

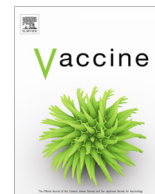


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Vaccine

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Editorial

Vaccinology in the 21st century–The 10th Annual Vaccine Congress



Vaccination is considered one of the greatest medical interventions in human history. After clean water, vaccines have provided the second most important mechanism to combat and eliminate infectious diseases. The first vaccination, or variolation in the case of smallpox, took place back in the early 18th century and paved the way for the development of the first smallpox vaccine using cowpox. By the end of the 19th century, scientists had already discovered that the administration of attenuated or inactivated pathogens resulted in protection against the disease caused by the pathogen. Throughout the 20th century, attenuation and inactivation led to the development of multiple vaccines not only against bacterial pathogens (cholera, typhoid, pertussis, and tuberculosis to name a few), but also against viral pathogens such as rabies and polio. If we consider these achievements to be the first stage of vaccine development, then the second stage began in the 1980s with the advent of subunit vaccines, conjugation, and DNA recombinant vaccines. These technologies have successfully brought about the development of vaccines against *Haemophilus influenzae*, pneumococcus, meningococcus, hepatitis B, and—most recently—papillomavirus [1].

Even though we have seen tremendous achievements in the field of vaccinology in the past decades, there are still challenges to be faced when designing vaccination strategies and developing new vaccines. We continue to use a public health paradigm of “one-size-fits-all” approach, a method that fails to recognize not only pathogen variability, but also host variability. The 21st century has new tools available that can help us create improved vaccines and vaccination strategies. Current advances in immunology, immunogenetics, immunogenomics, systems biology, bioinformatics, and personalized medicine can facilitate the establishment of a third stage of vaccinology, implementing a personalized approach [2]. Moreover, improved vaccination strategies must be in place for specific populations with increased susceptibility to infection, such as the elderly (immunosenescence) and infants (e.g., maternal immunization for the prevention of pertussis [3] and invasive Group B streptococcus disease [4] in neonates).

The 2014 Ebola virus disease outbreak, the Zika epidemic, and the recent emergence of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) are only a few examples that clearly demonstrate the urgent need for accelerated vaccine development against emerging pathogens [5–7]. Such rapid development can be achieved by employing well-characterized platform technologies such as the replication-deficient simian adenovirus model, which could be used to develop vaccines against Rift Valley Fever virus

and MERS-CoV [5]. Moreover, outbreaks of emerging pathogens further underscore the importance of establishing extensive partnerships between global health organizations, government agencies, clinical researchers, funding organizations, and vaccine developers who all worked together toward the rapid development of the V920 Ebola vaccine [6].

This Vaccine special issue is dedicated to the 10th Vaccine Congress held in Amsterdam, The Netherlands, from 4 to 7 September 2016. The annual Vaccine Congress, which gathers vaccinologists from around the globe, offers an outstanding scientific program and networking opportunities. Attendees include not only academics, but also representatives from industry and non-profit organizations. The congress provides an excellent platform for all members of the vaccine community to share knowledge and expertise. In addition, the Vaccine Congress strongly encourages early-career researchers to attend and provides special career sessions designed to guide PhD students and post-doctoral fellows.

This special issue contains short expert reviews from eight invited speakers at the 10th Vaccine Congress. These selected reviews cover some of the aforementioned topics, including not only maternal immunization and vaccines against emerging pathogens, but also vaccine supply chain issues [8], modern technologies for vaccine manufacturing [9], and novel adjuvant platforms [10].

We hope you enjoy reading this special issue and we cordially invite you to the 11th Vaccine Congress to be held in San Diego, California, USA, from 17 to 20 September 2017.

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