



Tech Abstract

“Bug-to-Drug”: A biotechnology platform for mining novel therapeutics from the evolutionary arms-race.

A major challenge in inflammation research has been the development of drugs that target the chemokine network, a validated therapeutic target. This network, composed of 46 chemokines and 19 G-Protein coupled receptors expressed on cells that drive adaptive and innate immunity, is highly robust to attack as diseased tissues typically express multiple chemokines. In such a situation targeting a single receptor or chemokine fails.

Evolution and natural selection in ticks has resulted in the creation of 1000s of salivary peptides in each tick species that combat inflammation at the site of tick bite. We have developed a biotechnology platform “Bug-to-Drug” that uses yeast surface display of tick peptides and allows us to efficiently mine tick salivary transcriptomes for peptide molecules that functionally neutralize chemokines. We screened yeast surface display libraries using fluorescent chemokines and fluorescent activated cell-sorting (FACS) to identify chemokine-binding yeast cells and identified 31 novel tick salivary peptides (“evasins”). Individual peptides bind multiple chemokines with high affinity and neutralize their activity, efficiently targeting and disrupting the chemokine network. They have potential application in a variety of orphan inflammatory disorders such as myocarditis and idiopathic lung fibrosis where the chemokine network plays a major role.

Notably, a number of therapeutic peptides have their origin in natural resources including cyclosporine (fungus), hirudin (leech), conotoxin (snail), exenatide (Gila monster), and coversin (tick). We anticipate that novel evasins we have identified could be translated into therapies for chemokine-driven disease, and also that the “Bug-to-Drug” platform could be used to identify other naturally occurring peptides that could be of therapeutic value.

[Shoumo Bhattacharya](#), author of this abstract and lead academic on the drugs from bugs project, will be available for interview on Monday 20th of February.

To arrange interview, please contact Gregg Bayes-Brown, Comms Manager, Oxford University Innovation:

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