

BIOCONJUGATE TECHNOLOGY FOR VACCINE PRODUCTION

Jon Cuccui





ASSEMBLY SYSTEM SIMILARITY





TECHNOLOGY





Francisella tularensis and glycotagging





Cuccui et al. 2013

Vaccine version 2: 10 glycosylation site on EPA

Balb/C mice (groups of 10) following vaccination i.p. and i.p. challenge with 100 CFU F. *tularensis* strain HN63. Mice were vaccinated with 10 μ g IP of test glycoconjugate + SAS, LPS + SAS or 10 μ g LPS and the data were analysed by stratified log rank test.



Fischer 344 rats (groups of 5) following vaccination s.c. or i.p. 10 μ g and aerosol challenge with 550 CFU *F. tularensis* SchuS4. Achieved 100% survival matching the live vaccine strain.

SP4 AS A MODEL





Extended to serotypes 5,8,12F Kay et al. 2016

MINING FOR OTHER PGLBS





Mills et al. 2016

THE LSHTM TEAM

Shigella spp. candidates MRC: Identification of C. difficile antigens Wellcome Trust: Understanding function of glycosylation BBSRC: Developing the Escherichia coli glycocell Protein Kit-**BBSRC Super** Follow On: Respiratory pathogens of MRC: pigs Prevention of Streptococcus Pgl library pneumoniae infection **RE Bloomsbury SET:** Streptococcus suis vaccine. In vitro assay.

EPSRC: VaxHub. Scale up of a *Streptococcus pneumoniae* glycoconjugate vaccine candidate

BBSRC LoLa: Glycoengineering of Veterinary Vaccines.

BactiVac: Developing a

TECHNOLOGICAL IMPROVEMENTS



- 1. New E. coli strains created
- 2. Oligosaccharyltransferase on the chromosome
- 3. No inducer necessary
- 4. Developing polysaccharide and acceptor protein integration

Modifying live attenuated vaccines





www.zoetisus.com

Developing glycoengineering for veterinary vaccines





VETERINARY VACCINES

Drinking Water Vaccination

-Live attenuated bacterial vaccines in common use

DEVELOPMENTS IN PGCT



- Utilisation for humanised protein production
- Utilisation in OMVs
- New PglBs
- In vitro glycosylation assay
- NGT N-linked cytoplasmic
- PGLS ComP O-linked system
- PGLL Nm O-linked system

Vax Hub - The Future Vaccine Manufacturing Research Hub: securing the supply of essential vaccines.

Become a Vax Hub member and apply for Interaction Vouchers (up to £10,000) to support collaborative projects and funding for Feasibility Studies (up to £100,000) of up to twelve months' duration!

Membership enquiries contact: Dr Naveraj Gill, UCL Strategic Alliance Director, <u>naveraj.gill@ucl.ac.uk</u>

For more information, please visit ucl.ac.uk/biochemical-engineering/vax-hub









Departmen

Imperial College London







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