End of project popular science description

Introduction

Malaria remains a major health problem in many parts of the world. The absence of efficacious vaccines has been a major obstacle to the international ambition of reducing the burden of this disease and eventually eradicating it. Two malaria vaccines are now approved and are being rolled out in Africa. Both vaccines target the sporozoite-stage parasites injected during the blood meal of an infected mosquito. However, the protection afforded by these vaccines is limited and likely of relatively short duration. There is thus still an urgent need for better vaccines. This project therefore aimed to improve the immune response to the blood-stages of the infection, which are causing all the symptoms of malaria and are the main target of the immunity that is developed in response to infection. We have strived for improvement both in terms of the precise molecular targets of this immune response as well as in terms of the effector function of the antibodies against these targets. The project was designed to combine knowledge-gaining research with opportunities for research-based training of project staff from both North and South partners. The more than 30 years long collaboration between University of Copenhagen and University of Ghana (UG) has proved this approach to be highly efficient both with respect to acquisition of new knowledge and upgrading of research capacity for everybody involved.

Results

The project had three objectives: To pave the way for a (i) PfEMP1-based and a (ii) PfRh5-based vaccine, and (iii) to improve the capacity for internationally competitive research at UG. At the end of the project, we have identified the main obstacles to the successful development of PfEMP1-based vaccines as well as outlined ways to overcome them. These obstacles include the inability of current vaccines to target critical (neutralizing and broadly cross-reactive) parts (epitopes) of the PfEMP1, and the inability of the vaccines to induce efficient cell-mediated effector functions. Furthermore, we have generated results that underpin and inform current efforts to develop PhRh5-based vaccines. Finally, we have strengthened the research capacity at UG by training three PhD students and one post-doc scientist, and by contributing to the formation and progress of dedicated malaria research teams. The capacity-building efforts have been coordinated with parallel institutional strengthening efforts through the BSU project at UG, which have had substantial synergistic advantages for both projects.

Conclusions

The MAVARECA project has generated conceptually novel findings that will enable an accelerated development of improved vaccines targeting the blood-stages of malaria infection. The project highlights the value of long-lasting and equitable research and training collaboration for mutually beneficial progress.

Recommendations

It is recommended to ascertain the clinical relevance of the results obtained by the MAVARECA project. Such research is required for knowledge-based translation of the MAVARECA findings into action beneficial to populations exposed to malaria.