

**NEUROSCIENCES- jan 2006-
Selection of Innovation Relay Center Network Technologie offers
Contact marino@rhone-alpes.cci.fr**

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Mouse model for target validation in neuropathic pain (chronic pain syndrome)

Reference: 05 EE EAAF ODTX (Open)

Organization: Archimedes Foundation (Estonia)

Abstract:

An Estonian university has developed a new disease model for neuropathic pain (chronic pain syndrome). A transgenic mouse line is genetically resistant for the development of neuropathic pain. Its phenotype has been thoroughly characterised and novel drug targets are being screened to be validated. For that purpose, technical collaboration with financial assistance is sought. Out-licensing will be considered.

Description:

The progress of research into neuropathic pain has not been very successful. This is partly due to lack of good animal models.

Now an Estonian research group has characterised, for the first time, a mouse strain, resistant to the induction of neuropathic pain syndrome. They have been characterised in chronic constriction injury model (by placing a ligature around the sciatic nerve). In wild-type mice, hypersensitivity to innocuous mechanical stimulus (light touch with fibre) develops (allodynia). In the new model allodynia will not develop and their mechanical sensitivity is not different from pre-operational (chronic constriction) level.

The mice are being used for further molecular analysis (gene expression profiling, proteomic analysis) to find and validate the molecules involved in this resistance.

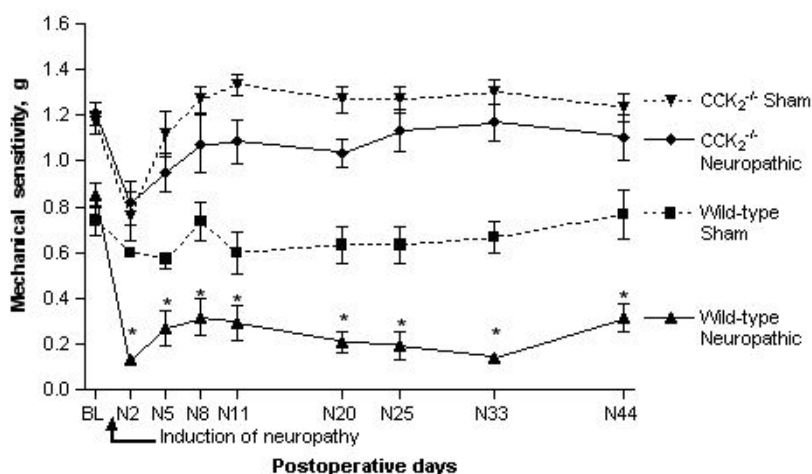
The following figure describes changes in mechanical sensitivity in mutant mice and wild-type mice after induction of neuropathy (CCK) and after sham operation.

Innovative Aspects:

At the moment there are no other animal models, resistant to neuropathic pain. The other working models are mutants that definitely will develop the syndrome. This feature opens a completely new avenue for drug development projects.

Main Advantages:

The existing models are random knockouts and drugs can be tested against just one target. The new model will allow for characterising whole pathways involved, and choose for the best target(s).



Current Stage of Development: Development phase - Laboratory tested
Intellectual Property Rights: Secret know-how

A new method for diagnosis and treatment of Huntington's disease

Reference: 05 IT LOAS ODF6 (Open)

Organization: Federazione delle Associazioni Scientifiche e Tecniche (Lombardia, Italy)

Abstract:

Three research laboratories from two Italian universities developed and patented a new method for diagnosis and treatment of Huntington's disease (HD) based on the detection of an anomalous A2A adenosine receptor behaviour, which is proposed as a specific biomarker of this disease. Industrial/academic/private partners are requested for further development and for setting up a diagnostic kit to be offered to clinical practice.

