AI for Patent Generation

Mentored by Kristin Smith

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Meet the Team

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Guessing Game

The present invention relates to the use of gene therapy vectors in the brain, particularly for treating gliomas and other neurological conditions. More specifically, the invention leverages the use of albumin to enhance the transduction efficiency of gene therapy vectors, particularly Herpes Simplex Virus-1 (HSV-1), in brain tissue.

In one aspect, the invention involves utilizing albumin to improve the transduction efficiency of gene therapy vectors in treating gliomas. Albumin, a naturally occurring protein, is utilized to open up spaces between cells and block heparin receptors in the brain tissue. This mechanism increases the availability of the gene therapy vectors for transduction, thereby enhancing the efficacy of the treatment.

Patenty Generated

A first aspect of the invention provides a pharmaceutical composition comprising a therapeutic agent and albumin or a functionally effective fragment thereof.

The composition preferably comprises a therapeutic agent for treatment of a neurological disease. The therapeutic agent is preferably for the treatment of a disease of the brain or spinal cord, especially a disease of the brain. It may be a cancer, especially a cancer of white matter, in particular a glioma. Alternatively, it may be any other appropriate neurological disease, especially a white matter disease such as multiple sclerosis.

Approved Patent

Synopsis

- Our Product:
  - A patent generator focused on gene-therapy
- Presentation Outline:
  - How we got to this product from our prompt
  - How it functions
  - A demonstration of use

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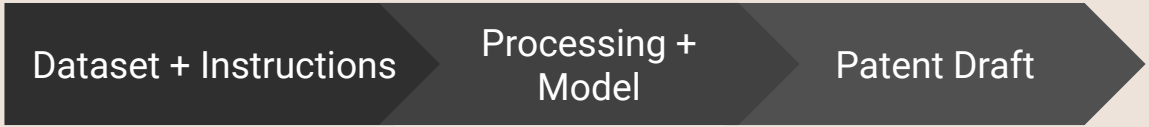
Project Overview

- Assigned Project
  - AI-based biotech patent generator



100+ patents combined with detailed user instructions

Model and our own processes help with understanding

Different generated sections are put together

- Final Deliverable
  - A functional, easy-to-use AI gene therapy and life sciences patent generator

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Current Market

- A nascent and sparse space
- AI is used to speed up existing processes, not create ‘new’ ideas
- Problems being addressed - expenses of lawyer consultation, speed of work, involvement of inventors

qatent
A Questel Company

DeepIP

PatentHacks

PatentPal

Current Market Approaches

- AI patent generators aim their inventions one of two directions
- Attorney Focused
  - Emphasis on speed of generation
- Inventor focused
  - Emphasis on cost efficiency

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Patenty's Approach

Focus on Inventors

Nearly all reviewed products catered to attorneys first and foremost

Gene-therapy emphasis

A specifically curated dataset to help understand the field

Affordability

Aimed to help inventors surmount the financial barrier

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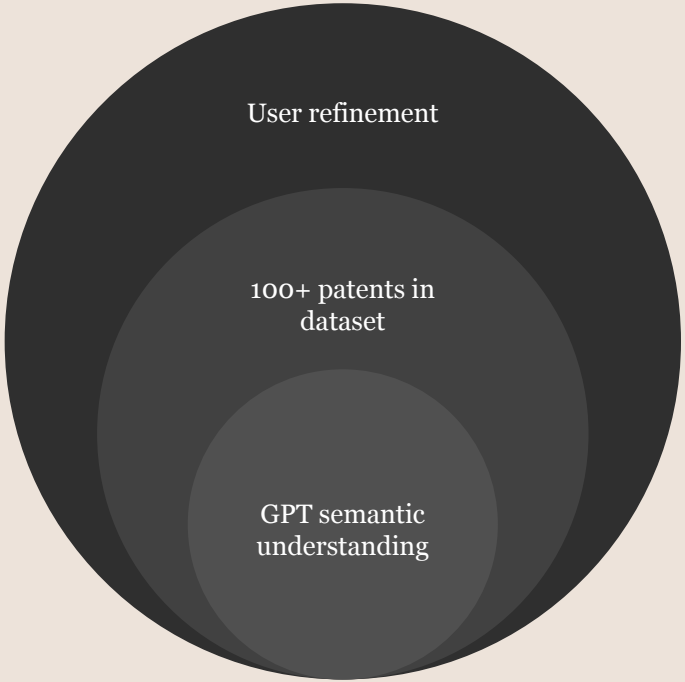
How It Works

