The Isolated Heparin-binding Domain (HBD) of VEGF165 and the Isolated D1 Domain of VEGFR2 (KDR)

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ABSTRACT

Researchers at the University of California, Davis have developed recombinant fusion protein compositions that inhibit pathological angiogenesis by targeting VEGF165-KDR interactions to treat cancers and related diseases.

FULL DESCRIPTION

This technology provides compositions comprising a soluble domain 1 of vascular endothelial growth factor receptor-2 (KDR D1) fused to an antibody Fc domain, designed to inhibit angiogenesis by blocking VEGF165 binding to KDR and its downstream autocrine signaling pathways. The composition can be delivered via multiple administration routes and optionally combined with molecular carriers such as nanoparticles or liposomes to enhance therapeutic efficacy. The invention targets cell proliferation and pathological angiogenesis involved in cancer progression, arthritis, and other disorders through novel mechanisms distinct from current anti-VEGF therapies, offering improved treatment options.

APPLICATIONS

- Therapeutics for breast cancer and other solid tumors exhibiting pathological angiogenesis.
- Treatment of angiogenesis-related disorders including rheumatoid arthritis, diabetic retinopathy, and age-related macular degeneration.
- Drug development targeting tumor vascularization and metastatic disease management.
- Advanced biopharmaceutical products utilizing novel fusion proteins fused with Fc domains for enhanced drug stability and efficacy.
- Nanomedicine formulations leveraging polymeric or lipid nanoparticle carriers for targeted delivery.

FEATURES/BENEFITS

- Specifically targets the heparin-binding domain of VEGF165 to block its interaction with the KDR D1 receptor and inhibit angiogenic signaling.
- Enhances protein stability and serum half-life through a fused Fc domain, improving pharmacokinetics.
- Provides versatile delivery options, including oral, intravenous, intramuscular, and local administration.

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OTHER INFORMATION

KEYWORDS

antibody fragment, angiogenesis inhibition, autoimmune disease, breast cancer, drug delivery, fusion protein, nanoparticles, pathological angiogenesis, VEGF165, VEGFR2

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Medical**
  - Disease: Cancer
  - Therapeutics

RELATED CASES

- Enables advanced target delivery by formulating with molecular carriers such as nanoparticles, dendrimers, liposomes, or exosomes.
- Overcomes limitations and safety concerns of anti-VEGF monoclonal antibodies like Avastin.
- Applies to a broad spectrum of diseases involving pathological angiogenesis, such as cancers and inflammatory conditions.
- Improves efficacy where existing VEGF inhibitors are limited, including in breast cancer.
- Introduces safer, more effective strategies targeting VEGF165 interactions beyond traditional KDR binding.
- Inhibits tumor growth and progression driven by pathological angiogenesis.
- Reduces aberrant blood vessel formation in disorders such as arthritis, ocular disease, and chronic inflammation.

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PATENT STATUS

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Suppression of sPLA2-Integrin Binding for Treating an Inflammatory Condition or Suppressing Cell Proliferation
- Development of Dominant Negative CD40L Antagonists DACD40L
- Novel Insight into Inhibiting IGF1 Signaling
- Novel Fibroblast Growth Factor 1-Derived Peptides for Therapy and Drug Discovery
- Modulating MD-2-Integrin Interaction for Sepsis Treatment
- Integrin Binding to P-Selectin as a Treatment for Cancer and Inflammation

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