Introduction

- Cysticercosis: Infectious parasitic disease caused by the larval stage of the tapeworm *Taenia solium*.
- Endemic regions (Latin America, Asia, Sub-Saharan Africa, and Oceania).
- Neurocysticercosis (NCC) is the most common cause of acquired epilepsy in the world.
- PigMatrix (similar to EpiMatrix) Immunoinformatic tool designed to map and predict T cell epitopes in pigs.
- We searched for epitopes that were both promiscuous and predicted to be presented to T cells by pig and human MHC.
- Develop a single pig-human vaccine, reducing the cost and time of vaccine development.

Methods

Development of MHC class II matrices

Pocket profile method

- Each HLA pocket can be characterized by "pocket profiles", a quantitative representation of the interaction of all natural amino acids residues with a given pocket.
- The sum of all pocket profiles of a given HLA allele is defined as a quantitative matrix.
- Based on this method we construct our matrix.

Results

PigMatrix

- A single PigMatrix was developed for this first-pass analysis of *T. solium* proteins.
- Best identity: Substitute 67% / Composite 76%.
- When evaluated using published SLA class II epitopes, the SLA-DRB1*D matrix had a mean Z score above 2 indicating good sensitivity and specificity.

Epitope selection

- Predicted secreted proteins from *T. solium* were evaluated using:
  1. EpiMatrix and ClustiMer to determine binding to selected class II HLA alleles and highly promiscuous T cell epitopes.
  2. PigMatrix SLA-DRB1*D. Based on its scoring, we selected peptides that contained a high number of human Class II epitopes (ClustiMer score over 15) and SLA-DRB1*D motifs.

Epitope prediction

In this study we aim to:  
- Develop a single pig-human vaccine.
- Use pocket profile information of the best matching HLA pockets to assemble the SLA matrix.
- To verify the predictive power of our SLA binding matrix, we compared our predicted epitopes with those discovered experimentally.

Acknowledgments

Funding for the initial analysis of *T. solium* and development of PigMatrix was provided by NIH Grant No. 3U19AI082642-02S1, a supplement to the Translational Immunology Research and Accelerated [Vaccine] Development U19, under the Collaborative Centers for Human Immunology Program (NIAID).

References


