1st Workshop on Translational Venomics Medicine

Challenging Human Envenoming Issues
Exploring & Exploiting Snake and Scorpion Venoms and Antivenoms

October 2nd – 6th, 2017
Institut Pasteur of Casablanca, Morocco

Topics of the Workshop

- Biology & Systematics
- Venoms, Composition and Mode of Action
- Epidemiological Aspects & Management of Envenomation
- Immunotherapy (Classic and Innovative)
- Venomics & Antivenomics
- Therapeutic Potential of Venom Bioactive Peptides
THE TEACHING TEAM
[THEORETICAL COURSES]

RETO STÖCKLIN
SCIENTIFIC ENTREPRENEUR
ATHERIS LABORATORIES
GENEVA, SWITZERLAND

VINCENT VAGNIÈRE
INDEPENDENT CONSULTANT EXPERT
IN BREEDING AND MILKING
LAUSANNE, SWITZERLAND

DOMINIQUE KOUA
EXPERT IN NEXT GENERATION TRANSCRIPTOMICS DATA ANALYSIS
UNIVERSITY OF BERN, SWITZERLAND

JORGE FERNANDO PANIAGUA-SOLIS
INTERNATIONAL CONSULTANT AND SENIOR ADVISOR
FOR BIOTECHNOLOGY PRODUCTS DEVELOPMENT
SILANES LABORATORIES, MEXICO

WALTER GARCIA UBBELOHDE
DEPUTY DIRECTOR OF MEDICAL RESEARCH
SILANES LABORATORIES, MEXICO

JUAN J. CALVETE
HEAD OF THE STRUCTURAL AND FUNCTIONAL VENOMICS LABORATORY
BIOMEDICINE INSTITUTE OF VALENCIA, SPAIN

FABIEN TAIEB
EPIDEMIOLOGY OF EMERGING DISEASES UNIT AND THE TRANSLATIONAL RESEARCH CENTER
INSTITUT PASTEUR OF PARIS, FRANCE

ROLAND STOCKMANN
HONORARY ASSISTANT PROFESSOR IN ZOOLOGY
UNIVERSITY OF PIERRE ET MARIE CURIE
PARIS, FRANCE

RYM BENKHALLIFA
HEAD OF A RESEARCH TEAM AT THE LABORATORY OF VENOMS AND THERAPEUTIC MOLECULES
INSTITUT PASTEUR OF TUNIS, TUNISIA

BALKISS BOUHAOUALA-ZAHAR
HEAD OF THE NANOBIOIMEDIKA RESEARCH TEAM AT THE LAB OF VENOMS AND THERAPEUTIC MOLECULES
INSTITUT PASTEUR OF TUNIS, TUNISIA

FATIMA LARABA-DJEBARI
DEAN OF THE FACULTY OF BIOLOGICAL SCIENCES
UNIVERSITY OF SCIENCES AND TECHNOLOGY ALGIERS, ALGERIA

OULAIID TOULOUN
RESEARCHER
UNIVERSITY OF SULTAN MOULAY Slimane BENI MELLAL, MOROCCO

MOHAMMED FEKHAOUI
DIRECTOR OF THE SCIENTIFIC INSTITUTE OF RABAT
RABAT, MOROCCO

RACHIDA SOULAYMANI-BENCHEIKH
DIRECTOR OF THE CENTRE ANTI-POISON ET DE PHARMACOVIGILANCE
RABAT, MOROCCO

SAID YOUNOUS
HEAD OF THE PEDIATRIC INTENSIVE CARE UNIT
CHU MARRAKESH
MARRAKESH, MOROCCO

NAOUAL OUKKACHE
HEAD OF THE LABORATORY OF VENOMS AND TOXINS
INSTITUT PASTEUR OF MOROCCO
CASABLANCA, MOROCCO
THE TEACHING TEAM

[PRACTICAL COURSES]

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SALMA CHAKIR
PhD. STUDENT AT THE LABORATORY
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INSTITUT PASTEUR OF CASABLANCA, MOROCCO

