BOOK OF ABSTRACT VACCINES

3rd International Conference on

VACCINES RESEARCH AND DEVELOPMENT

May 26, 2025 | Amsterdam, Netherlands

FOREWORD

3**rd International conference on Vaccines Research and Development (Vaccines-2025)** has been scheduled on **May 26, 2025** at **Amsterdam, Netherlands**. The one-day conference will include plenary and keynote lectures by experienced experts and Oral talks, Poster presentations, Workshops and Exhibitions.

The main objective of the meeting is to promote contacts between scientists working in Vaccines Research and Development, in order to share experiences, to spread the latest information on progress in their specialties and related fields, to gain visibility for their research, to put young researchers interacting with their peers and seniors, and to develop professionally.

We sincerely hope that **Vaccines-2025** will serve as an international platform for meeting researchers from around the world, establishing new collaborations, and broadening professional contact.

We look forward to welcoming you to Amsterdam for this inspiring congress in 2025!

COMMITTEE

ORGANIZING COMMITTEE MEMBERS

De-chu Christopher Tang
CEO OF VaxDome, USA

Barry T. Rouse
University of Tennessee, USA

Lyudmila Stojanovich
Belgrade University, Serbia

Parimal R. Desai
Experienced BioPharma and Vaccines Development Leader, USA

Ivana Haluskova Balter
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A Platform of Fourth Generation Adenoviral Vectors for Vaccines and Applications Beyond

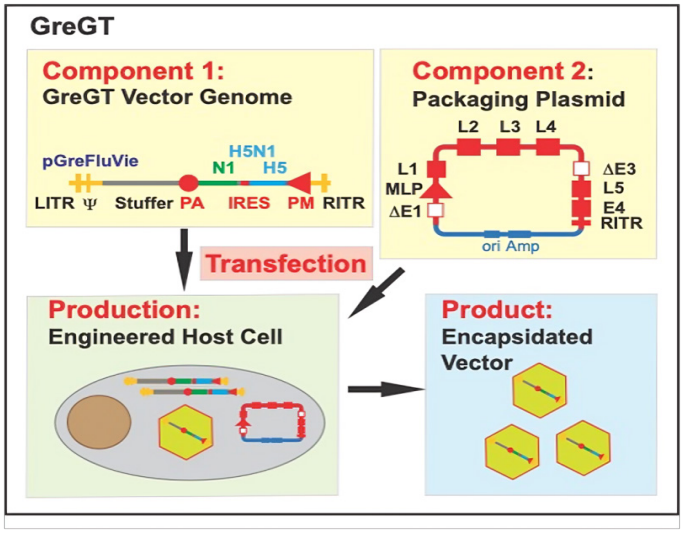
Uwe D. Staerz

Chief Scientific Officer Greffex, USA

Abstract:

Gene transfer (GT) vectors have diverse applications. They have been used to restore cellular activities by reconstituting normal cellular functions, by delivering therapeutic compounds, and by priming immune responses as genetic vaccines. Viruses, nature's gene delivery vehicles, have formed the basis of most GT vectors. The biology of the underlying virus may, however, hamper their use. Vectors designed as minor variants of the relatively benign, yet complex adenovirus (Ad) excite vigorous immune responses, thus limiting their therapeutic effects. Deleting Ad vectors of all endogenous Ad genes brought their beneficial features to the front. Earlier production schemes of fully deleted Ad (fdAd) vectors depended on helper virus constructs to deliver the vector production information in trans. They suffered from contaminations with the helper virus or the recombination of replication competent adenoviruses (RCA).

We developed a novel transfection-based helper virus-independent Ad vector encapsidation technology that avoided these pitfalls. It was built on a vector genome and a vector packaging module. We have now optimized our approach into the GreGTplug¬-and-play platform so that a new vector can be delivered in about four weeks. The GreGT system is built upon a set of base vector genome modules that can be quickly loaded with a new application, and a set of packaging modules that allow their encapsidation into capsids of



different Ad serotypes. As both components can be freely combined, the GreGT platform is endowed with high degrees of flexibility and versatility. Having been gutted off all endogenous Ad genes, GreGT vectors limited interference by anti-Ad immune responses and showed increased genetic payloads capacity to levels unique to this system. They were successfully used to engineer transplant tissues to stably evade graft rejection without supportive immune suppression and to demonstrate extraordinary potencies as vaccines against different infectious threats.

Biography

Dr. Uwe D. Staerz, M.D., Ph.D., received his M.D. degree from the Eberhard-Karls-Universitaet, Tuebingen, Germany, and his Ph.D. in Molecular Biology from the University of California, San Diego, CA. He worked as Fellow at The Scripps Research Institute, La Jolla, CA, as Member of the Basel Institute for Immunology, Basel, Switzerland and as Professor at the Department of Immunology, National Jewish Health / University of Colorado Health Sciences Center, Denver, CO. His work has focused on the development, activation and inhibition of T cell immune responses. Having founded Greffex, Inc., he left academia to guide the companies' R&D efforts. He established numerous research programs that were continuously funded for 30 years, published widely in highly regarded scientific journals, and was an inventor of the patents that established the T cell recruiting bispecific antibody and 4th-generation adenovirus vector technologies.

Management of Viral Immunopathological Diseases

Barry T. Rouse

University of Tennessee, USA

Abstract:

The mission of the talk is to identify immune damaging participants involved in antiviral immunoinflammatory lesions. We argue these could be targeted and their activity changed selectively by maneuvers that at the same time may not diminish the impact of components that help resolve lesions. Ideally, we need to identify therapeutic approaches that can reverse ongoing lesions that lack unwanted side effects and are affordable to use. By understanding the delicate balance between immune responses that cause tissue damage and those that aid in resolution, novel strategies can be developed to target detrimental immune components while preserving the beneficial ones. Some strategies involve rebalancing the participation of immune components through various approaches, such as removing or blocking proinflammatory T cell products, expanding regulatory cells, restoring lost protective cell function, using monoclonal antibodies to counteract inhibitory molecules, and exploiting metabolic differences between inflammatory and immuno-protective responses. These strategies can help reverse ongoing viral infections. We explain various approaches, from model studies and some clinical evidence that achieve innate and adaptive immune rebalancing offering insights into potential application to controlling chronic viral induced lesions.

