Background
The interactions between the microbiota and local immune system within the gut are believed to play a role in certain disorders such as Inflammatory Bowel Disease (IBD), with the disruption of intestinal homeostasis believed to be a mechanism behind some of these disorders. *Lactobacillus plantarum* is a mesophilic lactic acid bacterium, and one of the ‘most predominant... Lactobacillus species’ resident in the human gut. It has been touted for use as a probiotic due to its ability to survive within and interact with the human intestine. By capitalising on the cross-talk between master regulators of the immune system and commensal bacteria, Imperial College researchers have developed a novel peptide-based therapy for IBD.

STp as a ‘post-biotic’ immunotherapy
The ST peptide is based on an active domain of a protein secreted by a strain of *Lactobacillus plantarum*, so-called because it is rich in serine and threonine. The peptide interacts with human immune dendritic cells (DCs) specifically to block the pro-inflammatory interleukin, IL-12, and to stimulate production of the anti-inflammatory interleukin, IL-10, thereby restoring gut immune homeostasis. The programme derived from initial research lead by Prof Stella Knight and colleagues at St Mark’s Hospital (an international referral centre for intestinal and colorectal disorders) that found a lack of STp in Ulcerative Colitis (UC) patients compared to healthy controls. Interestingly, preliminary *in vivo* data shows that the peptide is orally available, resistant to proteolytic degradation, results in reduced gut inflammation and reverses signs of UC in the animal model.

Quick Info
- Orally available, protein-based immunotherapy for treatment of IBD e.g. Ulcerative Colitis
- STp restores gut immune homeostasis by modulating activity of dendritic cells (DCs) – the master regulators of the immune system
- Potential for development of a companion diagnostic due to absence of STp in patients with UC vs healthy individuals
- Preliminary in vivo data in animal models of UC and access to clinical experts at St Mark’s Hospital – international referral centre for GI disorders

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Market opportunity
There is a major unmet need for alternative therapies for IBD. KOLs report the need for new treatment paradigms that reduce the risk of adverse side effects from systemic use of immunosuppressants (e.g. infection) and, in particular, address the development of resistance in refractory patients on conventional anti-TNFα. An orally available immunotherapy developed alongside a companion diagnostic represents an exciting opportunity to address this unmet clinical need. The IBD market is estimated at $6 billion worldwide with a CAGR of 4.1%. In 2011, approximately 1.7 million prevalent cases of UC were reported in the 7 MM. In addition to UC, there exists other disease areas where this therapeutic approach could lend itself, including Crohn’s disease, pouchitis and Coeliac disease.

Development
Imperial Innovations holds a composition or matter and method of use patent published as WO2013/034796. The Imperial College team – lead by Prof Stella Knight – continue to validate the clinical diagnostic potential of STp, evaluate the efficacy and PK/PD of STp in animal models vs conventional anti-TNFα, address questions around recombinant expression/production of STp, and build further data around mechanism of action.

References: