HBGA associated rotavirus host ranges and evolution, new understanding on rotavirus epidemiology and vaccine strategy

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The success of the two rotavirus (RV) vaccines (Rotarix and RotaTeq) in many countries endorses a live attenuated vaccine approach against RVs. However, the lower efficacies of both vaccines in many low- and middle-income countries indicate a need to improve the current RV vaccines. The recent discovery that RVs recognize histo-blood group antigens (HBGAs) as potential receptors has significantly advanced our understanding of RV diversity, evolution, and epidemiology. HBGAs are synthesized step-wisely, a process that is developmentally regulated in the early lives of children which is also shared with some animals. This feature has led to conserved HBGA products between humans and some animals resulting in complicate disease burden and epidemiology of RVs in different populations as well as in many animal species. An elucidation of such diverse virus-host interactions and HBGA-controlled RV host ranges and evolution provides important new insights into the performances of current RV vaccines in different populations and emphasizing a P type-based vaccine approach. New understanding of RV diversity and evolution also raises a fundamental question about the 'Jennerian' approach, which needs to be addressed for future development of live attenuated RV vaccines. Alternative approaches to develop safer and more cost-effective subunit vaccines against RVs are discussed.

Keyword: rotavirus, HBGA, receptor, evolution, epidemiology, vaccine

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