- Mixture of agents architecture combining a fine-tuned ChatGPT model with human systems, bringing legal understanding and biological comprehension
- Model splits into sections, with each portion asking detailed questions of the user before generating into a patent template.
- User input and refinement is added at each step of the process, making sure the model stays relevant



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Inputs

Enter your prompt to generate a patent:

Enter the title of your patent:

Delivering gene therapy vectors to the brain

You are currently generating the claims section

Include the answers to these questions below, as well as include any additional details: Draft your patent claims, starting with the broadest independent claim: • What is the essential core of your invention? • What are the key steps or components that make it novel? • How can you describe it broadly while still distinguishing it from prior art? Then, add dependent claims that narrow the scope: • What specific embodiments or variations of your invention exist? • Are there particular materials, conditions, or applications that are important? • What optional features could be added to the core invention? Aim for a mix of broad and specific claims to provide comprehensive protection. Use clear, precise language and avoid unnecessary limitations.

A pharmaceutical composition comprising a therapeutic agent, particularly a gene therapy vector, and albumin or a functional fragment thereof. The composition's use in treating neurological diseases, particularly gliomas. The method of administering this composition via convection-enhanced delivery (CED) to enhance the distribution of the gene therapy vector. The inclusion of albumin to improve vector distribution and reduce the effective dose of the therapeutic agent. Dependent claims include specific embodiments, such as the composition's use in other neurological diseases, and variations in the administration methods.

Generate

Refinement Details:

Outputs

Claims:

1. A pharmaceutical composition for delivering gene therapy vectors to the brain, comprising a therapeutic agent selected from the group consisting of gene therapy vectors and albumin or a functional fragment thereof, wherein the gene therapy vectors are capable of treating neurological diseases, particularly gliomas.

2. The pharmaceutical composition of claim 1, wherein the gene therapy vectors are designed to target and treat neurological diseases beyond gliomas.

3. The pharmaceutical composition of claim 1, wherein the albumin is included to enhance the distribution of the gene therapy vectors in the brain and reduce the effective dose of the therapeutic agent required for treatment.

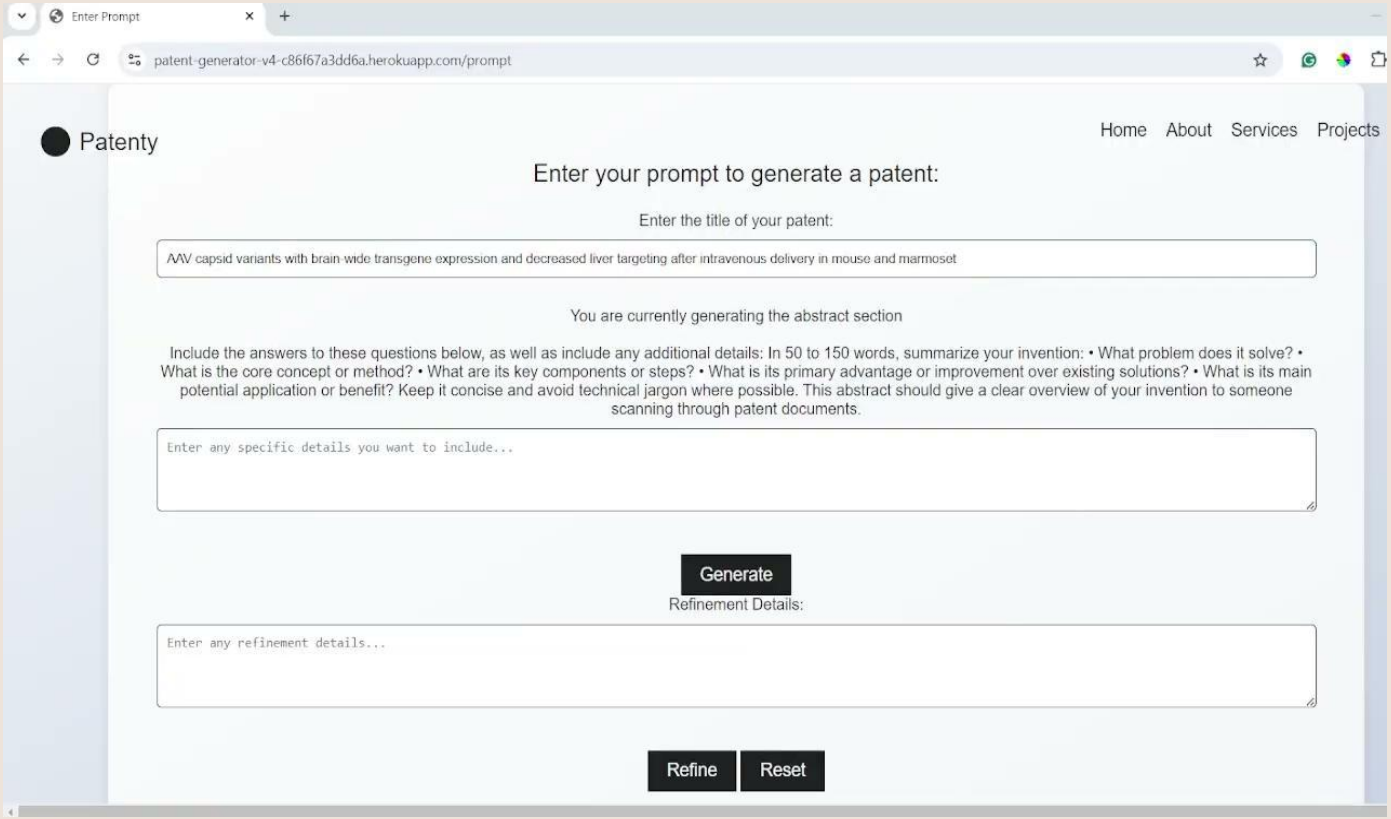
4. The pharmaceutical composition of claim 1, wherein the gene therapy vectors are encapsulated or conjugated with albumin to improve their distribution in the brain.