Biography:

Prof. Rouse is a native of England where he completed his education through a BVSc honors degree. Graduate education in Canada with MSc in Virology and PhD in immunology Post-doctoral fellowship at Walter and Eliza Hall of Medical Research in Melbourne Australia in Cellular Immunology 1970-72. Established research Program at University of Saskatchewan on Viral immunology supported by Medical Research Council of Canada. Moved to College of Veterinary Medicine University of Tennessee in 1977 where he remains as the Lindsay

Young Distinguished Professor. Took several mainly sabbaticals, including one with Peter Doherty (another veterinarian) in Canberra and Hermann Wagner for one year in Mainz, Germany Worked on the immunology of herpes virus infections supported continuously by multiple NIH grants until the lad was closed in Dec 2022.

Unraveling Vaccine Hesitancy: A Cross-Disciplinary Approach to Identifying Barriers and Evolving Interdisciplinary Interventions

Gulzar H. Shah

Georgia Southern University, USA

Abstract:

Vaccine hesitancy remains a complex global health challenge, influenced by a spectrum of sociocultural, psychological, political, and structural factors. This study adopts a cross-disciplinary framework to systematically explore the multifaceted barriers contributing to vaccine resistance and delay. Drawing insights from public health, behavioral science, sociology, communication studies, and ethics, the research aims to dissect the underlying causes of hesitancy across diverse populations. Through qualitative and quantitative methods—including surveys, focus groups, and policy analysis—we identify key themes such as mistrust in health systems, misinformation, cultural beliefs, and access inequities. The findings underscore the necessity of a coordinated, interdisciplinary intervention strategy that moves beyond traditional public health messaging. We propose a dynamic model for intervention development that integrates culturally competent communication, community engagement, policy reform, and digital literacy initiatives. This approach not only addresses current hesitancy but also builds resilient, trust-based frameworks for future vaccine campaigns. Our study highlights the imperative for sustained, collaborative action to effectively combat vaccine hesitancy and safeguard public health.

Biography

Dr. Gulzar H. Shah is a renowned public health expert specializing in health informatics, vaccine hesitancy, and health equity. He serves as Department Chair and Professor of Health Policy and Community Health at the Jiann-Ping Hsu College of Public Health, Georgia Southern University. Dr. Shah has significantly contributed to addressing population health challenges, notably through his editorial leadership in the MDPI Vaccines special issue on “Vaccine He-

sitancy." He holds editorial roles in leading journals including the American Journal of Public Health and Frontiers in Public Health. His extensive public health practice experience includes work with the Utah State Department of Health, NACCHO, and NAHDO. Through a major DHHS grant, he has also led efforts to strengthen health informatics capacity, underscoring his commitment to building the future public health workforce.

Inadvertent Outcomes of using Monkey Kidney Cells to Produce Polio Vaccines

W. John Martin

Medical Director - Institute of Progressive, USA

Abstract:

Dr John Ender and his colleagues reported in 1949 that polioviruses could be grown in cell cultures. This allowed cultured polioviruses to replace earlier attempts to develop polio vaccines using animal-grown viruses.Multiple passages of replicating cultured human cells would be needed to obtain sufficient cells for large-scale vaccine production. There was concern that the passaged cells could potentially undergo unspecified precancerousgenetic changes.Alternatively, polioviruses could be grown in non-passaged primary cultures of monkey kidney cells. Several prominent researchers unsuccessfully argued that monkey cultures would be a likely source of contaminating animal viruses. Despite being vindicated by the detection of Simian Virus 40 (SV40) in cultured kidney cells from rhesus monkeys,the manufacturing of polio vaccines was merely switched to using cultured kidney cells from African green monkeys. Both rhesus and African green monkeys are commonly infected with their respective cytomegaloviruses. These viruses could interactwith the vaccine viruses or other microbes in inoculated humans and animals. Rhesus monkey cytomegalovirus-contaminated CHAT polio vaccine was tested in simian immunodeficiency virus (SIV) infected chimpanzees.Virus interaction between cytomegalovirus and SIVcpzcan explain the initial formation of the human immunodeficiency virus (HIV). This view is widely contested in mainstream science because ofthe zoonotic transfer of SIV from other primates to humans and the estimated several decades required for the observed genetic divergence of the env gene in the earliest two examples of HIV (ZR59 and DRC60). HIV differs from the examples of other zoonotic SIV infections in being highly pathogenic. Moreover, the genetic divergence of a more recently arising HIV could occur from concurrent passage in chimpanzees with divergent SIV. Modified rhesus and African green monkey simian cytomegalovirus (SCMV) can further provide co-pathogens in

HIV infected individuals, as well as directly contagious sole pathogens in non-HIV-infected individuals. Indeed, as will be discussed, such atypical cytomegaloviruseswere cultured from patients with a range of neurological and psychiatric illnesses, including chronic fatigue syndrome (CFS) and autism. Updated information on the structural and functional modifications in an SCMV-derived cytomegalovirus will be reported. These include: 1. Deletion or mutation of the genes coding for the relatively few virus components typically targeted by the cellular immune system. This generic immune evasion mechanism, termed stealth adaptation, explains the typical lack of an inflammatory response to these viruses. 2. Fragmented, genetically unstable genome. 3. Acquisition of"renegadegenetic sequences" from infected cells and other microbes. The acquired sequences have undergone genetic changes, including mutations,recombinations, and replacements. 4. Capacity to evoke a non-immunological anti-virus defense mechanism mediated by the Alternative Cellular Energy (ACE) pathway. 5. Potential interactions with other viruses, including Covid-19. Stealth adapted viruses have significant biological, diagnostic, and therapeutic implications. They also provide a cautionary tale on how developing vaccines in response to an epidemic can inadvertently create additional epidemics.