THE ORGANISATION COMMITTEE

NAOUAL OUKKACHE
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HASNA BOURA
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PATHOLOGY-ONCOLOGY
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LATIFA ANGA
RESEARCHER AT THE LABORATORY
OF VIROLOGY
INSTITUT PASTEUR OF CASABLANCA, MOROCCO
THE SCIENTIFIC COMMITTEE

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INSTITUT PASTEUR OF CASABLANCA
CASABLANCA, MOROCCO

THE SPONSORS
**PROGRAM OF THE WORKSHOP**

### DAY 1

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<th>Activity</th>
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<tr>
<td>09h00</td>
<td>REGISTRATION &amp; WELCOME</td>
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<tr>
<td>09h15</td>
<td>OPENING CEREMONY &amp; COURSE INTRO</td>
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<tr>
<td>09h35</td>
<td>ORAL PRESENTATION OF ONE-MINUTE OF THE RESEARCH PROJECTS BY EACH STUDENT</td>
</tr>
<tr>
<td>10h00</td>
<td>COFFEE BREAK</td>
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### SESSION 1: BIOLOGY & SYSTEMATICS

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>10h30</td>
<td>GEOGRAPHICAL DISTRIBUTION, BIOLOGY &amp; SYSTEMATICS OF SNAKES.</td>
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<tr>
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<td><strong>Pr. MOHAMMED FEKHAOUI</strong> [SCIENTIFIC INSTITUTE OF RABAT]</td>
</tr>
<tr>
<td>11h00</td>
<td>THE REPRODUCTION OF SCORPIONS - CLIMATE CHANGE IMPACT.</td>
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<tr>
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<td><strong>Pr. ROLAND STOCKMANN</strong> [PARIS VI UNIVERSITY]</td>
</tr>
<tr>
<td>12h00</td>
<td>MOROCCAN SCORPIONS: INVENTORY, REPARTITION &amp; MEDICAL INTEREST.</td>
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<td><strong>Pr. OULAID TOULOUN</strong> [UNIVERSITY OF SULTAN MOULAY SLIMANE, BENI MELLAL]</td>
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<tr>
<td>13h00</td>
<td>LUNCH BREAK</td>
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### SESSION 2: EPIDEMIOLOGICAL ASPECTS & MANAGEMENT OF ENVENOMATION

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>14h00</td>
<td>EPIDEMIOLOGICAL AND MANAGEMENT OF SCORPION AND SNAKE ENVENOMATIONS.</td>
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<tr>
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<td><strong>Pr. RACHIDA SOULAYMANI-BENCHEIKH</strong> [CENTRE ANTI-POISON ET DE PHARMACOVIGILANCE, RABAT]</td>
</tr>
<tr>
<td>14h30</td>
<td>CLINICAL MANAGEMENT OF SCORPION AND SNAKE ENVENOMATIONS.</td>
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<tr>
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<td><strong>Pr. SAID YOUNOUS</strong> [CHU, MARRAKESH]</td>
</tr>
<tr>
<td>15h00</td>
<td>MANAGEMENT OF SNAKEBITE ENVENOMATION: CLINICAL INVESTIGATION AND THE IMPACT OF ANTIVENOM.</td>
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<td><strong>Dr. FABIEN TAEIB</strong> [INSTITUT PASTEUR OF PARIS]</td>
</tr>
<tr>
<td>16h00</td>
<td>ROUND TABLE - VENINS: POISONS ET MOLÉCULES THÉRAPEUTIQUES.</td>
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</table>
## PROGRAM OF THE WORKSHOP

