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Wnt Signaling Pathway Inhibitors for Treatments of Disease

Key Investigator
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Field
Cancer
Metabolic Disease
Diabetes

Technology
Therapeutic
Small Molecule

Advantages
Novel Small Molecules
Bioavailability

Status
Available for licensing

Patent Status
EP Appl. 17 760 727.2
U.S. Patent 10,882,841
U.S. Patent Appl.16,900,616

UMB Docket Reference
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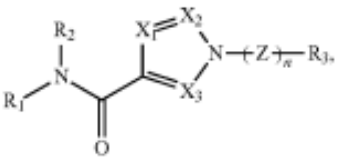
External Reference
Wei Yang, Yingjun Li, Yong Ai, Obinna N. Obianom, Dong Guo, Hong Yang, Srilatha Sakamuru, Menghang Xia, Yan Shu, and Fengtian Xue
Journal of Medicinal Chemistry
2019 62 (24), 11151-11164
Obinna N. Obianom, Yong Ai, Yingjun Li, Wei Yang, Dong Guo, Hong Yang, Srilatha Sakamuru, Menghang Xia, Fengtian Xue, and Yan Shu
Journal of Medicinal Chemistry
2019 62 (2), 727-741

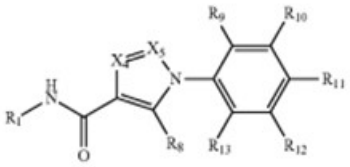
Summary
UMB inventors have developed compounds that inhibit the Wnt/β-catenin signaling pathway, which is implicated in various diseases, including cancer and metabolic disorders such as type 2 diabetes, obesity, hyperlipidemia, and fatty liver disease. The compounds offer a promising approach for treating these diseases and provide advantages over other treatment modalities due to their bioavailability and ease of administration. The compounds can be used alone or in combination with other therapeutic agents.

Market
The global cancer treatment market was valued at approximately USD 151 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 11.6% from 2021 to 2028, according to a report by Grand View Research. The market for metabolic disease treatment is also substantial, with an estimated value of USD 156.6 billion in 2020, according to a report by Research And Markets**.**

Technology
UMB inventors have developed a series of compounds that effectively inhibit the Wnt/β-catenin signaling pathway. This pathway is responsible for regulating cell proliferation and differentiation, and malfunction of the pathway is implicated in various diseases. The compounds developed by the researches, represented by formulas I and II, can be used to treat diseases that implicate the Wnt/β-catenin signaling pathway, including cancer and metabolic diseases such as type 2 diabetes, obesity, hyperlipidemia, and fatty liver disease.


(I)

The Wnt/β-catenin pathway is implicated in various cancers due to the constitutive activation of β-catenin, which may be due to various factors that lead to its stabilization or inhibition of the degradation pathway. The use of compounds that inhibit this pathway represents a promising approach for cancer treatment. The Wnt/β-catenin pathway has been implicated in several types of cancer. Some examples of cancers where the Wnt/β-catenin pathway is activated include colorectal cancer, lung cancer, breast cancer, cervical cancer, and pancreatic cancer.


(II)

Several studies have reported an association between type 2 diabetes risk and single nucleotide polymorphisms (SNPs) in TCF7L2, an effector of the Wnt/β-catenin pathway, as well as additional modulators of the pathway. These findings suggest that modulating the Wnt/β-catenin pathway could be a promising approach for treating metabolic disorders. For example, a study found that inhibiting the Wnt pathway can improve insulin sensitivity and glucose tolerance in mice with diet-induced obesity, suggesting a potential therapeutic benefit for treating metabolic disorders. Similarly, another study demonstrated that activating the Wnt pathway can improve glucose metabolism and insulin sensitivity in obese mice.

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The compounds developed by UMB researchers provide a novel therapeutic approach for treating diseases that implicate the Wnt/β-catenin signaling pathway, including metabolic diseases and various cancers. The compounds offer advantages over other treatment modalities because of their bioavailability and ease of administration. The compounds can be used alone or in combination with other therapeutic agents.

Technology Status

Available for license.

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