Biography

Dr. W. John Martin is the Medical Director of the Institute of Progressive Medicine, part of MI Hope Inc., a non-profit organization supporting individuals with mental illnesses. He earned his medical degree from the University of Sydney in 1965 and his PhD from the University of Melbourne in 1970. Board-certified in Anatomic and Clinical Pathology, with subspecialty training in Immunopathology and Medical Microbiology, Dr. Martin has held academic and research positions at the National Institutes of Health, the Uniformed Services University, and the University of Southern California. Dr. Martin's current research explores the role of KELEA in supporting environmental and physiological adaptation, a process he calls Nature's Allostasis. His innovative use of KELEA-activated water offers promising approaches to restoring balance in disordered ecosystems and human health.

Lessons Learnt from 3 Decades of HIV and Cancer Vaccines for a Covid Vaccine

Angus G. Dalgleish

St. George's University of London, England

Abstract:

No HIV vaccine has been successful based on the HIV envelope inspite of nearly half a trillion dollars expenditure. This is because the envelope has too many epitopes hiding the important Achilles heel. Vacc-4x focused on just 4 epitopes in the gag protein and is highly effective in reducing viral load in chronically infected people. It has now been enhanced with a further conserved epitope and adjuvant and can restore CD4 counts in a clinical study.

Cancer vaccines based on tumour associated antigens are initially effective but are rapidly rendered ineffective by antigen down regulation. A review of 12 different vaccine studies involving the ICVI have shown that only non-specific immune stimulating agents such as heat killed mycobacteria Vaccae and Obuense are effective in the long term. Moreover ,they enhance the efficacy of chemotherapy and immunotherapy given concomitantly or afterwards in clinical studies including Melanoma and pancreatic studies.

The common thread for effective vaccines in both HIV and cancer is the non-specific restoration of a suppressed innate immune response, which is not addressed by current HIV vaccines and cancer vaccine candidates.

Such an approach would allow specific targeting of multiple conserved tumour antigens.
When Covid emerged , selecting the spile protein as a vaccine component was as pointless as the HIV envelope and this explains why no Covid vaccine induced protection and why such serious side effects occurred. The spike protein was 80% homologous to human proteins and was certain to induce broad ranging autoimmunity as reported , as well as stimulating the ACE-2 receptor with such devastating cardiovascular effects.

Future vaccines should avoid the spike proteins and focus on non specific inmate immune stimulation which would cover all respiratory viruses.

Biography

Prof. Angus G. Dalgleish is Emeritus Professor of Oncology at St George's University of London and Principal of the Institute of Cancer Vaccines and Immunotherapy. A pioneer in HIV and cancer immunotherapy, he was the first to identify the CD4 receptor as the HIV binding site and linked HIV to slim disease and Kaposi's Sarcoma. His work helped develop Revlimid, one of the world's top oncology drugs. He also advanced IMM-101, a mycobacterium-based cancer immunotherapy. His research has shown that vitamin D3 and low-dose naltrexone significantly enhance treatment outcomes in cancer and long COVID. During the pandemic, he was among the first to raise concerns about the engineered origins of the virus and vaccine-related inflammatory effects. 10 Professor Dalgleish is a Fellow of multiple prestigious institutions and recipient of the Joshua Lederberg Award. His career bridges virology, oncology, and immunology, contributing major insights into virus-induced cancers and immunotherapeutic strategies.

Implementing Strategic Plasma Resource Self-Sufficiency Through Unpaid Plasma Donations on the Global Plasma Market

Jean Mercier Ythier

University Paris-Panthéon-Assas, France

Abstract:

The last two decades have seen a considerable increase in the pharmaceutical industry's demand for plasma on a global scale for the production of plasma-derived medicinal products (PDMPs). It is impossible to meet the demand for fractionation plasma from unpaid voluntary donations on a global scale at the present state of manufacturing and biomedical techniques. Nevertheless, we argue that self-sufficiency in strategic plasma resources, properly construed, can be achieved through unpaid plasma donations to appropriately designed national blood donation organizations. We proceed in three short steps: (i) by first recalling why and in what sense plasma and PDMPs should be considered strategic commodities; (ii) by secondly explaining why self-sufficiency in strategic plasma products matters and in what practical sense it can be achieved; and (iii) by outlining the main characteristics that a national blood organization must meet to achieve self-sufficiency through unpaid voluntary donations.

Biography

Dr. Jean Mercier Ythier is professor of economics at the University Paris-Panthéon-Assas, France. He graduated from the Institute of Political Studies of Paris (PhD, 1989). He was also a graduate student at Harvard University (1986-87). He went notably through positions of invited research fellow at the University of Montréal (Québec, Canada), assistant professor and associate professor of economics at the University of Paris Panthéon-Sorbonne and professor of economics at the University of Lorraine (France). Prof. Jean Mercier Ythier's research interests include the theory of general competitive equilibrium, microeconomic theory, public economic theory, economic philosophy, altruism, ethics, and topics of economic anthropology.

VLP Polio Vaccine-The Ultimate Solution for Post Eradication World

Chunlin Xin

Vice President at CanSino Biologics, China

Abstract:

Polio eradication efforts have led to remarkable progress, including the successful elimination of wild poliovirus types 2 and 3. Nevertheless, wild poliovirus type 1 continues to circulate in pockets of Afghanistan and Pakistan, posing ongoing risks of international spread. In addition, vaccine-derived polioviruses (VDPVs) remain a challenge, primarily linked to the oral polio vaccine (OPV). While OPV is effective and easy to administer, it can, in rare instances, revert to a neurovirulent form, leading to circulating VDPVs (cVDPVs).

The introduction of the next-generation OPV (nOPV2) aims to address this issue by genetically modifying the Sabin type 2 strain, reducing its ability to replicate in the human gut and diminishing the risk of reversion to virulence. nOPV2 has received Emergency Use Listing (EUL) from the World Health Organization (WHO) and is deployed in targeted campaigns to stop cVDPV2 outbreaks. Although it shows promise, nOPV2 still requires robust safety monitoring to ensure its effectiveness and minimal risk profile.

Meanwhile, new vaccine strategies are emerging to overcome the limitations of both OPV and the inactivated polio vaccine (IPV). One innovative approach involves virus-like particle (VLP) polio vaccines, which mimic the structure of poliovirus without containing its genetic material. VLPs can be produced in various recombinant expression systems, offering several advantages: they are inherently safer (no risk of reversion to virulence), potentially cheaper to manufacture at scale, and can be engineered for improved stability. Early preclinical and clinical data suggest that VLP polio vaccines can elicit strong immune responses, comparable to existing vaccines.