### DAY 2

#### SESSION 3: VENOMS, COMPOSITION & MODE OF ACTION

<table>
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<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>09h00</td>
<td>SCORPION AND SNAKE VENOMS: COMPOSITION, MODE OF ACTION, PHARMACOLOGY AND PHYSIOPATHOLOGY.</td>
<td>Dr. NAOUAL OUKKACHE</td>
<td>INSTITUT PASTEUR OF MOROCCO</td>
</tr>
<tr>
<td>10h00</td>
<td>STRUCTURAL &amp; FUNCTIONAL DIVERSITIES OF BIOACTIVE SCORPION &amp; SNAKE VENOM COMPOUNDS.</td>
<td>Pr. BALKISS BOUHAQUAULA</td>
<td>INSTITUT PASTEUR OF TUNIS</td>
</tr>
<tr>
<td>11h00</td>
<td>COFFEE BREAK</td>
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<tr>
<td>11h30</td>
<td>INVOLVEMENT OF INFLAMMATORY RESPONSE AND OXIDATIVE STRESS IN PATHOGENESIS OF SCORPION ENVENOMATION: ROLE OF NEUROTOXINS.</td>
<td>Pr. FATIMA LARABA-DJEBARI</td>
<td>UNIVERSITY OF SCIENCE AND TECHNOLOGY OF ALGIERS</td>
</tr>
<tr>
<td>12h30</td>
<td>SCORPION TOXINS TO UNDERSTAND NEUROPATHOLOGIES/ INTERACTION OF SCORPION TOXINS WITH THE NERVOUS SYSTEM.</td>
<td>Dr. RYM BENKHALIFA</td>
<td>INSTITUT PASTEUR OF TUNIS</td>
</tr>
<tr>
<td>13h30</td>
<td>LUNCH BREAK</td>
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#### SESSION 4: IMMUNOTHERAPY (CLASSIC AND INNOVATIVE APPROACHES)

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<th>Time</th>
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</tr>
</thead>
<tbody>
<tr>
<td>14h00</td>
<td>CHALLENGES IN THE DEVELOPMENT OF ANTIVENOM, PAST AND FUTURE.</td>
<td>Dr. JORGE FERNANDO PANIAGUA-SOLIS</td>
<td>SILANES LABORATORIES, MEXICO</td>
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<tr>
<td>16h00</td>
<td>COFFEE BREAK</td>
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<tr>
<td>16h30</td>
<td>ADVANCES IN SPECIFIC TREATMENT AGAINST SCORPION ENVENOMATION: FROM IMMUNOTHERAPY TOWARDS VACCINE.</td>
<td>Pr. FATIMA LARABA-DJEBARI</td>
<td>UNIVERSITY OF SCIENCE AND TECHNOLOGY OF ALGIERS</td>
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<tr>
<td>20h00</td>
<td>GALA DINNER</td>
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## DAY 3

### SESSION 4: IMMUNOTHERAPY (CLASSIC AND INNOVATIVE APPROACHES)

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>09h00</td>
<td>STRATEGIES FOR ANTIVENOM EFFICACY IMPROVEMENT: NANOBODY GENERATION AND ENGINEERING.</td>
<td><strong>Pr. Balkiss Bouhaouala</strong> [Institut Pasteur of Tunis]</td>
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<tr>
<td>10h00</td>
<td>COFFEE BREAK</td>
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<tr>
<td>10h30</td>
<td>THE CLINICAL VALIDATION AND STANDARDIZATION OF ANTIVENOM.</td>
<td><strong>Dr. Walter Garcia Ubbelohde</strong> [Silanes Laboratories, Mexico]</td>
</tr>
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### SESSION 5: VENOMICS & ANTIVENOMICS

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<th>Time</th>
<th>Topic</th>
<th>Speaker &amp; Affiliation</th>
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<tbody>
<tr>
<td>11h00</td>
<td>STRUCTURAL &amp; PROTEOMIC MASS SPECTROMETRY.</td>
<td><strong>Dr. Juan J. Calvete</strong> [Biomedicine Institute of Valencia]</td>
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<tr>
<td>13h30</td>
<td>LUNCH BREAK</td>
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<tr>
<td>14h00</td>
<td>NEW APPROACHES FOR VENOMICS AND ANTIVENOMICS INVESTIGATIONS.</td>
<td><strong>Dr. Juan J. Calvete</strong> [Biomedicine Institute of Valencia]</td>
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<tr>
<td>16h00</td>
<td>COFFEE BREAK</td>
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<tr>
<td>16h30</td>
<td>AN INTRODUCTION TO VENOMICS: COMBINING GENOMICS, PROTEOMICS AND BIOINFORMATICS.</td>
<td><strong>Dr. Reto Stocklin</strong> [Atheris Laboratories, Geneva]</td>
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</tbody>
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## DAY 4

