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# Genetic approach to the construction of a controllable phage display platform for use in optimized therapeutic development

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Bacteriophage Lambda (λ) has played an historical role as an essential tool in our current understanding of molecular genetics. It's major capsid protein gpD occurs on each capid at 405 to 420 copies per phage in homotrimeric form and functions to stabilize the head and likely to compact the genomic DNA. The interesting conformation of this protein allows for its exploitation through the genetic fusion of peptides or proteins to either the amino or carboxy terminal end, while retaining phage assembly and viability. We endeavoured to design and construct a highly controllable head decoration system governed by two genetic conditional regulation systems; temperature sensitive repressor expression and bacterial conditional amber mutation suppression. We have sequenced an historical amber mutant of D identifying the position of the stop codon, and employing this mutant in combination with our cellular and plasmid constructs, we will endeavour to measure the decoration of the λ capsid by a *D::gfp* fusion under varying conditions. This controllable system has the ability to establish a variable number of fusions per phage based on genetic and physical environment without compromising viability.

This approach has important implications in the design of new therapeutics in which steric hindrance and avidity are important concerns. To this end we have applied this process innovation and are in the process of testing, toward the development and optimization of new Alzheimer's Disease therapeutic vaccines, *S. aureus*, *M. tuberculosis* and *P. acnes* antibacterials.

## Biography

Roderick Slavcev is an Assistant Professor, Pharmaceutical Sciences at the University of Waterloo, School of Pharmacy and holds the SDM Chair for Entrepreneurship. He completed his Ph.D. from The University of Saskatchewan and postdoctoral post-doctoral studies from University of Toronto, College of Medicine. He currently heads MediPhage Bioceuticals (MB), focuses on bacteriophage-based biotechnology and the use of coliphages and phage- encoded genes and genetic elements to design and construct vectors for the development of novel vaccines, biopharmaceuticals and gene therapy systems. He also currently serves as an editorial board member for Pharmaceutica Analytica Acta.