To achieve a polio-free world, efforts must focus on sustained vaccination coverage, robust surveillance, and strategic use of next-generation vaccines. Continued collaboration among global health agencies, governments, and vaccine manufacturers is vital to address the final hurdles. By integrating new options such as nOPV2 and VLP-based vaccines into immunization programs, the international community stands on the brink of eradicating polio once and for all.

Biography

Dr. Chunlin Xin serves as the Vice President of CanSino Biologics. With more than 40 years of research experience across the US, Canada, and China, I have dedicated my career to advancing vaccine technologies and enabling technology transfers in developing countries. My global contributions encompass the development of innovative platforms such as Virus Vector, VLP, and mRNA, as well as playing a crucial role in localizing vaccine manufacturing during the COVID-19 pandemic. As a leader in the biopharmaceutical industry, I am committed to fostering global health equity through science and innovation.

SYN023 mAb Cocktail for Rabies Prophylaxis

Eric Tsao

CEO at Synermore Biologics Co., Ltd., China

Abstract:

SYN023is a mixture of two anti-rabies humanized monoclonal IgG1κ antibodieswhich bind to distinct and non-overlapping antigenic sites on the rabies virus glycoprotein.Updated spectrum of neutralization studies and epitope mapping analyses will be discussed. A Phase 2b and a Phase 3 randomized double-blindedtrials were conducted to demonstrate the safety and efficacy of SYN023 in 1448 Category III rabies patients. The analysis of the safety profile of SYN023 based on the integrated data from all 6 clinical trials demonstrated that SYN023 was generally well tolerated when administered alone or with rabies vaccine in subjects with rabies exposure as well as healthy subjects and has a favorable safety profile. The safety profile was similar tothat of the currently approved HRIG in the US. Overall, the incidence of serious TEAEs throughout the studies was low (<5.0%) and similar between the SYN023 and HRIG groups.No TEAE led to study withdrawal in subjects treated with SYN023. The most common solicited TEAEs with SYN023 and HRIG were injection site swelling, injection site pain, headache, and injection site erythema. Ahigher incidence of these TEAEs was noted in subjects treated with HRIG than in subjects treated with SYN023.Across 6 clinical trials, RVNA appeared to be adequate at the 0.3 mg/kg dose level to rapidly establish RVNA of ≥0.5 IU/mL in the rabies-exposed person. The primary endpoint for the ISE was the GMC of the RVNA on Study Day 8 in the FAS (SYN023, N=978; HRIG, N=469). The GMC ratio of RVNA (SYN023 vs HRIG) on Study Day 8 was 13.977 (97.5% CI: 11.887, infinity; P<0.0001); SYN023 was considered superior to HRIG with respect to GMC of RVNA on Study Day 8, as the lower bound of the 97.5% CI was above the prespecified margin 1.2.The immune response (RVNA ≥0.5 IU/mL) rate ratio (SYN023 vs HRIG) was 0.99 (95% CI: 0.96, 1.01; P<0.0001); SYN023 was considered noninferior to HRIG with respect to immune response rates on Study Day 99, as the lower bound of the 95% CI was above the prespecified margin 0.9.There were no deaths, serious adverse events, or AEs leading to study discontinuation up to 365 days after dosing.

Biography

Dr. Eric Tsao is the Chief Executive Officer of Synermore Biologics, a company he founded in 2013. With over 25 years of experience in the biopharmaceutical industry, he has led the development of more than 20 clinical-stage products and contributed to the successful approval of four biologics in the U.S. and EU. His expertise spans biological product development, process design, facility engineering, and operations. Under his leadership, Synermore developed and commercialized SYN023, an innovative anti-rabies monoclonal antibody cocktail for post-exposure prophylaxis. Dr. Tsao has also worked with Morningside Group on biotech investments, enhancing CMC capabilities across portfolio companies. His previous leadership roles include Vice President of Technical Operations at Aeras and Vice President of Process and Manufacturing Sciences at MedImmune, where he played a key role in the development and licensing of Synagis, FluMist, and Cervarix.

From Pandemic Firefighting to Long-Term Recovery: Primate Research in the Service of Global Health

Merel F.M. Langelaar

Director - Biomedical Primate Research Centre, Netherlands

Abstract:

The COVID-19 pandemic underscored the critical role of nonhuman primate (NHP) research in accelerating biomedical breakthroughs, particularly in vaccine development, antiviral therapies, and immunological studies. This paper examines how primate research rapidly transitioned from emergency "pandemic firefighting" to supporting long-term strategies for global health resilience and recovery. We explore the scientific, ethical, and logistical challenges faced during the pandemic and highlight how NHP models contributed uniquely to understanding SARS-CoV-2 pathogenesis, vaccine efficacy, and variant responses. Beyond the immediate crisis, we analyze the evolving role of primate research in addressing future zoonotic threats, informing One Health approaches, and supporting sustainable global health infrastructure. Emphasis is placed on interdisciplinary collaboration, ethical stewardship, and international policy frameworks that ensure the responsible use of NHPs. This work advocates for strengthening primate research systems not only for pandemic preparedness but also as a cornerstone for enduring global health security.

Biography

Dr. Merel Langelaar is a veterinarian, immunologist, and senior public health expert with over 25 years of experience across science, policy, and governance. Since 2024, she has served as Director of the Biomedical Primate Research Centre (BPRC), a leading European institute for translational research using non-human primate models. Prior to this, she was Professor of One Health Governance at Utrecht University, integrating scientific, societal, and regulatory perspectives on infectious disease and ecosystem health. Her previous roles include leadership positions at the Dutch National Institute for Public Health (RIVM), the Health Council of the Netherlands, and the Health and Youth Care Inspectorate (IGJ), where she focused on

antimicrobial resistance and preventive healthcare. She also served as Vice Dean of Education at Utrecht's Faculty of Veterinary Medicine, leading curriculum innovation during the COVID-19 pandemic. At BPRC, she champions scientific excellence, ethical integrity, and innovation in both primate-based and non-animal model research. Dr. Langelaar advises national and international health authorities and has held key positions in organizations such as ZonMw, the European Joint Action on AMR, and the Royal Dutch Veterinary Association. She is committed to interdisciplinary collaboration and advancing biomedical research to address current and future public health challenges.

