UMKC inventors have identified an IGF2R specific peptide with high binding affinity and specificity that can be used for HSC targeted delivery for liver fibrosis therapy.

**Need:**
Liver Fibrosis is caused by chronic diseases such as hepatitis, liver cirrhosis caused by alcohol abuse and nonalcoholic steatohepatitis or fatty liver disease. The prevalence of liver fibrosis is ever-increasing and affects approximately 30 million people in the United States alone. Over 11% of people with liver fibrosis will progress to the more severe condition of cirrhosis, in which the liver begins to decompensate and lose overall function. The fibrotic stage is considered a key inflection point where baseline liver function can still be salvaged with adequate treatment. However, no approved treatment exists that ameliorates or reverses the course of fibrosis.

**Invention Details:**
Liver Fibrosis is characterized by the excessive accumulation of extracellular matrix (ECM) in the liver. Hepatic stellate cells (HSCs) are responsible for the excessive production of ECM in a fibrotic liver. A protein found on the surface of HSCs is insulin-like growth factor 2 receptor (IGF2R), which is upregulated in HSCs during liver fibrogenesis. One of the major functions of IGF2R is to internalize extracellular ligands; therefore IGF2R could be used as a delivery system for small molecules into HSCs.

The proposed invention is an IGF2R-binding peptide identified by protein-based and whole-cell-based phage display with high binding affinity and target specificity. The proposed peptide (a.a. sequence - VHWDFRQWWQPS) exhibits high binding affinity and specificity toward IGF2R. The peptide acts via two distinct mechanisms of action, 1) it acts as a carrier to deliver conjugated small molecule agents to HSCs; and 2) it acts as a targeting ligand for nanoparticles encapsulating antifibrotic agents.

**Advantages:**
Conventional methods for delivering drugs to HSCs have limitations, including inefficient uptake. IGF2R is ubiquitously expressed on HSCs and facilitates entry of extracellular molecules at a relatively rapid rate. Identifying peptide ligands that target IGF2R and bind with high affinity is imperative to the development of a HSC-targeted drug delivery system. The identification of the IGF2R-specific peptide can be used to develop targeted therapeutics or imaging agents for liver fibrosis.

**Suggested Uses:**
To treat liver fibrosis as well as other diseases in which IGF2R plays an important role.

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