### SESSION 6: THERAPEUTIC POTENTIAL OF SCORPION & SNAKE VENOM PEPTIDES

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>09h00</td>
<td>INTEGRATIVE BIOINFORMATICS APPROACH FOR VENOM GLAND TRANSCRIPTOME ANNOTATION.</td>
<td><strong>Dr. Dominique Koua</strong> [National Polytechnical Institute of Yamoussoukro]</td>
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<tr>
<td>10h30</td>
<td>COFFEE BREAK</td>
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<tr>
<td>11h00</td>
<td>NATURAL PEPTIDES TO DRUGS: VENOMOUS ANIMALS AS DRUG DISCOVERIES.</td>
<td><strong>Dr. Reto Stocklin</strong> [Atheris Laboratories, Geneva]</td>
</tr>
<tr>
<td>13h00</td>
<td>LUNCH BREAK</td>
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PROGRAM OF THE WORKSHOP

PRACTICE 1

13h30  BREEDING AND MILKING OF VENOMOUS ANIMALS.
Mr. VINCENT VAGNIÈRE [LAUSANNE, SWITZERLAND]

14h30  PROTEIN CONCENTRATION, VENOM ACTIVITY, GEL ELECTROPHORESIS,
CHROMATOGRAPHIC TECHNIQUES, ANTIVENOM PRODUCTION,
ANTIVENOM TITRATION, AFFINITY DETERMINATION, CROSS-RECOGNITION
ASSAYS, ELISA TEST FOR THE CLINICAL VALIDATION.
Dr. NAOUAL OUKKACHE, Dr. FATIMA CHGOURY, SALMA CHAKIR AND
MYRIAM REZZAK (Ph.D. STUDENTS) [INSTITUT PASTEUR OF MOROCCO]

16h30  SOCIAL ACTIVITIES

DAY 5

PRACTICE 2

09h00  STRATEGIES FOR THE DISCOVERY OF NOVEL BIOACTIVE DRUG
CANDIDATES IN ANIMAL VENOMS.
Dr. RETO STÖCKLIN & Dr. DOMINIQUE KOUA

11h00  ROUND TABLE: “BUILDING CAPACITIES IN TRANSLATIONAL VENOMICS
MEDICINE”, “MAJOR CHALLENGES AND FUND RAISING OPPORTUNITIES”.

12h00  CLOSING CEREMONY & CERTIFICATE DISTRIBUTION

14h00  LUNCH BREAK
PROGRAMME DE LA TABLE RONDE
VENINS : POISONS ET/OU MOLÉCULES THÉRAPEUTIQUES

02 Octobre 2017
Faculté de Médecine et de Pharmacie de Casablanca.

16h00 – 16h30
Accueil des participants.

16h30 – 17h00
Allocutions d’ouverture.
Directrice de l’Institut Pasteur du Maroc.
Directeur de la Direction de l’Épidémiologie et de Lutte contre les Maladies.
Directeur du Médicament et de la Pharmacie.
Doyen de la Faculté de Médecine et de Pharmacie de Casablanca.

17h00 – 17h15
Envenimation scorpionique et la valeur ajoutée de l’Immunothérapie : Preuves Scientifiques.
Pr. BALKISS BOUHAOUALA-ZAHAR
Chef d’équipe NanoBioMedika, LVMT Institut Pasteur Tunis

17h15 – 17h30
Envenimation scorpionique & standardisation des antivenins.
Dr. WALTER GARCIA UBBELOHDE
Dr. GUY HOUILLON
Directeur adjoint de la recherche médicale, Laboratoires Silanes, Mexique.

17h30 – 17h45
Profil clinique des antivenins administrés par voie intraveineuse, focus sur Scorpifav.
Dr. GUY HOUILLON
Expert médical à SANOFI PASTEUR, France.

17h45 – 18h00
Apport des études cliniques dans la compréhension des envenimations scorpioniques & standardisation des antivenins.
Dr. JORGE FERNANDO PANIAGUA-SOLIS
Consultant international et expert du développement de produits biologiques, Suisse.

18h00 – 18h15
Venins au service de la médecine.
Dr. RETO STÖCKLIN
Expert dans le domaine de la découverte de nouveaux médicaments, fondateur et directeur des laboratoires Atheris, Suisse.

