

Nanomedicine for Combination Therapy Based on Cell Therapy and Nanomedicine.

TECHNOLOGY DESCRIPTION

Development of a new nanomedicine, with inhibitory activity on Rock kinase, for two high impact in human health: spinal cord injury and in metastatic breast cancer, alone or in combination with other approaches as a co-adjuvant in these treatments.

In the treatment of spinal cord injury, nowadays there is no evidence of any nanopharmaceutical that has been clinically tested. The new Fasudil nanoconjugate would be indicated for intrathecal administration, which could be delivered from a reservoir for sustained release, which would increase its efficiency and versatility in patients from the first hours after spinal cord injury to chronic patients, and would significantly facilitate subsequent surgical procedures.

The development of the new Fasudil nanoconjugate and its study in combination with cell therapy would improve all those cellular strategies that are currently in clinical research phases due to their synergistic effect in rescuing neuronal activity in the most complicated scenario, in chronic lesions. The results obtained in individual or combination therapy with neural precursor transplantation may also be extrapolated to other pathologies such as traumatic brain injury, cerebral stroke or neurodegenerative diseases such as amyotrophic lateral sclerosis, Parkinson's or ataxias.

The development of Fasudil nanopharmaceuticals with application in metastatic breast cancer is an innovation in the field where new mechanisms of inhibition of metastasis could be explored, in addition to its potential application in combination with such novel drugs as dinaciclib. Conjugation to polymeric carriers gives them the character of a new

chemical entity (in fact, the patent is for the product, PGA-SS-FAS), it reduces their systemic toxicity, since it preferentially accumulates in the tumor area due to the specificity ('targeting') passive due to the EPR effect in this case, as well as an increase in its antitumor and antimetastatic activity since the most vascularized areas (metastasis) accumulate a higher concentration of these nanopharmaceuticals. On the other hand, due to the multivalence of the polymeric carrier (PGA, completely biodegradable and safe, already demonstrated in phase III trials with nanopharmaceuticals such as Opaxio) it allows the application of polymeric combination therapy, giving a new family of therapeutic agents with the possibility of increasing synergistically its antitumor-antimetastatic activity. This design would provide significant advantages in patients: (i) the combination would be administered as a single dose with a clear improvement in the patient's quality of life, (ii) reduction of side effects thanks to the passive specificity mediated by the RPE effect, (iii) evasion of chemoresistance mechanisms thanks to the specific internalization of conjugates by endocytosis, (iv) adequate approach for the treatment of metastases, (iv) additionally, this design provides the possibility of modifying polymer-drug bonds and therefore, it is possible to confer different release kinetics for each drug, thus allowing them to act appropriately or synergistically in each patient, thus addressing the trend towards personalized medicine.

BUSINESS APPLICATION SECTORS

- Public or private research entities for research on neurodegenerative processes and tumor processes.
- Pharmaceutical companies and / or public or private health centers could develop a clinical trial to improve therapeutic treatments in spinal cord injury or cancer.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

- More efficient pharmacology.
- Consolidated technological platform.
- Treatment of spinal cord injuries, in individual pharmacological therapy or in synergy with cell therapy.
- Treatment of tumors that require a combination of drugs.

STATE OF DEVELOPMENT OF THE TECHNOLOGY

Scaling procedure under GMP-like conditions necessary for the generation of sufficient quantities of the new Fasudil nanoconjugate.

Safety and efficacy studies in combination for the treatment of spinal cord injuries, in animal models, using rodent or human neural precursors as therapy adjuvants.

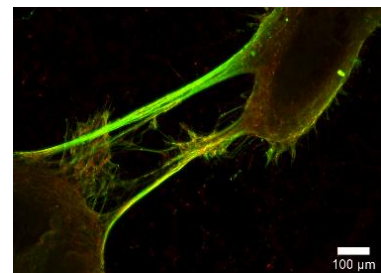
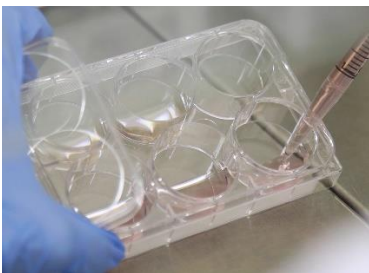
INDUSTRIAL AND INTELLECTUAL PROPERTY RIGHTS

PCT / EP2020 / 058940 with title "POLYMERIC CONJUGATES AND THE USES OF THEM"
Co-owners: FCIPF and STEP BY STEP FOUNDATION

COLLABORATION SOUGHT

Development projects in clinical research for the treatment of spinal cord injuries and cancer.

RELATED IMAGES



CONTACT

Centro de Investigación Príncipe Felipe (CIPF)

Eduardo Primo Yúfera, 3
46012 VALENCIA (Spain)
TEL: 96 328 96 80

gerencia@cipf.es www.cipf.es