food supplements in the EU. AgroFOOD industry - Sept/Oct 2012 - vol 23, pp. 20-23.

ニコ バーミューレン 博士

Prof. Dr. Nico P.E. Vermeulen

オランダ・アムステルダム自由大学・化学/薬科学部・学部長・教授
ライデン・アムステルダム薬物研究所 (LACDR)・科学部長
アムステルダム分子医学システム研究所 (AIMMS) ・所長
Professor of Molecular Toxicology, VU-University, Amsterdam
Scientific Director Leiden-Amsterdam Center for Drug Research
Director Amsterdam Institute for Molecules, Medicines and Systems
Coordinator / Manager IMI-SafeSciMET:
(Modular Education and Training programme for Translational Safety Sciences for Medicines)

Profile of Dr. Nico Vermeulen

Education/Degree

1975 Bachelor in Chemistry, Radboud University Nijmegen
1980 PhD in Pharmacology, Leiden University

ISSX activities and honors

- Councillor (1991-‘96), chairman Regional Scientific Adv. Committee Europe (1992-‘97) and chairman Nomination Committee (2004- ‘05)
- President-elect (2000- ‘01), President (2002- ‘03) and Past-president (2004-’05)
- Honorary member of ISSX (2004, lifetime)
- European ISSX Scientific Achievement Award (2006)

Research interests

- In general: Roles molecular and computational toxicology and drug metabolism can play in drug discovery, development and safety assessment,
- More specifically: toxication/detoxication mechanisms involving Cytochromes P450; *in silico* and *in vitro* prediction and screening of ADME-Tox properties, biocatalytic metabolite production and profiling and translational biomarkers of adverse drug reactions

- He is author/co-author of more than 350 publications and since 2001 he has been on the Thomson Reuters ISI lists of highly cited scientists.
- He was promotor/supervisor of more than 38 Ph.D-students. Currently he is supervising, amongst others, 5 staff members / project managers, 10 Ph.D.-students and 3 post-docs.

バーミューレン博士は、1985 年来、オランダ・アムステルダム自由大学の化学/薬科学部で教授を務める世界的にきわめて高名な科学者であり、現在は学部長を務めておられます（ご専門は分子毒性学)。1975 年にナイメーゲン・ラドバウド大学にて化学の学士号を、1980 年にライデン大学で薬理学の博士号を取得されました。分子計算科学も駆使した毒性学と薬物代謝学研究を通じて、薬物の発見と開発、毒性安全性評価の領域で数多くの傑出した業績を挙げておられます。特に薬物代謝酵素チトクローム P450 が関与する反応について、薬物動態と毒性、反応代謝物などの予測を、コンピューターシミュレーションや試験管内実験から行っています。

Towards Mechanism-based Translational Strategies for Adverse/Idiosyncratic Drug Reactions

薬物の有害/特異体質反応に関する作用機序に基づいた橋渡し的研究戦略

Prof. Dr. Nico P.E. Vermeulen

AIMMS-Section of Molecular Toxicology, Dept. of Chemistry and Pharmaceutical Sciences (CPS), VU-University Amsterdam, De Boelelaan 1083, 1081 HV Amsterdam.

Analysis of attrition in drug discovery and development has revealed that unfavorable drug disposition (ADME), pharmacokinetics (PK), lack of efficacy and toxicity (Tox) constitute the major determinants for drug failures. More specifically, the balance between bio-activation and bio-inactivation processes by, in some cases genetically polymorphic enzymes, appears crucial for risks of exposure to active and chemically reactive metabolites in terms of potential Adverse Drug Reactions (ADRs) or Idiosyncratic Adverse Drug Reactions (IDRs).

In this presentation, general concepts and selected results of two large multidisciplinary and translationally oriented projects (i.e. TI-Pharma ADR and IMI MIP-DILI) will be introduced.

Cytochromes P450s (Cyt P450s), being the most important drug metabolizing enzymes, are key in pharmacological and toxicological drug properties. Consequently, major efforts are being invested in understanding the properties and activities of Cyt P450s in this regard. The same holds true for Glutathione S-transferases (GSTs) for protection against chemically reactive metabolites. Apart from the properties of drug metabolites, their mechanisms of formation, large-scale production, identification strategies for adducts between reactive metabolites and proteins as well as their role in selected ADRs, will be touched upon. Some attention will be given to ADME-Tox properties of Curcumin, the major yellow pigment and dietary component from *Curcuma longa*. Possible strategies for translation from the 'molecule to man' levels will be illustrated as well.

[1] *Park B.K., .. Vermeulen N.P.E., .. and Baillie T.:* Managing Chemically Reactive Intermediates in Drug Development. *Nature Revs Drug Disc., 10, 292-306 (2011).*

[2] *Dragovic S, Venkataraman H, Begheijn S, Vermeulen NPE, Commandeur JNM.:* Effect of human Glutathione S-transferase hGSTP1-1 polymorphisms on the detoxification of reactive metabolites of clozapine, diclofenac and acetaminophen. Toxicol Lett. 2014; 224(2): 272-81.