Description:

Huntington's disease (HD) is a progressively disabling neurodegenerative disorder, caused by a mutation in the gene encoding for huntingtin, an anti-apoptotic protein. Despite a relatively low incidence (1/10.000), the symptomatic phase of the disease is characterised by a mean duration of 17 years, with consequent high economic cost for the society. Inventors have initially identified a disease-related alteration of A2A adenosine receptors and activity in striatal cells engineered to express either normal or mutant huntingtin. In particular, an increase of A2A receptor number and of adenosine-dependent stimulation of adenylyl cyclase was detected. Since A2A receptors are expressed on brain striatal neurons that preferentially undergo death in HD, this alteration may be causally involved in HD-associated-neurodegeneration. The aberrant A2A receptor phenotype was also consistently found in the peripheral blood mononuclear cells (PBMC) of patients carrying the mutant gene, both at a pre-symptomatic and at a symptomatic stage. Notably, this alteration was quite selective, since other G-protein coupled receptors were found to be unaltered in the same patients. Thus, the A2A adenosine receptor activity may be considered a specific biomarker for HD. The proposed diagnostic-prognostic method is based on the measure of this parameter in the PBMC of at-risk subjects via a simple and ethically acceptable blood test, thus allowing the identification of mutation carriers and enabling an early and timely treatment. Moreover, the longitudinal analysis of this biomarker in the same subjects may allow evaluating the efficacy of new pharmacological or non-pharmacological treatments. Researchers obtained a patent on this diagnostic method for Huntington's disease and are interested in finding partners for the set up and miniaturisation of the method and for the production of a diagnostic kit to clinical practice. Due to the peculiar nature of the identified parameter that seems to be casually related with the disease, the patent also opens up the possibility of using selective antagonists of the A2A adenosine receptor for disease treatment.

Innovative Aspects:

Currently, subjects at risk for developing Huntington's disease can be only identified by genetic analysis, which, however, only gives information about the presence of the mutation (i.e., no information on disease progression or regression) and also carries significant ethical problems. In this context, and given the progressive manifestation of the disease, the identification of peripheral biomarkers that may be able to indicate HD progression and possibly offer a prediction of drug efficacy would be of great value.

The altered A2A adenosine receptor phenotype represents the first peripheral biomarker of the disease that is not based on genetic analysis. Moreover, literature data suggest that the aberrant A2A receptor phenotype may be causally related with symptom onset and progression, thus providing an ideal biomarker for monitoring the efficacy of pharmacological and non-pharmacological treatments longitudinally in the same subjects. Finally, since HD still represents an unmet-medical need and no therapies are currently available, the patent based on the aberrant A2A receptor phenotype also opens up new possibilities in the identification of novel therapeutic strategies selectively targeting this receptor subtype.

Main Advantages:

The analysis of A2A adenosine receptors in peripheral blood circulating cells is a simple, easy and highly reproducible biochemical test. In particular, reproducibility eliminates the need to repeat the test many times, unless required by longitudinal analysis on the same patient. There are no ethical problems, because the test is

simply based on the withdrawal of a blood sample from patients and, at variance from the already available test, is not based on genetic analysis. Moreover, inventors have already adjusted the technique to a reasonably low amount of blood/patient. The test can be easily done in laboratory without any investments in expensive instruments and does not require any particular laboratory expertise. Moreover, from initial calculations a quite low cost per test/patient has been estimated.

Current Stage of Development: Development phase - Laboratory tested
Intellectual Property Rights: Patent(s) granted

In vitro and in vivo microdialysis sampling coupled to analysis by nano or capillary liquid chromatography/tandem mass spectrometry

Reference: 05 FR RACA 0DCH (Open)

Organization: Chambre Régionale de Commerce et d'Industrie Auvergne

Abstract:

The University of Auvergne offers an original technical platform that enables sampling of compounds in different matrices by microdialysis. The sampling method is associated with a very sensitive and specific analytical technique. Applications could be therefore as diverse as neurosciences, cancerology, nutrition, cosmetology, pharmacokinetic and drug metabolism. The university is interested in technical collaboration and/or offers analyse services.

