

GlycoCaged Drugs:

Targeted delivery of anti-inflammatory drugs

The standard first-line treatment for inflammatory bowel disease (IBD), a group of chronic diseases caused by inflammation in the lower gastrointestinal (GI) tract, is orally administered NSAIDs or corticosteroids. However, adverse side effects often emerge due to non-specific uptake of the anti-inflammatory drugs by the upper GI tract. This GlycoCaged technology uses a “cage” and “release” method that protects IBD drugs allowing their precise delivery to the lower GI tract. Ultimately, this approach can minimize the loss of drugs before they reach the inflammation site resulting in a lower required dosage. The GlycoCaged platform is also applicable within the hog and poultry industry where animal intestinal inflammatory diseases are currently treated with antibiotics.

Key Benefits

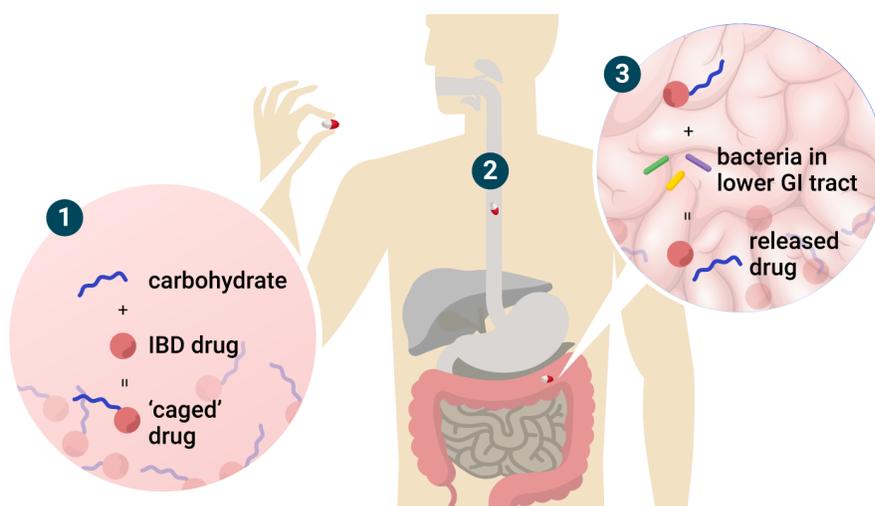
- Colon-specific delivery
- Controlled drug release
- Versatile platform for other classes of anti-inflammatory drugs

Global Impact & Market

The incidence and prevalence of IBD is on the rise globally, especially in developed and developing countries. Globally, 6.8 million people suffer from IBD. In Canada, every 1 in 140 people have IBD. Crohn’s disease and ulcerative colitis are two major types of IBD. The estimated total annual financial burden of IBD is \$14.6-\$31.6 billion in the US and \$2.8 billion in Canada. The market size of IBD treatment is expected to reach \$22.4 billion in 2026.

Current Treatments

Because treatments only address symptoms, patients need to take medications throughout their life. Current treatments are limited to anti-inflammatory drugs (e.g. immunosuppressants, corticosteroids, 5-ASA), and there are disadvantages such as side effects from non-specific uptake, poor solubility, poor bio-availability, and poor pharmacokinetics.



The Technology

- ① **Caging:** carbohydrates are chemically attached to existing or new IBD drugs, forming a protecting cage. The cage prevents the drug from being adsorbed.
- ② **Traveling:** the caged drug passes through the upper GI tract and reaches the lower GI tract at the site of inflammation.
- ③ **Uncaging and release:** specific groups of bacteria in the lower GI tract can cleave the chemical linkage between the carbohydrate and the drug, thereby controlling its release specifically within the lower GI tract.

Application

The GlycoCaged Drugs platform is not limited to human IBD treatment. This technology also has the potential to address challenges associated with antibiotics overuse in the hog and poultry industry. In this application, animal intestinal inflammation can be treated with GlycoCaged anti-inflammatory drugs while avoiding large-scale administration of antibiotics.

Funding Support

Agriculture and Agri-Food Canada, Canadian Poultry Council, Alberta Innovates, Genome Alberta, Crohn’s and Colitis Canada, Michael Smith Foundation for Health Research.