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PRO AND CON EDITORIALS

Rhinovirus vaccination: the case in favour

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Respiratory viruses have been shown to be important respiratory pathogens. The majority of upper respiratory tract infections and most uncomplicated cases of acute tracheobronchitis are due to respiratory viral infections [1]. Moreover, respiratory viruses play an important role as infective triggers of acute exacerbations of chronic respiratory diseases such as asthma [2–5] and chronic obstructive pulmonary disease (COPD) [6–8]. Human rhinoviruses (HRVs) were by far the most frequent respiratory viruses detected in most of the studies cited. Hence, HRVs can be considered as very important respiratory pathogens in upper and lower respiratory tract infections. In particular, the role of HRVs in exacerbations of asthma and COPD makes them an important therapeutic target. Treatment of acute respiratory viral infections is difficult and results of interventional studies have not yet been convincing [1, 9]. Management of influenza infections has shown especially that vaccination is much more effective than treatment of acute infection [10]. To date, we do not have an approved treatment for HRV infections and, given our experience with influenza, vaccination seems a much more sensible option. However, we face a range of difficulties in approaching HRV vaccination. First, there are >100 HRV serotypes with high sequence variability in their antigenic sites [11]. Secondly, knowledge of HRV epidemiology is limited, as we do not have HRV surveillance as we have for influenza. Therefore, it is nearly impossible to identify the most important serotypes that have to be covered by a possible vaccine. Thirdly, HRV has three antigenic capsid proteins and evidence is limited with regard to their individual importance for vaccine development [12]. Finally, and most importantly, animal models of HRV infections are limited and evidence on HRV pathophysiology from such models is still scarce.

Nevertheless, in this issue of the *European Respiratory Journal*, EDLMAYR *et al.* [13] present good evidence that development of a HRV vaccine might be possible in the nearer future. Why does this manuscript present a step forward in the development of an HRV vaccine? First, important observations on neutralising antipeptide antibodies date back to the late 1980s [14]. Compared with that study, as well as others, EDLMAYR *et al.* [13] are able to show that immunisation with the complete VP1 protein induces higher titres and better neutralising antibodies compared with peptide-derived antibodies. Perhaps more importantly, they are able to demonstrate cross-neutralisation of HRV strains that are not closely related (HRV14 and 89). This represents a step forward, but the road to a clinically relevant HRV vaccine is still long. Cross-neutralisation was observed in only half of all viruses tested. Hence, epitopes on proteins presented in the paper only cover a certain proportion of HRVs. It will be laborious to find the mixture of epitopes that match most HRV serotypes. It is interesting to observe in the current manuscript that antisera obtained from HRV14 and 89 VP1 immunisation neutralised HRV44 better than the serotypes that were the source of the antigen (table 6 in [13]). This phenomenon can not be definitively explained and points out possible virological issues that are not yet elucidated. Hence, we face not only a problem with vaccine development, but we also observe a lack of knowledge of HRV pathophysiology.

Although we are still not very close to the clinical development of an HRV vaccine, current research, including the study of EDLMAYR *et al.* [13], indicates that development of such a vaccine seems feasible. Joint efforts are probably needed to get closer to such a vaccine.

STATEMENT OF INTEREST

None declared.

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