Novel Bacteria Protein Nanoparticles for the Treatment of Inflammatory Bowel Disease

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Inflammatory Bowel Disease

• Crohn’s Disease and Ulcerative Colitis
• 1.2 M affected individuals in U.S. (2012)
• Severe impact on quality of life
  – Abdominal pain and cramping
  – Fatigue
  – Chronic diarrhea
  – Development of fistulas and abscesses
  – Elevated risk of intestinal cancer
Overkill with Current IBD Therapy

- **Existing Therapies**
  - Corticosteroids
  - TNF-a inhibitors (Remicade)
  - Azathioprine/6-Mercaptopurine
  - 5-aminosalicylic acid

- **Problems**
  - Apoptosis of immune system cells
  - Systemic immunosuppression (infection and cancer)

- **Unmet need**
  - Locally acting therapy that selectively inhibits inflammation
Anti-Inflammatory By Nature

- Pathogen-host effector protein: AvrA
- Non-toxic
- Reduces host inflammatory response
- No cellular apoptosis

*Salmonella enterica*
Protein Nanoparticle Delivery System

Crosslinked AvrA nanoparticle

Particles enter cells

Mucous layer

Epithelium

Particles disassociate
AvrA blocks inflammation & cell death
Efficacy POC of AvrA Nanoparticles in Model Colitis

DSS: dextran sulphate sodium
IP and Future Steps

- PCT patent application filed March, 2014
- Further characterize cellular uptake and molecular target engagement *in vivo*
- Repeat in additional IBD models
- Demonstrate oral bioavailability and delivery to different regions of the gut