VCU Innovation Gateway

HCN Channel Targeting Drugs

Switching screenings from targeting I_h to I_{inst} channels

VCU researchers have developed a novel screening strategy for drugs that target HCN channels. HCN channels, often called pacemaker channels, contribute to a diverse number of physiological functions, including heart rate, pain sensation, as well as learning and memory. Blockers of HCN channels are able to regulate some of these processes, such as reducing heart rate, and have minimal side effects. Traditional screening methods for these drugs focus on the HCN channel which conducts the I_h current. However, the I_{inst} current could have a greater physiological effect due to its longer opening duration. As a result, our researchers have developed methods to change the conductance of the HCN channels from I_h to I_{inst} to investigate its potential applications.

The technology

Two different methods have been developed to convert the HCN channels from conducting I_h to I_{inst}. The first method, which involves photochemical transformation, leads to a permanent conversion of the channel. The second method, which involves physiological modifications, is completely reversible. These methods will not only allow for further understanding of the I_{inst} current, they will also allow for the drug screening of I_{inst} HCN channels. These drug screenings could lead to the discovery of a whole new family of drugs with clinical significance that may be more effective than the current I_h blockers.

In silico data is available.

Benefits

- Longer opening duration
- Effects occur at a faster rate
- Minimal side effects

Applications

- Discovery of novel HCN blocking drugs
- Drugs for heart failure

Patent status:
Patent pending: U.S. and foreign rights are available.

License status:
This technology is available for licensing to industry for further development and commercialization.

Category:
Biomedical

VCU Tech #:
18-013F

Investigators:
Lei Zhou, Ph.D.
Qinglian Liu, Ph.D.

Contact us about this technology

Magdalena K. Morgan, Ph.D.
Director of Licensing
mkmorgan@vcu.edu
(804) 827-6095