Advancing the Efficacy of Vaccine with mRNA Technology

Yujian Zhang

CEO at Belem Therapeutics, USA

Abstract:

The mRNA technology is revolutionizing the vaccine field, elevating it to new heights by transforming vaccines into precise "chemical products" with clearly defined quality and structural attributes. This advancement makes the rational design of mRNA vaccine molecules not only possible but also essential. mRNA possesses unique characteristics as antigen-encoding molecules, where its regulatory elements, chemical composition, encoding sequence, and modifications significantly influence translatability, stability, immunogenicity, and toxicity. The underlying mechanisms involve RNA folding, ribosome binding and movement, translation initiation, and innate immune sensing, among others.

As we stand on the practical frontier of developing next-generation vaccines, we have employed various strategies to enhance the performance of mRNA vaccines. One such approach is codon optimization using natural language processing (NLP) algorithms, leveraging the analogy between protein encoding rules and "voice recognition." This innovation has led to a significant improvement in antigen-specific immunogenicity, culminating in the Emergency Use Authorization (EUA) licensure of an mRNA-based COVID-19 vaccine. Our work underscores the importance of rational design and highlights the feasibility of optimizing mRNA sequences using artificial intelligence.

Biography

Dr. Yujian Zhang is a pharmaceutical industry leader with experience at Otsuka, BeneVir, GSK, and StemiRNA. As the former CEO of Belem Therapeutics, he contributed to the development of groundbreaking molecules, including Arexvy®, Lumoxiti®, RG7787, and a Personalized

Cancer Vaccine (mRNA). He co-created LinearDesign, a leading mRNA design algorithm, and led the development of the COVID-19 mRNA vaccine BIC-213, the first AI-designed, tissue-specific vaccine to receive Emergency Use Authorization. He also spearheaded large-scale mRNA vaccine production solutions, enabling an annual capacity of up to 2 billion doses.

Cellular Energy Support: An Alternative to Vaccination in the Prevention of Infectious Diseases

W. John Martin

Medical Director - Institute of Progressive, USA

Abstract:

Cell damaging (cytopathic) viruses can undergo deletions or mutations in the genes coding the relatively few components generally targeted by the cellular immune system. This immune evasion mechanism is termed stealth adaption. The best-studied stealth adapted virus is a derivative of an African green monkey simian cytomegalovirus (SCMV). It presumably arose from an SCMV-contaminated polio vaccine. Stealth-adaptation can occur in all human and animal viruses. Stealth adapted viruses induce a generally consistent cytopathic effect (CPE) in fibroblast cell cultures. The CPE is characterized by rounding and swelling of the cells, often with cell fusion; abundant formation of intracellular and extra-cellular lipids; and development of pigmented inclusions. The CPE tends not to be progressive unless the tissue culture medium is frequently replaced. The repair process in infrequently refed cultures is attributed to an accumulation of intra- and extra-cellular energy-converting materials termed alternative cellular energy (ACE) pigments. Macroscopic ACE-pigments comprise irregular conglomerates of many much finer microscopic particles, which can also form into ribbons and longer threads. They typically display electrostatic, fluorescent, electron-donating, and even ferromagnetic properties. ACE pigments increase the kinetic energy of fluids, including water, and add to cellular survival. Patients and animals infected with stealth adapted viruses do not commonly have progressive disease and, in many cases, show significant clinical recovery. The recovery is attributed to the body's capacity to produce ACE pigments. Several commonly available natural products, formulated remedies, and specific electrical devices can function similarly to ACE pigments. It is proposed that compounds and devices with fluctuating electrical activities will attract and then release in a more concentrated form, a natural force termed KELEA. This is an acronym for Kinetic Energy Limiting Electrostatic Attraction. KELEA is arguably needed to prevent the fusion and annihilation of electrostatically attracted opposing electrical charges.

Clinical studies will be reviewed that confirm the value of enhancing the ACE pathway in the therapy of autism, a disease attributed to stealth adapted virus brain infection beginning before birth. Evidence will also be provided that enhancing the ACE pathway can effectively treat conventional infections due to herpes simplex virus, herpes zoster virus, human papillomavirus, rotavirus, HIV, and tuberculosis. The ACE pathway has several advantages over vaccine-induced immunity in preventing infectious diseases. Not least is avoiding the risk of vaccine-triggered immunologically induced inflammation against residual minor antigenic targets on previously acquired stealth adapted viruses. Vaccines can evoke autoimmunity and can cause tissue damage from toxic additive components, such as preservatives and adjuvants. Enhancing the ACE pathway can also suppress antigenic variants and co-infecting pathogens. It can protect immunologically privileged sites in the body. Furthermore, ACE-pathway-based therapy applies to preventing infections in pre-vertebrate animals and plants.

Biography

Dr. W. John Martin is the Medical Director of the Institute of Progressive Medicine, part of MI Hope Inc., a non-profit organization supporting individuals with mental illnesses. He earned his medical degree from the University of Sydney in 1965 and his PhD from the University of Melbourne in 1970. Board-certified in Anatomic and Clinical Pathology, with subspecialty training in Immunopathology and Medical Microbiology, Dr. Martin has held academic and research positions at the National Institutes of Health, the Uniformed Services University, and the University of Southern California. Dr. Martin's current research explores the role of KELEA in supporting environmental and physiological adaptation, a process he calls Nature's Allostasis. His innovative use of KELEA-activated water offers promising approaches to restoring balance in disordered ecosystems and human health.

There will be Another Nasty Virus; How will we be Prepared?

Stef Stienstra

NATO Joint CBRN Defence Centre of Excellence, Czech Republic

Abstract:

Public health systems are often unprepared for infectious disease outbreaks, partly due to declining investments in global public health over recent decades. More focus has been placed on curative care than on preventive measures. The Ebola outbreak in West Africa sparked renewed interest in investing in global public health to prevent the spread of contagious diseases. Concerns now focus on limiting the spread of COVID-19, highlighting the need for public health systems to be ready for emerging zoonotic diseases and for better public communication to prevent infections.

