

## **Bacterial infections: translational genomics, immunity and prevention**

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**Description of the project:** The research projects of this group are focused on respiratory bacterial pathogens, host immunity and genetic susceptibility to infectious diseases. The study topics are: 1) Impact of Toll-like receptor gene polymorphisms on nasopharyngeal bacterial colonization and respiratory infections in children; 2) Assessment of immune responses to pertussis vaccinations and *Bordetella pertussis* infection in search of novel biomarkers of protection; 3) Molecular surveillance of *B. pertussis* and *Corynebacterium diphtheria*; and 4) Development of novel POC tests for pertussis diagnostics. The research group is currently leading the European network “EUpertstrain” in which national pertussis reference laboratories from 11 European countries are involved to compare circulating *B. pertussis* strains in these countries with different vaccination programs and to evaluate impact of bacterial changes on effectiveness of vaccines and disease incidence and the ECDC-funded project “EUPert-LabNet” to develop a laboratory-based surveillance of pertussis in whole Europe. The research group has participated in the EU Innovative Medicine Initiative (IMI) 2 project “Periscope” on the trail of next generation vaccines against pertussis.

### **Publications**

- Nuolivirta K, Törmänen S, Teräsjärvi J, Vuononvirta J, Koponen P, Korppi M, Helminen M, Peltola V, He Q. Post-bronchiolitis wheezing is associated with toll-like receptor 9 rs187084 gene polymorphism. **Sci Rep** 2016;6:31165.
- Gröndahl-Yli-Hannuksela K, Kauko L, Meeren OVD, Mertsola M, He Q. Pertussis specific cell-mediated immune responses ten years after acellular pertussis booster vaccination in young adults. **Vaccine** 2016;34:341-349.
- Vuononvirta J, Peltola V, Mertsola J, Ilonen J, He Q. The gene polymorphism of IL-17A G-152A is associated with increased colonization of *Streptococcus pneumoniae* in young Finnish children. **Pediatr Infect Dis J** 2015;34:929-932.
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- Bart MJ, Harris SR, Advani A, Arakawa Y, Bottero D, Bouchez V, Cassidy PK, Chiang C-S, Dalby T, Fry NK, Gaillard ME, van Gent M, Guiso N, Hallander HO, Harvill ET, He Q, et al. Global population structure and evolution of *Bordetella pertussis* and their relationship with vaccination. **mBio** 2014;5:e01074-14.

**The number of Ph.D. degrees completed during 2010-2015: 3**

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