5. A method of administering a pharmaceutical composition for delivering gene therapy vectors to the brain, comprising convection-enhanced delivery (CED) to enhance the distribution of the gene therapy vectors and albumin in the brain for the treatment of neurological diseases, particularly gliomas.

6. The method of claim 5, wherein the convection-enhanced delivery (CED) is used to administer the pharmaceutical composition directly to the brain tissue to achieve a wider and more uniform distribution of the gene therapy vectors and albumin.

7. The method of claim 5, wherein the convection-enhanced delivery (CED) is used to administer the pharmaceutical composition to target specific areas of the brain affected by neurological diseases, particularly gliomas.

8. The method of claim 5, wherein the convection-enhanced delivery (CED) is combined with other administration methods to enhance the distribution of the gene therapy vectors and albumin in the brain.



Demonstration

Patent-Patent “Score” Comparison

DELIVERY OF A GENE THERAPY VECTOR TO THE BRAIN BY CONVECTION-ENHANCED DELIVERY

FIELD OF THE INVENTION

The invention relates to the compositions and compounds for use in the treatment of gliomas.

BACKGROUND TO THE INVENTION

Malignant gliomas are the most common primary brain tumour and are associated with a very poor prognosis (Wrensch et al, 2002). It has been hypothesised that gliomas arise from endogeneous glial progenitor or neural stein cells (Canoll and Goldman, 2008), with which they share the ability to migrate along white matter tracts and perivascular and subpial spaces (Louis, 2006). As a consequence, malignant gliomas are highly infiltrative tumours for which complete surgical resection is not feasible. The limitations of conventional treatment modalities at adequately treating infiltrative tumour cells are highlighted by the observation that 80% of malignant gliomas recur within 2 to 3 cm of the original tumour mass (Hess et al, 1994).

Herpes Simplex Virus (HSV-1) is a large, naturally neurotropic, double-stranded DNA virus that is actively being developed into useful replication-selective (oncolytic) and replication-defective gene therapy vectors (Bowers et al, 2003). To date, two replication-selective viral constructs have reached clinical trials in patients with malignant gliomas (Rampling et al, 2000; Marken et al, 2000; Papanastassiou et al, 2002; Harrow et al, 2004). These viruses, designated G207 and HSV1716, harbour null mutations in both copies of the $\gamma_1$34.5 gene. The products of this gene are critical in enhancing the ability of HSV-1 to infect neurones and overcome host cell responses to viral infection (He et al, 1997). In addition, null mutations of the $\gamma_1$34.5 gene confer the ability of these vectors to selectively replicate in tumour cells (Shah et al, 2003).

To date, in all clinical trials of selectively-replicating HSV-1, vector administration has been achieved by direct intratumoural or intraparenchymal injection. Early clinical trials

be efficacious, viral distribution must be optimised to facilitate the transduction of as many infiltrating tumour cells as possible.