18h15 – 18h30
Discussion et recommandations des experts.
Pr. Balkiss Bouhouala-Zahar is a professor in Biochemistry and Head of NanoBioMedika research Team at the Laboratory of Venoms and Therapeutic Molecules of the IPT.

Her areas of expertise include scorpion venom analysis, genetic engineering of toxins and antibodies as well as the evaluation of serotherapy efficiency.

She has been nominated as Fellow of the African Academy of Sciences, FAAS since November 2013 and currently is appointed as a Member of the Advisory Committee (MAC).

Dr. Walter Garcia Ubbelohde is a doctor in Medicine; he graduated from the National Autonomous University of Mexico in 1995. He is currently the Deputy Director of Medical Research at Silanes Laboratories in Mexico.

His areas of expertise cover the design and execution of the entire clinical trials studies, the integration of global pharmacovigilance processes at national and international levels, orphan drug such as antivenoms designation request strategies in FDA (US Food and Drug Administration) and EMA (European Medicines Agency).

After a PhD in Biochemistry and Immunology, Dr Jorge Paniagua-Solis has more than 20 years of experience in the development of biotechnology products and some of them are approved by the FDA.

His areas of expertise include the development of Polyclonal (equine origin) and monoclonal therapeutic antibodies as well as in vitro diagnostics (IVD).

He is also involved in Strategic alliances, regulatory affairs, preclinical and clinical experience, Management of Academy-Industry relationships and Intellectual property and Orphan drug strategies such as antivenoms. Dr. Paniagua-Solis is currently working as a senior consultant in Teraclon (Spain) and Silanes laboratories (Mexico).

Dr. Stöcklin graduated from the University of Geneva with mass spectrometry, proteomics, protein engineering and bioinformatics as core expertise.

After a PhD in medical biochemistry in 1994, he specialised in the discovery of new drug candidates in animal venoms. Since 1995, Dr. Stöcklin is the head of Atheris SA and co-founded several emerging biotech, pharma and beauty-care companies. He is co-author of over one hundred peer-reviewed scientific publications and co-inventor of five granted patents.

Amongst other commitments, Dr. Stöcklin is currently coordinating the implementation of an ambitious new pharmaceutical company developing original antivenoms.
BIOGRAPHY OF THE EXPERTS

DOMINIQUE KOUA
EXPERT IN NEXT GENERATION TRANSCRIPTOMICS DATA ANALYSIS
UNIVERSITY OF BERN, SWITZERLAND

After a master degree in agronomy (2004) and advanced studies in applied genetics (2006), Dr. Koua obtained a master in proteomics (2008) and his PhD in Bioinformatics at the University of Geneva (Switzerland) in 2012.

In 2008, Dr. Koua is actively working in the field of venomics and specifically in the development of integrative bioinformatic solutions for comprehensive transcriptome annotation. He is collaborating with various international research groups working on spiders, snakes, cone snails, etc. A number of very good articles have been published from his research activities.

FUJIAN J. CALVETE
HEAD OF THE STRUCTURAL AND FUNCTIONAL VENOMICS LABORATORY
BIOMEDICINE INSTITUTE OF VALENCIA, SPAIN

Dr. Juan J. Calvete research focuses on venomics and antivenomics.

Dr. Calvete served as first President (2004-2009) of the Spanish Proteomics Society. Since 2011 he is President of the European Section of the IST, Editorial Board Member of Toxicon, J Venom Res, Biochemie, and Editor-in-Chief of J Proteomics. Dr. Calvete belongs to the Scientific Advisory Comittee of GSI.

In 2013, Dr. Calvete received the Vital Brazil Medal by Instituto Vital Brazil. He also co-authored more than 350 peer reviewed articles.

FABIEN TAIEB
EPIDEMIOLOGY OF EMERGING DISEASES UNIT AND THE TRANSLATIONAL RESEARCH CENTER INSTITUT PASTEUR OF PARIS, FRANCE

Fabien Taieb is a clinical doctor who, after a broad formation including intensive care and specialization in internal medicine and in Infectious and Tropical Diseases.

He obtained his specialist qualifications in basic sciences, management of anti-infectious drug and Public Health.

