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(12) **United States Patent**  
**Zhu et al.**(10) **Patent No.:** **US 10,188,724 B2**  
(45) **Date of Patent:** **Jan. 29, 2019**(54) **EFFICIENT MUCOSAL VACCINATION  
MEDIATED BY THE NEONATAL FC  
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College Park, MD (US)(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.(21) Appl. No.: **14/961,938**(22) Filed: **Dec. 8, 2015**(65) **Prior Publication Data**  
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**A61K 39/00** (2006.01)(52) **U.S. Cl.**  
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C07K 14/70503; C07K 16/1018  
See application file for complete search history.(56) **References Cited**

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*Primary Examiner* — Bao Q Li(74) *Attorney, Agent, or Firm* — Hodgson Russ LLP(57) **ABSTRACT**The present invention relates to methods and compositions  
for enhancing delivery of vaccine antigens to the mucosal  
epithelium, the composition comprising an antigen from an  
infectious agent fused with an Fc fragment of an immuno-  
globulin recognized by the neonatal receptors (FcRn). The  
composition is effective in eliciting a protective long-term  
memory T cell immune response against infection at a  
distant mucosal site.**16 Claims, 16 Drawing Sheets****Specification includes a Sequence Listing.**