"ANTICOAGULANT INTELLECTUAL PROPERTY PORTFOLIO–SULFATED HEPARIN MIMETICS" VCU # 11-91, 12-53, 12-96, 12-98

Applications

- Therapy for thromboembolic disease and cardiovascular disease
- Anticoagulant
- Anti-thrombosis treatment during surgery
- Coatings for stents, tubes and other devices
- Some formulations may also be:
    - Possible cancer therapeutic
    - Possible anti-herpes agent
    - Research tool

Advantages

- Reversible with existing FDA approved drug
- Easily synthesized- inexpensive to make-no animal sources
- Novel mechanism of action-
    - Reduced side effects, Low cellular toxicity
    - Targets Factor Xia-proposed to be a very safe target
- Can be given orally and IV
- Reduced patient response variability

Inventors

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Market Need

The current treatment and prevention of thromboembolic diseases, Heparin, has numerous disadvantages. Heparins usually consist of a heterogeneous mixture, and thus contain many additional ingredients which result in a variety of side effects. Concern has also arisen with the purity and safety of the supply of heparin. Additionally, heparins are highly sulfated molecules, and thus highly hydrophilic and result in poor bioavailability. Some of the side effects observed with heparin usage are thrombocytopenia, osteoporosis, as well as concern if the dosage is incorrect and the patient is overdosed. There is a clinical need for a new anticoagulant with heparin-like activity without the many potentially lethal side effects currently observed with its use.

Technology Summary

This is a group of synthetic compounds that are potent inhibitors of coagulation with a novel mode of action that distinguishes them from all other known anticoagulants and are also structurally unique.

Low Molecular Weight Lignins

These naturally occurring bipolymers exhibit high selectivity and potent inhibition of plasmin. The molecules act as functional macromolecular mimetics of low-molecular weight heparins, a commonly prescribed drug, without the associated side effects.

Factor XIa inhibitors

These small molecules may be the most promising group of direct inhibitors. The developed molecules include sulfated gallic acids, sulfated inositol analogs, and sulfated quinazolinones. These compounds act via an entirely new allosteric mechanism, providing higher efficacy and safety.

Technology Status

In-vitro and ex vivo studies demonstrate efficacy
Issued patent: 8,262,881 Patents pending: App No 13/057,374 (U.S. rights only). Provisional: US and foreign rights.
Publications: Al-Horani et al 2013, Karuturi et al 2013, Henry et al 2011, Sidhu et al 2012, Aziz et al 2011
More publications can be found on Dr. Desai's webpage
This technology is available for licensing to industry for further development and commercialization.