Zoonotic diseases pose significant threats because populations lack natural or vaccine-induced immunity, as seen during the 2014 Ebola outbreak. The West African Ebola strain had a longer incubation period, making it more likely to spread, despite being less lethal than other strains. Many public health systems are not adequately trained to manage such outbreaks, and while NGOs often focus on curative care, they lack experience with biological threats, for which military personnel are trained.

The UNMEER mission uniquely brought military and civilian actors together to combat a biological threat, underscoring the need for better protection for health workers and smarter systems to prevent disease spread. Both biosafety and biosecurity are critical, as the misuse of dangerous microorganisms or the creation of harmful pathogens using technologies like CRISPR-Cas poses a growing risk. Zoonotic diseases like anthrax, smallpox, and hemorrhagic fevers are potential bioweapons, and comprehensive measures, including bio-watch programs to monitor emerging pathogens, are essential to creating a safer society.

Biography

Stef Stienstra is a strategic consultant in biomedical science and a Commander in the reserve of the Royal Dutch Navy. He serves as a specialist in countermeasures for CBRNe threats and medical consequence management for both military and civilian (anti-terrorism) settings within the Dutch Armed Forces. He is the Strategic Functional Specialist for "Health & Environment" at the 1-Civil 10 Military Interaction Command and was part of the NATO Response Force in 2015 under the 1 German-Netherlands Corps. Mr. Stienstra directed the 2014 World Congress on CBRNe Science & Consequence Management in Tbilisi, Georgia. In his civilian career, he advises several international biotech and medical companies, particularly in biodefense, and serves on scientific advisory boards. His ability to bridge scientific insight with business strategy makes him a valued advisor in both military and civilian sectors.

The Development of a Novel Broad-Spectrum Influenza Polypeptide Vaccine Based on Multi-EpitopeTandem Sequences

Rongbao Gao

National Institute for Viral Disease Control and Prevention, China

Abstract:

The remarkable success and impact of mRNA Covid-19 vaccines has sparked great interest and extensive R&D activities in RNA vaccine innovation 50 years after the discovery of messenger RNA. The development speed of mRNA vaccines during the pandemic demonstrated the potential value of mRNA technology platforms to not only respond to epidemics and pandemics but to contribute to the development of new vaccines or the improvement of existing vaccines. mRNA technology however requires ongoing multi-disciplinary research to fully embed the technology in vaccine R&D and translate into cost effective manufacturing. The challenges stimulating R&D includes access (complex evolving IP landscape), high cost of goods, raw material supply, durability and potency, thermostability, delivery technology and a diverse advancing product pipeline. The place for mRNA in a geo-diversified vaccine manufacturing sector is center stage to the WHO/MPP mRNA technology development and transfer program making mRNA technology accessible to 15 partners in LMICs and building end-to-end research, development and manufacturing capabilities. The more than 50 leading vaccine developers are primarily located in the USA, Europe and Asia which potentially could result in prioritizations that does not focus on neglected diseases in LMICs. The mRNA program center for vaccine development and transfer has created global R&D partnerships to contribute to the sustainability of mRNA platforms. This paper will discuss the progress, results, R&D partnerships and portfolio of the mRNA technology development and transfer program making mRNA vaccine development and manufacturing accessible to a network of partners in LMICs.

Biography

Professor Rongbao Gao is a distinguished virologist at the National Institute for Viral Disease Control and Prevention, China CDC. His research primarily focuses on the emergence and control of influenza viruses, viral immunology, the pathogenesis of viral pneumonia, and the development of novel diagnostic techniques. Between 2009 and 2010, Professor Gao served as a guest research fellow at the Infectious Diseases Pathology Branch of the U.S. CDC. He published over 100 science papers on NEJM, The LANCET, Nature, CID, and so on, and obtained several Chinese scientific and technology honors for H5N1, 2009pdmH1N1 and H7N9 associated works.

Future Pandemic Response: Strengthening Vaccine R&D for Global Preparedness

Salome Magalhaes

University College London, UK

Abstract:

Vaccine preparedness is a key element of global health security, vital for preventing the spread of infectious diseases and minimizing illness and death. Although high-income countries generally have more developed systems, low- and middle-income countries (LMICs) face unique challenges, including limitations in infrastructure, funding, and access to technology. From a research and development (R&D) perspective, investing in innovative vaccine technologies, as well as creating platforms that facilitate faster and more equitable vaccine production, is essential. With international assistance, enhanced healthcare systems, targeted public health initiatives, and strengthened R&D capacity, vaccine preparedness in LMICs can be significantly improved. In the end, a robust global network of collaboration, shared resources, and innovation will ensure that vaccines reach those who need them most, contributing to the protection of public health worldwide. Our R&D group is dedicated to pioneering innovative solutions in the field of vaccines, with a strong focus on translational impact and scientific excellence. We believe that collaboration between industry and academia is key in accelerating vaccine development and improving responses to future epidemics or pandemics. The development program requires that several expertise is brought together, ranging from vaccine design and more bioprocess research focused to manufacturing expertise. This presentation will focus on three case studies, two of them carried out in collaboration with PT Biofarma in Indonesia and funded by the Future Vaccine Manufacturing Research Hub (Vax Hub), and one based on our currently research focused on streamlining plasmid DNA manufacturing for advanced therapy manufacturing, which is part of The Vaccines Manufacturing Hub for LMICs (Vax-Hub Global), funded by the UK Department of Health and Social Care (DHSC) and the Engineering & Physical Sciences Research Council (EPSRC). • Case study one highlights the development of user-friendly, accurate and precise method for nanoparticle characterization to significantly

improve labor and cost efficiency for VLP vaccine development. • Case study two features the technology transfer for the manufacture of RBD Spike SARS CoV2, using a microbial platform, addressing integrated upstream and downstream operations, aiming to create an easy-to-scale process, emphasizing key analytics and the need for a robust, simple platform. • Case study three, exemplifies the development of a purification strategy with to achieve the three key themes in pDNA production: ease, speed and cost. These initiatives underscore our commitment to tackling global health challenges through innovative research, strategic partnerships, and sustainable interventions that prioritize equity, access, and long-term impact.