Convection-enhanced delivery (CED) involves the use of fine catheters and precisely controlled infusion rates to distribute therapeutic agents by bulk-flow directly into the brain extracellular space, possibly along the same extracellular pathways that glioma cells are able to migrate. In contrast to techniques of drug delivery that depend on diffusion to achieve adequate drug distribution, such as carmustine-impregnated biodegradable polymers, with CED it is possible to distribute drugs homogeneously over potentially large volumes of brain, irrespective of the molecular size of the therapeutic agent (Morrison et al, 1994). As such it is an ideal technique for the administration of viral vector-mediated gene therapy to the brain of patients with malignant gliomas.

HSV-1 vectors have a diameter of 120 to 300 nm (Jacobs et al, 1999), whereas on average the brain extracellular space has a diameter of 38 to 64 nm (Thorne and Nicholson, 2006). Clearly this has the potential to make the administration of HSV-1-based vectors by CED unachievable. Consequently, in this study the distribution of a replication-selective HSV-1 viral construct by CED has been examined in both grey and white matter and, a variety of strategies to enhance viral vector distribution have been evaluated.

Nevertheless, in addition to the aforementioned clinical trials (6-9), HSV vectors have been administered by stereotactic injection into normal mouse (17-19), rat (20-26) and primate brains (20-28), animal models of high-grade glioma (29-35), mucopolysaccharidosis type VII(36), GM2 gangliosidosis (37) and Parkinson’s disease (37-39), as well as being administered by CED into a glioma rat model (40). In view of this large number of studies it is surprising that to date no attempt has been made to systematically evaluate and optimise the delivery of these vectors directly into the brain. Consequently, in this study the distribution of a replication-selective HSV-1 viral construct by CED has been examined in both grey and white matter and, a variety of strategies to enhance viral vector distribution have been evaluated.

SUMMARY OF THE INVENTION

Cosine Similarity for U.S. Patent 8,901,077B2: 0.87

Abstract:

The present invention provides a solution for the challenging task of delivering gene therapy vectors to the brain, particularly for treating gliomas. The invention involves a pharmaceutical composition that incorporates a therapeutic agent, such as a gene therapy vector, with albumin. This composition is advantageous as it optimizes the delivery of large viral vectors by convection-enhanced delivery (CED) to the brain's white matter. This approach improves the distribution of the therapeutic agent, ensuring better transduction of target cells and reducing the required dose of the gene therapy vector. The primary application of this invention is in treating brain cancers, specifically gliomas, by enhancing the effectiveness of gene therapy.

Background:

The field of gene therapy for treating malignant gliomas has experienced notable progress in recent years, with viral vectors such as HSV-1 being investigated in clinical trials. Despite these advancements, existing methods for delivering gene therapy vectors, such as direct intratumoural injections, are limited in their efficacy. These methods suffer from poor distribution and minimal effectiveness, particularly in infiltrative tumor cells. As a result, there remains a significant need for improved methods of delivering gene therapy vectors to the brain for treating malignant gliomas.

To address these limitations, the present invention proposes a novel approach to enhance the delivery of gene therapy vectors in the brain. Specifically, the invention leverages Convection-Enhanced Delivery (CED) to achieve more effective distribution of therapeutic agents across the brain's extracellular space. By employing CED, the invention aims to overcome the challenges associated with existing delivery methods and enable more widespread and efficient transduction of glioma cells.

In summary, the invention fills a critical gap in current treatment methods by offering a means to enhance the delivery of gene therapy vectors to the brain for treating malignant gliomas. By leveraging CED, the invention aims to improve the distribution and efficacy of therapeutic agents, thereby addressing the limitations of existing delivery methods.

Next Steps

- Expand the dataset to include a broader range of patents
- Implement upload functionality
- Journal article conversion feature
- Further UX Improvements
- Attorneys will ensure that patents are enforceable and defensible

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Reducing Dependency on Legal Consultations

- **Advanced Legal Compliance Engine**: Automatic legal checks for patent compliance
- **Integrated Legal Knowledge Base**: Real-time legal guidance and best practices
- **Smart Contract Integration**: Automate legal documents within patent applications
- **Enhanced AI for Claim Drafting**: Precise, legally defensible claim generation
- **Interactive Patent Review Simulation**: Preemptively address patent examiner objections
- **Collaborative Review Tools**: Invite reviewers for real-time feedback
- **Automated Patent Filing**: Direct e-filing to patent offices
- **Legal Audit Function**: Pre-filing audit for common legal pitfalls

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Questions

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