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.

A second generation compound, known as DRB-18, was tested for anti-cancer activity in the NCI-60 cancer cells panel in a single-dose test. DRB-18 showed strong inhibition in all cell lines of six cancer types—leukemia, CNS cancer, melanoma, ovarian cancer, renal cancer, prostate cancer, and breast cancer. Of note, a metastatic triple-negative and Kras onc breast cancer cell line was significantly decreased by DRB-18. Triple-negative breast cancer cells, which lack estrogen receptor (ER), progesterone receptor (PR) and Her2/neu receptor, are known to be more aggressive and resistant to chemotherapies targeting the three receptors. Therefore, DRB-18 has the potential to be a valuable new weapon against triple-negative breast cancer.

Benefits

- New class of cancer therapeutic compounds
- Effective across multiple cancer types
- Specific targeting of cancer cells that minimizes damage to healthy cells
- Starves cancer cells of their primary energy source for growth, angiogenesis, and metastasis

Commercial Application

- Oral cancer therapy targeted against multiple cancer types
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.