Oral Formulations of Activated Nucleoside Analogs

Technology Fields: Therapeutics
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Patent Status: International Rights Available

Summary
Nucleoside analogs (NA) are used as therapeutic drugs for the treatment of cancer and viral diseases as they can inhibit the proliferation of viruses and cancer cells in phosphorylated form. Many NA, like Gemcitabine, are not stable for oral administration. Patients taking NA face multiple toxicity issues and the development of drug resistance caused by nucleoside transporter deficiency, reduced nucleoside kinase activity, and over-expression of multidrug resistance proteins. Application of drug delivery systems (liposomes, nanoparticles, etc.) opens novel venues to overcoming these problems. However, several dilemmas including instability in the gastrointestinal (GI) tract, short gastric residence time, and poor drug absorption limit the usability of these systems. Dr. Serguei Vinogradov invented polymer conjugates of phosphorylated NA forming compact nanogel particles that, via oral administration, can deliver therapeutic concentrations of activated phosphorylated NA. These conjugates increase the efficacy of therapy against drug-resistant tumors, and drug stability in GI tract, extend the drug release profile and reduce its non-specific toxicity.

Market Value
The polymeric conjugates of NA (nanogels) not only deliver therapeutics for the treatment of disease but also allow oral application of drugs, like Gemcitabine, previously administered only through injections, and are highly efficient against drug resistance. Applications these analog formations are suitable for include:

- Anti-Cancer
- Anti-Viral
- Anti-Parasitic
- Anti-Fungal

Features and Benefits
- Low production cost
- Breadth of applications
- Ability to enhance a variety of existing and new drugs
- Biodegradable/biocompatible components
- Non-cross resistance with other classes of drugs

Publications