This special issue of Leprosy Review is dedicated to the theme: Immunodiagnostics for Leprosy. Developments in this area of research have mainly been focusing on two topics: the humoral mediated immune response directed against *Mycobacterium leprae* antigens, as assessed by serological assays, and its counterpart the cell mediated immune response to *M. leprae* antigens indicated by cytokine producing cells.

In order to develop new immunodiagnostic tools that can identify and predict patients across the leprosy spectrum, research groups within the IDEAL consortium have put much effort in the identification of *M. leprae* antigens inducing immune responses (humoral and/or cellular) specific for *M. leprae* exposure/infection. In addition, these responses should be measurable using sensitive and user friendly assays. The availability of genome sequences of *M. leprae* and other mycobacteria has immensely catalysed the search for new antigens with diagnostic potential. Therefore, this issue includes an overview of ‘post-genomic’ *M. leprae* proteins and peptides that have been tested in different leprosy endemic areas for cellular and serological responses diagnostic of *M. leprae* exposure, -infection and/or leprosy disease.

The most broadly applied serological test to identify humoral responses against *M. leprae*, mostly present in patients at the lepromatous pole of the leprosy spectrum, is based on detection of IgM antibodies against phenolglycolipid I (PGL-I). In a historic overview John Spencer and Patrick Brennan portray the identification, synthesis and function of this widely known *M. leprae*-specific molecule as well as current and future applications of its native and synthetic variants in serodiagnosis for leprosy. In addition to this overview, the diagnostic use of PGL-I is described in two interesting studies situated in Brazil: Barreto *et al.* use anti-PGL-I Ab assays for sero-epidemiology in a hyperendemic area in the Amazon, whereas Lobato *et al.* compare the effectiveness of three different PGL-I-based assays. The use of other *M. leprae* proteins (ESAT-6, CFP-10 and 45 kD) in serological assays is described in a short report by Parkash whereas a second Indian study (Kawatra Madan *et al.*) analyses the potential of circulating serum-cytokines to classify various forms of leprosy.

New diagnostic tests based on the detection of T cell-mediated immune responses at the tuberculoid pole of the leprosy spectrum are under evaluation in the context of various genetic and geographical backgrounds. In this issue a comparative immunogenicity study (Bobosha *et al.*) conducted in human cohorts in Ethiopia and Nepal reports T cell responses to newly identified, ‘post-genomic’ *M. leprae* antigens. Since duration of infection, intensity of exposure and unknown confounders such as co-infections are difficult to control, animal models for leprosy can be useful tools to monitor T cell responses to *M. leprae* antigens in vivo at various stages of infection. Two such studies, one in a mouse- and one in an armadillo *M. leprae* infection model (Lahiri *et al.* and Pena *et al.*, respectively), measure systemic T cell responses to *M. leprae* proteins allowing identification of *M. leprae* antigens with diagnostic potential.

The articles in this issue are accompanied by four editorials, dedicated to the question whether there is future need for (laboratory based) leprosy research: Patrick Brennan puts the future in the light of what more than 30 years of leprosy research have already contributed to our knowledge of leprosy and its etiologic agent *M. leprae*, whereas Hazel Dockrell emphasises more recent developments in new platform technologies and what lessons can be learnt in this respect from tuberculosis research. Future research on mechanisms of and biomarkers for (the occurrence of) leprosy reactions and nerve damage, which are still incompletely understood, remain a necessity as pointed out from a clinical
point of view by Steve Walker as well as from a basic research perspective by Tom Ottenhoff. The uniqueness of leprosy with its characteristic immunological spectrum, still poses many challenges for future research amongst which prediction of leprosy reactions and prevention of nerve damage are the most essential.

Annemiek Geluk
Guest Editor