Biography

Dr. Salome de Ss Magalhaes is a leading Research Fellow in Vaccine Bioprocessing at University College London's (UCL) Department of Biochemical Engineering. Her research is at the forefront of sustainable vaccine manufacturing, with a particular emphasis on creating scalable, cost-effective solutions tailored to the needs of low- and middle-income countries (LMICs). Dr. Magalhães brings a rare blend of academic rigor and industrial experience to her work. She previously served as Head of Biology at Orphida Inc., where she led the development of innovative point-of-care diagnostic technologies, and at Nofima in Norway, where she pioneered strategies to enhance the robustness and efficacy of DNA vaccines. Her current research is driven by the urgent need to streamline vaccine development and quality control, focusing on novel approaches that reduce complexity, shorten timelines, and enable rapid deployment of life-saving vaccines. Dr. Magalhães' contributions are helping to reshape the future of global health by making advanced bioprocessing technologies more accessible, efficient, and equitable..

Safety and Efficacy of RCP Recombinant Spike Protein Covid-19 Vaccine Compared to Sinopharm BBIBP: A phase III, Non-Inferiority Trial

Mohammad Hossein Fallah Mehrabadi

Razi Vaccine and Serum Research Institute, Iran

Abstract:

Background: We conducted a phase III, non-inferiority trial comparing safety and efficacy of RCP recombinant spike protein Covid-19 vaccine to BBIBP (Sinopharm).

Methods: Adult Iranian population received RCP or BBIBP in a randomized, double blind and an additional non-randomized open labeled trial arms. Eligible participants signed a written informed consent and received two intramuscular injections three weeks apart. In the randomized arm, an intranasal dose of vaccine or adjuvant-only preparation were given to the RCP and BBIBP recipients at day 51 respectively. Participants were actively followed for up to 4 months for safety and efficacy outcomes. Primary outcome was PCR+ symptomatic Covid-19 disease two weeks after the second dose. The non-inferiority margin was 10% of reported BBIBP vaccine efficacy (HR = 1.36).

Results: We recruited 23110 participants (7224 in the randomized and 15886 in the non-randomized arm). We observed 604 primary outcome events during 4 months of active follow-up including 121 and 133 in the randomized and 157 and 193 cases in the non-randomized arms among recipients of RCP and BBIBP respectively. Adjusted hazard ratios for the primary outcome in those receiving RCP compared with BBIBP interval were 0.91 (0.71-1.16) and 0.62 (0.49 – 0.77) in the randomized and non-randomized arms respectively. The upper boundary of 99.1% confidence interval of HR=0.91 (0.67 – 1.22) remained below the margin of non-inferiority in the randomized arm after observing the early stopping rules using O'Brien Fleming method.

Conclusion: Our study showed that the RCP efficacy is non-inferior and its safety profile is comparable to the BBIBP.

Biography

Dr. M.H. Fallah Mehrabadi holds a Ph.D. in Epidemiology and serves as a researcher at the Razi Vaccine and Serum Research Institute under the Agricultural Research, Education, and Extension Organization (AREEO) of Iran. His work focuses on infectious disease surveillance, vaccine evaluation, and the development of preventive strategies to enhance public and animal health. With a strong background in epidemiological modeling and field research, Dr. Fallah Mehrabadi contributes to national and international efforts in disease control and One Health initiatives.

The Challenge Efficacy Study of Bivalent Genotypes I and VII Inactivated Vaccines Against Circulating Virulent Newcastle Disease Virus

Mohammad Abdoshah

Razi Vaccine and Serum Research Institute, Iran

Abstract:

Background: We conducted a phase III, non-inferiority trial comparing safety and efficacy of RCP recombinant spike protein Covid-19 vaccine to BBIBP (Sinopharm).

Methods: Adult Iranian population received RCP or BBIBP in a randomized, double blind and an additional non-randomized open labeled trial arms. Eligible participants signed a written informed consent and received two intramuscular injections three weeks apart. In the randomized arm, an intranasal dose of vaccine or adjuvant-only preparation were given to the RCP and BBIBP recipients at day 51 respectively. Participants were actively followed for up to 4 months for safety and efficacy outcomes. Primary outcome was PCR+ symptomatic Covid-19 disease two weeks after the second dose. The non-inferiority margin was 10% of reported BBIBP vaccine efficacy (HR = 1.36).

Results: We recruited 23110 participants (7224 in the randomized and 15886 in the non-randomized arm). We observed 604 primary outcome events during 4 months of active follow-up including 121 and 133 in the randomized and 157 and 193 cases in the non-randomized arms among recipients of RCP and BBIBP respectively. Adjusted hazard ratios for the primary outcome in those receiving RCP compared with BBIBP interval were 0.91 (0.71-1.16) and 0.62 (0.49 – 0.77) in the randomized and non-randomized arms respectively. The upper boundary of 99.1% confidence interval of HR=0.91 (0.67 – 1.22) remained below the margin of non-inferiority in the randomized arm after observing the early stopping rules using O'Brien Fleming method.

Conclusion: Our study showed that the RCP efficacy is non-inferior and its safety profile is comparable to the BBIBP.

Biography

Dr. Mohammad Abdoshah is a researcher at the Razi Vaccine and Serum Research Institute in Iran. His work focuses on the development and evaluation of vaccines and biopharmaceuticals, contributing to national efforts in disease prevention and public health. With a background in biomedical sciences and a commitment to scientific innovation, he plays an active role in advancing research aligned with both human and animal health priorities.

From Vaccination to Viral Infection: The Role of CLEC5A in Shaping Immune Responses

Juliana Gil Melgaco

Oswaldo Cruz Foundation, Brazil

Abstract:

CLEC5A plays a significant role in immune responses to both vaccination and viral infections, including yellow fever and COVID-19. The yellow fever vaccine (YF17DD) elicits long-lasting immunity by inducing a TH1/TH2 CD4+ profile, strong CD8+ T-cell responses, and high neutralizing antibody titers. In a follow-up study of YF17DD-immunized individuals, early activation of CLEC5A+ monocytes was observed at five days post-vaccination, followed by CD4+ and CD8+ T-cell activation at seven days. Positive correlations emerged between interferon-gamma (IFN-γ), genes of the innate antiviral response (STAT1, STAT2, IRF7, IRF9, OAS1, and RNASEL), and antibody production. Additionally, specific IFNG and CLEC5A single nucleotide polymorphisms (SNPs) (rs2430561 AT/AA, rs2069718 AG/AA, and rs13237944 AC/AA) were linked to higher IFNG and CLEC5A expression, suggesting their involvement in durable immunity.

