WiSys Ref: T100001 & T170032

Warfarin Promoter for Enhanced Rodenticide Efficiency

Background

Warfarin is a “first-generation” anticoagulant that has been widely used as a multiple feeding rodenticide for more than 60 years. The prolonged use of warfarin as a rodenticide has, according to some accounts, led to the evolution of warfarin-resistant rodents. More powerful “second-generation” anticoagulant rodenticides were developed and introduced to combat resistance and kill rodents with a single feeding, but there are environmental concerns due to inadvertent poisoning larger predatory animals that ingest poisoned rodents. Recent EPA restrictions on rodenticides using second-generation anticoagulants have created a need for more potent first generation anticoagulants, i.e. warfarin. There is a great need specifically for new compounds that can be paired with first generation poisons to give enhanced rodenticide qualities that can kill rodents in a single feeding.

Technology

Researchers at UW-Eau Claire and Marshfield Clinic have developed a new class of compounds that enhance the anticoagulant activity of warfarin when co-administered. When the compound is paired with warfarin, they quadruple the anticoagulant activity when compared to warfarin alone. Additionally, preliminary animal tests show the compounds are not toxic when administered alone.

Research and Development Status and Commercialization Needs

Earlier studies in a rodent model assessed the effects of lead compounds (UWEC-K1 and UWEC-K2) for their effects on blood clotting in the presence and absence of warfarin after 4 and 10 days of separate administration and co-administration of warfarin. At day 4, UWEC-K2 demonstrated antagonistic effects with regard to warfarin activity, however at day 10, the compound was observed to act as a warfarin promoter enhancing the effect of warfarin to a significant degree. Briefly, the prothrombin clotting time was increased almost an order of magnitude compared to the control and by a factor of over 4 relative to warfarin alone. In addition, Factor VII levels were reduced by a factor of close to 20 compared to the control and by a factor of 3 relative to warfarin alone. These preliminary data suggested that at 10 days, the UWEC-K2 molecule quadrupled the anticoagulant effect of warfarin. Recent studies have been focused on elucidating UWEC-K2’s mechanism of action, and resulting new models propose an interaction among warfarin, UWEC-K2, and a native enzyme that modulates warfarin activity *in vivo*. Further *in vitro* and *in vivo* studies are required to validate this proposed model. WiSys is currently seeking a strategic partner to assist in such further development providing a route to market for the commercialization of lead analogues. The lead compound, UWEC-K2 can be readily synthesized along with its simple metabolites and can be provided to partners for further development and testing.

Applications and Key Benefits

- As a synergistic rodenticide with warfarin;
- Increases warfarin anticoagulant activity by up to 4x;
- Non-toxic when administered without warfarin;
- Likely not classified as a pesticide by the EPA;
- As a synergistic rodenticide with analogues of warfarin;
- Neither warfarin analogue nor the UWEC-K2 derivative is toxic alone.

Intellectual Property

A U.S. Patent has been issued for this technology (US 8,765,982). For more information, please contact our licensing team at licensing@wisys.org.