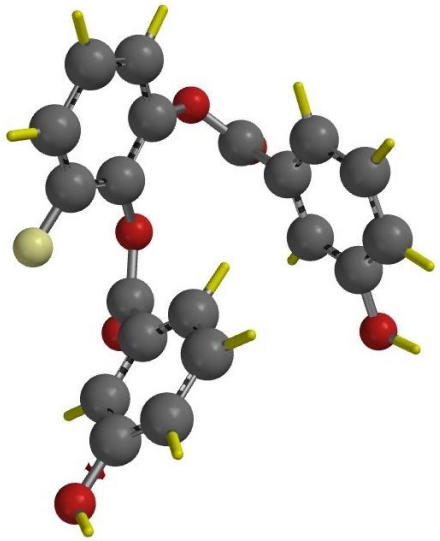
BASAL GLUCOSE TRANSPORT INHIBITORS AS ANTI-CANCER THERAPEUTICS

OU ID: #09002

Overview

Researchers at Ohio University have created a new class of therapeutic compounds targeting basal glucose transport with implications for broad efficacy across multiple cancer types. This group of compounds focuses on the inhibition of basal glucose transport as a strategy for cancer treatment.



Cancer cells are known to have up-regulated basal glucose transport and are "addicted" to glucose as their energy source. Inhibition of basal glucose transport cuts off this energy supply to starve and ultimately kill the cancer cells. Normal cells are less sensitive to glucose deprivation as a result of their ability to use alternative energy sources, e.g., amino acids and lipids. Clinical trials have been based on the concept of glucose deprivation through metabolic targeting (inhibition) of glycolysis. However, glucose deprivation through inhibition of glucose transport, the first rate-limiting step of glucose metabolism, has never been attempted due to the lack of specific glucose transporter inhibitors. The current invention provides a novel, proprietary group of potent small molecules that effectively and selectively target basal glucose transport.

Lead Compound

A second generation lead compound known as DRB-18 shows an IC_{50} of ~800 nm against Hop-92 cells, a human non-small cell lung cancer (NSCLC) cell line. Similar anti-cancer potency is also shown against triple negative breast cancer, leukemia, and renal cancer cell lines. DRB-18 has a half-life 8x longer than the original compounds and is safe when injected into mice at a concentration 10x the maximal dose used in cell culture studies.

Mechanistically, DRB-18 is more selective to Glut1 than Glut2 and also demonstrates some inhibition of Glut3 and Glut4. This likely explains why DRB-18 is more efficacious towards certain cancer subtypes.

Benefits

- Lead compound has been identified and is being further researched for drug-like properties
- Effective across multiple cancer types
- Initial studies indicate that the drug is not toxic to mice

Commercial Application

Novel therapeutic for targeting multiple cancer types, including the large cell subtype of non-small cell lung cancer and triple negative breast cancer.

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Intellectual Property

Issued U.S. Patent 9,181,162 includes the composition of matter for DRB-18, as well as method of use claims for treating cancer, both as a single treatment or in combination with another known cancer therapeutic. Pending applications cover additional composition of matter and method of use claims for additional inhibitors.

About the Inventor

Dr. Stephen C. Bergmeier, PhD, is a professor in the Department of Chemistry and Biochemistry at Ohio University. He has seven patents in the area of drug discovery and has published over 80 peer-reviewed scientific manuscripts. Dr. Bergmeier carries out research in the general area of synthetic organic chemistry, designing new chemical reactions and creating novel compounds.

Dr. Xiaozhuo Chen, PhD, is an associate professor in the Department of Biomedical Sciences of Ohio University's Medical School. He has worked in industry developing a human gene therapy technology, which was successfully licensed to a major biopharmaceutical company. Dr. Chen is an inventor on ten issued and pending patents.

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