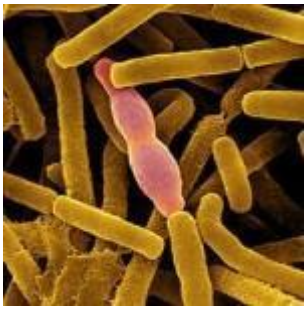
Genetically modified commensal bacteria used as a possible HIV vaccine adjunct



It is desirable to strive towards an HIV vaccine that elicits mucosal protective immunity to prevent infection of immune cells within the genital tract or gut. Most current vaccine candidates are given systemically, either via the intra-muscular or intra-dermal route, with the hope that vaccine-specific cells will migrate to mucosal surfaces. How can we be sure of this homing pattern?

In the October edition of Microb Cell Fact, Kuczkowska et al have used a commensal lactic acid bacteria-based delivery of CCL3 (also known as MIP-1α) – a chemokine that induces the movement of T cells from the periphery to site of inflammation. In this case, the aim would be to establish a chemokine gradient would that would attract T cells to the site of vaccination. The authors constructed strains of *Lactobacillus plantarum* displaying a chemokine on its surface. *L. plantarum* was genetically engineered to express CCL3Gag, a fusion protein comprising of truncated HIV-1 Gag antigen and the murine chemokine CCL3. The authors used a chemotaxis assay to show that CCL3Gag-producing *L. plantarum* strains are able to recruit immune cells in vitro.

This proof of principal study shows “the ability of engineered *L. plantarum* to produce a functional chemotactic protein immobilized on the bacterial surface.” These results could

then be used to formulate a bacteria-based vaccine that can increase the recruitment of immune cells at the site of vaccination and enhance localised vaccine immunity in mucosal tissues.

Kuczkowska, K. et al. 2015. Lactobacillus plantarum displaying CCL3 chemokine in fusion with HIV-1 Gag derived antigen causes increased recruitment of T cells. *Microb Cell Fact.*