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A DRUG THERAPY UTILIZING THE ALPHA4 / BETA2 RECEPTOR TARGET FOR THE TREATMENT OF OBSESSIVE-COMPULSIVE

LEAD INVENTORS

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UNMET NEED

According to the World Health Organization, obsessive-compulsive disorder (OCD) is one of the top 20 causes of illness-related disability, worldwide, for individuals between 15 and 44 years of age. In the US, about 1 in 40 adults and 1 in 100 children have OCD with an annual economic impact of $8.4B.

Despite the estimated $10.6B indirect annual treatment cost in the US, about 1/3 of treatments are ineffective. According to a recent review, compulsivity is "associated with widespread adverse health and social consequences, and underpins a variety of chronic, costly, functionally disabling diseases."

Stereotypic and obsessive-compulsive behaviors are also quite common in livestock, zoo animals, and pets, such as crib biting in horses, pacing in zoo animals, and a 1 in 35 occurrence of acral lick dermatitis in dogs. These behaviors are detrimental to the animals' health, increase veterinary care costs, and interfere with pet-owner interactions and appreciation of the animals.

This invention presents an innovative new approach to developing therapies for OCD and OCD spectrum disorders in humans and animals, and outlines the development of a new class of drugs.

OPPORTUNITY

A new approach to the treatment of OCD and OCD spectrum disorders by targeting a novel receptor type, the beta2 containing nicotinic acetylcholine receptors. The current treatments typically broadly target serotonin, adrenergic and/or dopaminergic receptor systems.

This invention targets the α4β2 subtype of the nicotinic acetylcholine receptor (nAChR) and describes a novel therapeutic application of α4β2 positive allosteric modulators (PAMs) in the treatment of OCD and OCD spectrum disorders. Data from animal studies of the PAM des-formylflustrabromine (dFBr), a drug capable of increasing responses to the neurotransmitter acetylcholine by >250%, and possessing a high selectivity for the α4β2 nAChR subtype, the most abundant central nervous system (CNS) nicotinic receptor is also able to rapidly and selectively alleviate OCD-like behaviors in a mouse model of OCD. This suggests that other nicotinic PAMs or α4β2 selective drugs can provide a novel alternative therapy for OCD. This approach could produce more rapidly acting OCD drugs and would provide improved drug options for patients resistant to the commonly used serotonin reuptake inhibitors (SRIs).

UNIQUE ATTRIBUTES

- Rapid onset of efficacy: The drugs described in the invention act within a few hours rather than days or weeks as with current treatments. SRIs often require higher daily doses in the treatment of OCD than of depression, and may take 8 to 12 weeks to start working,

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- The use of nicotinic receptor positive allosteric modulators (PAMs): There is substantial difference in the mode of action of nicotinic agonists that directly stimulate receptors versus the modulators discussed in this invention that increase receptor efficacy.

CLINICAL APPLICATIONS

Treatment of OCD and OCD spectrum disorders in humans and animals.

STAGE OF DEVELOPMENT

Preclinical Studies: Evidence from an animal model of OCD that demonstrate the efficacy of this approach to OCD and OCD spectrum disorders.

INTELLECTUAL PROPERTY

Provisional patent in force. PCT International Application filed March 2017.

COLLABORATION OR LICENSING OPPORTUNITY

We are actively seeking research and development collaborators or licensees to advance this invention.

REFERENCES

Hollander et al, “The cost and impact of compulsivity: a research perspective”, 2016, European Neuropsychopharmacology

Hill et al., “Survey of the prevalence, diagnosis and treatment of dermatological conditions in small animals in general practice”, 2006, Veterinary Record

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