

Dual-targeting bivalent ligands

A novel treatment method for neurological disorders

Opioid abuse and HIV have been described as interrelated epidemics. Even with combined anti-retroviral therapy, the concurrent abuse of opioids among HIV/AIDS patients appears to result in greater neurological complications, making it a serious public health issue. Of the 1.2 million people in the United States living with HIV infection, it is predicted that more than 50% of them experience some associated neurological condition. These conditions are collectively referred to as neuroAIDS. One of the most common forms of neuroAIDS is neuropathic pain and is thought to be the result of dimerization between the mu opioid and CXCR4 receptors. VCU researchers have developed a bivalent ligand which can be used to study this biological and pharmacological process.

The technology

The developed bivalent ligand contains two distinct pharmacophores linked through a spacer, one of which will interact with the mu opioid receptor and the other with the CXCR4 receptor. This allows the molecules to serve as unique tools for studying the function of dimerization between the mu opioid receptor and the chemokine CXCR4 receptor in neurological disorders. Additionally, if used as therapeutics these ligands could help to avoid drug-drug interactions which would result from using two separate pharmacophores to target each receptor.

Various types and lengths of linkage have been tested with these ligands. Results show that the overall reaction routes to prepare these ligands are convergent and efficient with moderate to good yields.

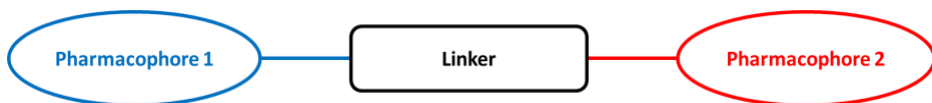


Figure 1. 'Bivalent Ligand' concept containing an antagonist for both the mu opioid and CXCR4 receptor (pharmacophore 1 & 2 respectively).

Benefits

- » Treats neuropathic pain
- » Passes through the blood-brain barrier
- » Avoids drug-drug interaction
- » Convergent and efficient development process

Applications

- » Characterize interaction between mu opioid & CXCR4 receptors
- » Treatment for neuro-disorders:
 - Neuro-AIDS
 - Neuropathic pain
 - Neuro-degradation
 - Dementia

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:

Research Tool

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