[3] Commandeur JNM and Vermeulen NPE: Cytotoxicity and cytoprotective activities of natural compounds. The case of Curcumin. *Xenobiotica.* 1996, 26: 667-80. Review.

フィリップ ロジャース 博士

Prof. PharmD Philip T. Rodgers

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Profile of Dr. Philip Rodgers

Philip Rodgers, PharmD, received his bachelor of science in pharmacy and his doctor of pharmacy from the University of North Carolina at Chapel Hill and completed a pharmacy residency in ambulatory care at the Medical College of Virginia Hospitals in Richmond, Virginia. Currently, he is assistant dean of pharmacy practice partnerships and a clinical associate professor at the UNC Eshelman School of Pharmacy. His areas of scholarship and teaching are in primary care pharmacy practice, chronic disease management, and innovative pharmacy education programs. He has been named a Fellow of the American College of Clinical Pharmacy, and has completed the Academic Leadership Fellows Program for the American Association of Colleges of Pharmacy.

Dr. Rodgers previously served as a clinical pharmacist and faculty in ambulatory care at Duke University Hospital, where he was designated a clinical pharmacist practitioner as per the state of North Carolina in the areas of diabetes, hypertension, and anticoagulation. Rodgers also served as director for the ASHP-accredited PGY2 Ambulatory Care Pharmacy Residency program at Duke Hospital for eleven years and as the director of pharmacy education for the Duke Area Health Education Center for nine years. He is active with state and national organizations to promote pharmacy practice and the highest quality experiential education for pharmacy students.

ロジャース博士は、薬科学の学士号と薬学の博士号を、米国ノースカロライナ大学チャペルヒル校で取得した後、リッチモンドのバージニア医科大学病院で救急ケアの薬学レジデント研修を修了されました。ご専門は、プライマリケアに関する薬学実務教育、慢性疾患管理、および先進的薬学教育プログラムです。また米国薬科大学協会のフェローであり、同協会の教育リーダーシップフェロープログラムを修了されています。過去には、デューク大学病院の救急ケア部門において臨床薬剤師および教員として勤務し、糖尿病、高血圧および抗凝固の分野における州の臨床指定薬剤師、救急ケア薬剤師レジデントプログラムの責任者、健康教育センターの部門長などを歴任され、薬学生実地教育におけるエキスパートです。

Partnerships and AHECs: Educating Pharmacy Students in Practice

地域健康教育拠点 (AHECs) との協力による、薬学生の実地教育

Prof. PharmD Philip T. Rodgers

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Abstract: Pharmacy schools strive to provide the highest quality practice experiences for their students. To provide meaningful practice experiences for students, pharmacy schools can discover many advantages to building strong partnerships with health care institutions. A partnership can create an effective long-term relationship with opportunities for collaborative education, practice innovation, and practice-based research that benefit both. Establishing a coordinator or "champion" within both the school and institution are critical for development. During development and implementation there can be multiple barriers and issues that arise and addressed early. It is important to recognize the pressures and demands that each party is under. However, both parties must be willing to invest significant resources to ensure long-lasting success. Beyond partnerships with individual institutions, an Area Health Education Center (AHEC) system is another useful arrangement to educate students across a wide geographic area. An AHEC divides a large region into smaller sections and focuses resources on educating students and other learners as well as health care professionals in those areas in a concentrated and customized manner. Each AHEC may be provided with a budget to develop local faculty and staff to manage their individual educational needs. The strengths of each AHEC region should be built upon and showcased. Challenges in developing and maintaining an AHEC system include considerable startup costs and resources, as well as developing a sustainable plan for housing for learners that come for short durations such as a few months. Developing a plan for revenue to the AHEC helps to make it sustainable. In the U.S., several states have developed AHEC programs and the program in North Carolina is one of the most elaborate. With the changing environment of health care and greater needs to train students in real-world practice sites, partnerships and AHEC systems are an excellent way for a pharmacy school to provide an optimal educational experience as well as opportunities for progressive practice and scholarly endeavors.

討論

Discussion

講演内容に対する質疑応答や、いくつかのトピックに関する討論を行います。日本語でも英語でも結構ですので、この機会に是非活発なご質問・ご討論をお願いいたします。オーガナイザーらは通訳を試みます。

Questions and answers for contents of the lectures are welcomed. We also have discussions with some topics prepared by organizers. Please do not hesitate to have questions not only in English but also in Japanese (the organizers will try to translate).

【MEMO】

徳島大学 薬学部 国際シンポジウム 2014
地域からはじまる創薬と薬学教育
International Symposium in Univ. Tokushima 2014
Developing drugs and pharmacy awareness and education from a regional viewpoint

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