Conversely, in COVID-19, CLEC5A is implicated in severe disease outcomes. SARS-CoV-2 triggers CLEC5A expression on monocytes, promoting proinflammatory cytokine release and lung injury. Severe COVID-19 patients exhibited higher CLEC5A expression than mild cases or vaccinated individuals. In a hamster model, CLEC5A expression was detected during 3–15 days of Omicron infection, and in vitro studies indicated CLEC5A interaction with SARS-CoV-2 via the N-acetylglucosamine binding site (NAG-601). A CLEC5A monoclonal antibody reduced proinflammatory cytokine production, highlighting its therapeutic potential. Despite this, vaccination remains the most effective strategy to prevent severe disease and mortality. Collectively, these findings underscore CLEC5A's dual role in protective immunity following vaccination and its contribution to immunopathology in severe COVID-19 cases.

Biography

Dr. Juliana Melgaço is a highly accomplished scientist with extensive expertise in Virology, Immunology, Biochemistry, Molecular Biology, and Cell Biology. She completed her post-doctoral training in Immunology at Massachusetts General Hospital, Harvard Medical School, and currently works at the Oswaldo Cruz Foundation (Fiocruz) in Rio de Janeiro, Brazil. Her research focuses on viral pathogenesis and vaccine development for viral hepatitis, arboviruses, and other emerging and re-emerging viruses of medical importance. As a collaborator at the Laboratory of Immunological Technology (LATIM), she contributes to the development of vaccines and biopharmaceuticals, as well as the analysis of immunological assays. She also serves as a faculty collaborator in the Graduate Program in Immunobiological Technology at Bio-Manguinhos/Fiocruz and is actively involved in projects at the Oswaldo Cruz Institute, studying immune responses in viral hepatitis, arboviruses, and other infectious diseases. In addition to her research, Dr. Juliana Melgaço is an Associate Editor for Cell Press-Elsevier Journals and an Academic Editor for Wiley Journals. She is a member of the Ethics Committee on Animal Use (CEUA) at Bio-Manguinhos/Fiocruz and has been awarded a Young Scientist of Our State (JCNE) productivity grant since 2023, recognizing her contributions to the field of immunology and vaccine research. Her work bridges cutting-edge science with practical applications in public health, making significant strides in the fight against infectious and non-infectious diseases.

Tecnological Advances in Quality Control of Messenger RNA

Renata Maria dos Santos

Bio-Manguinhos, Brazil

Abstract:

Vaccines that utilize messenger RNA (mRNA) technology have gained significant prominence in recent years due to their high efficiency, rapid development, and flexibility in application against various pathogens. In this context, ensuring the maximum efficacy of these vaccines requires the implementation of a rigorous Quality Control (QC) process throughout all stages of development and production, in order to guarantee the safety, effectiveness, and consistency of the final product. The manufacturing process of mRNA-based vaccines generally involves approximately five main steps to achieve the final product. Within this framework, a range of analyses are classified as Critical Quality Attributes (CQAs)—parameters that cannot be monitored in real-time during production, but only at the end of each stage. These analyses are essential for the final release of the product. Accordingly, the general objective of this study is to apply analytical techniques to evaluate the critical quality attributes involved in the release of messenger RNA-based vaccines intended for COVID-19 prevention. To this end, approximately 74 analytical procedures were mapped throughout the mRNA vaccine production chain, all of which are considered CQAs. Among these, key analyses include capping efficiency, poly-A tail length, percentage of mRNA fragments, and residual quantification of the T7 RNA polymerase enzyme, particularly after the purification process following the in vitro transcription (IVT) reaction. The evaluation of capping efficiency was performed through a hybridization step using RNA/DNA hybrid probes (probes 41 and 57), specific to complementary regions of the mRNA molecule, followed by cleavage with ribonuclease H. For poly-A tail length assessment, an initial cleavage with ribonuclease T1 was conducted, followed by purification using oligo(dt)-functionalized magnetic beads. The samples obtained from both procedures were analyzed by capillary electrophoresis. The percentage of mRNA fragments was determined using reverse-phase high-performance liquid chromatography coupled with

a diode array detector (RP-HPLC-DAD). Finally, residual T7 RNA polymerase levels were quantified using a sandwich ELISA assay. The capillary electrophoresis results showed that probes 41 and 57 successfully hybridized to the expected regions of the target mRNA. In the poly-A tail length analysis, an internal control with the same number of adenines as the tail sequence was used, and a predominant band corresponding to the expected tail length was observed. RP-HPLC-DAD analysis revealed a dominant peak with an area of 91.66%, meeting established quality requirements. The quantification of residual T7 RNA polymerase yielded a result of 2.0 ng/mL, which falls within acceptable limits and does not interfere with subsequent stages of mRNA vaccine production. In conclusion, the capillary electrophoresis technique proved effective in providing preliminary data regarding the processing of mRNA samples, although confirmation through LC/MS remains necessary. The RP-HPLC-DAD method met expectations for mRNA fragment analysis, and the ELISA method was found to be suitable for quantifying residual T7 RNA polymerase.

Biography

Dr. Renata Maria dos Santos is a scientist and pharmaceutical innovations analyst at Bio-Manguinhos / Fiocruz, a leading public health and biotechnology institution in Brazil. She holds a PhD in Biochemistry with an emphasis on Biotechnology from the Federal University of Rio de Janeiro and has over five years of experience in R&D projects in microbiology, proteomics, molecular biology, and analytical methods. Renata currently works on the development of the WHO mRNA vaccine Hub, focusing on quality control, analytical validation, and process optimization. Her work supports innovation in biotechnology and contributes to global public health.

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