He is currently attached to the Center for Translational Science and the Epidemiology of Emerging Diseases Unit of Institut Pasteur Paris.

He is also in charge of the development of the clinical research in the International Network of Pasteur Institutes (INCREASE initiative).

FATIMA LARABA-DJEBARI
DEAN OF THE FACULTY OF BIOLOGICAL SCIENCES UNIVERSITY OF SCIENCES AND TECHNOLOGY ALGIERS, ALGERIA

Professor Fatima Laraba-Djebari is a Teacher-Researcher at the Faculty of Biological Sciences of USTHB. She had more than 20 years of experience in Biochemistry, Immunology and Toxinology. She is now serving as the Dean of the Faculty of Biological Sciences of USTHB.

She is also Funder Member of Academy of Sciences and Technology of Algeria.

She has published books, two chapters of handbook and several indexed scientific publications. She has been serving as a reviewer in several journals and involved as an Editorial board member.
GUY HOUILLON
GLOBAL MEDICAL EXPERT
SANOFI PASTEUR
LYON, FRANCE

Guy Houillon, M.D has been working in pharma companies for 30 years and 15 years in the vaccine industry. He worked as a GP for two years and then got a master in Toxicology and Clinical Pharmacology in 1985 (Paris; France). He then joined several pharma companies working in the CNS field as clinical project leader and country medical director. He got a master in Health Economics and joined Sanofi Pasteur in 2002 as Global Medical Expert.

Current areas of expertise include Rabies vaccines, immunoglobulins, Yellow fever vaccines, Japanese encephalitis vaccines and anti-venoms.

ROLAND STOCKMANN
HONORARY ASSISTANT PROFESSOR IN ZOOLOGY
UNIVERSITY OF PIERRE ET MARIE CURIE
PARIS, FRANCE

Roland Stockmann is a professor in Zoology and Animal Biology.

He has over 40 years of expertise in scorpion systematic, biology and distribution.

His areas of research include Etiology, Histology, and Cytology and scorpion reproduction.

Pr. Roland Stockmann co-authored two books and is part of more than 25 publications.

RYM BENKHALIFA
HEAD OF A RESEARCH TEAM AT THE LABORATORY OF VENOMS AND THERAPEUTIC MOLECULES
INSTITUT PASTEUR OF TUNIS, TUNISIA

After a PhD of Neurosciences at the University of Angers and a post-doctoral internship at the Department of Neurobiology (CNRS, Marseille), Rym Benkhaliﬁja joined the Laboratory of Venom and Therapeutical Molecules of the Institut Pasteur of Tunisia (IPT) where she is actually head of a research team. Her areas of interest are related to ion channels involvement in degenerative diseases and their interaction with natural peptides and toxins as therapeutic modulators.

She is a member of the IPT’s Biomedical Ethics Committee and she is also responsible for institutional and international projects in Biosafety and Biological Risk Management, as a national focal point.

NAOUAL OUKKACHE
HEAD OF THE LABORATORY OF VENOMS AND TOXINS
INSTITUT PASTEUR OF CASABLANCA
CASABLANCA, MOROCCO

Dr. Naoual Oukkache is part of the Institut Pasteur of Morocco since 2006 and is currently the head of the Venoms and Toxins laboratory.

Dr. Oukkache specializes in immunotherapy and molecular biology of antibodies.

Dr. Oukkache published more than 20 scientific articles in different peer reviewed international journals and contributed to numerous conferences.

Her specific areas of expertise include characterization of snake and scorpion venoms, venomics and antivenomics, therapeutics molecules from venoms and improvement of immunotherapy.
<table>
<thead>
<tr>
<th>NAME</th>
<th>EMAIL</th>
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<th>COUNTRY</th>
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<tr>
<td>BENKHALIFA RYM</td>
<td><a href="mailto:rym.benkhalifa@pasteur.tn">rym.benkhalifa@pasteur.tn</a></td>
<td>INSTITUT PASTEUR OF TUNIS</td>
<td>TUNISIA</td>
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<tr>
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<td><a href="mailto:balkiss.bouhaouala@gmail.com">balkiss.bouhaouala@gmail.com</a></td>
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