Description:

The University of Auvergne offers an original technical platform that enables sampling of compounds in different matrices by microdialysis. The sampling method is associated with a very sensitive and specific analytical technique, a capillary (or nano) liquid chromatography apparatus coupled to a mass spectrometry detector with a triple quadrupole analyser. This powerful equipment allows monitoring various compounds, parent drugs and metabolites at very low concentrations. Applications could be therefore as diverse as neurosciences, cancerology, nutrition, cosmetology, pharmacokinetic and drug metabolism.

Microdialysis involves the insertion of a probe into a selected sample. The probe consists of a small semi-permeable membrane connected to a small diameter inlet and outlet tubing. The probe is continuously perfused with a solution which composition must closely match the ionic composition of the fluid surrounding the probe. Molecules small enough to cross the semi-permeable membrane will diffuse into the perfusate. The resulting dialysate is therefore collected and analysed by an appropriate method or directly transferred to the analytical system.

To obtain a high temporal resolution of the measurements and correct microdialysis recoveries, short collection intervals and low dialysate flow-rates ($\approx 1 \mu\text{L}/\text{min}$) are required. Therefore, microdialysis handlings are often small volumes (several microlitres) containing very low concentrations (pico- to nano-molar range) of target compounds. These analytical challenges justify the choice of a capillary liquid chromatography system coupled to tandem mass spectrometry as an appropriate analytical technique.

Liquid chromatography at nano- (50 to 200 nL/min) or capillary flow-rates (1 to 5 $\mu\text{L}/\text{min}$) permits analysis of small sample volumes since dead volumes are very reduced. Associated with tandem mass spectrometry, this technique leads to high sensitivity and specificity. Analysis of various structural molecules such as endogenous compounds (neurotransmitters, hormones, etc.) or a drug together with possibly affected endogenous compounds, or parent drugs and metabolites, are then possible.

Innovative Aspects:

- Sampling of compounds in extra-cellular fluids in awake animals.
- Microdialysis sampling associated with a very sensitive and specific analytical technique.
- Possible direct coupling of microdialysis to the analytical system.

Main Advantages:

- In vivo and in vitro qualitative and quantitative assessment of the static and dynamic composition of fluids. Evaluation of physiologic or pathologic states, or influence of therapeutic and toxic administration.
- Continuous extra-cellular injections of drugs and/or sampling of tissue and fluid compartments in awake, freely moving animals.
- Possible direct injection of microdialysis samples into the chromatographic system.
- Considerable reduction of the number of subjects needed for pharmacokinetic investigations.
- Very high sensitive analytical method (nano an capillary liquid chromatography coupled to tandem mass spectrometry).

Current Stage of Development: Already on the market

Intellectual Property Rights:

Others

None

Development of compact amplifier modules for EEG (electroencephalogram) devices for mobile and stationary applications

Reference: 05 DE DSTA 0D5N (Open)

Organization: TAC Technologieagentur Chemnitz GmbH (Germany)

Abstract:

A SME from Saxony/Germany develops, produces and services devices and equipment for neurophysiologic function diagnostics, alongside the marketing of top-quality international products. The company is looking for potential partners for developing compact amplifier modules for EEG (electroencephalogram) devices for mobile application. Thereby it goes with priority about development of miniaturised of amplifier modules connecting with a small consumption of electricity.

Description:

A SME from Saxony/Germany develops, produces and services diagnostic devices and equipment including corresponding application and software in the field of neurophysiology. Highly qualified and experienced personnel develop under use of rapid development speed in computer science constantly improved world-marketable equipment. The export rate of the company is nearly 25%. The company's quality management is certified after DIN ISO 13485:2003. The company intended to develop a new generation of medical diagnostic devices. They aim to a compact construction and modular structure.

Technical Specifications / Specific technical requirements:

The company is searching for a technology for miniaturisation of hardware, especially of amplifier modules.

- The requested deliverer must have experience in development of EEG amplifiers
- Digitisation and data processing have to be realised inside the amplifier
- The developer is able to transfer the technology to the recipient
- The requested capacity is 100 modules per year

Novel method for growing the nerve

Reference: 05 FI FILC 0D4H (Open)
Organization: Licentia Ltd. (Finland)

Abstract:

One key feature in the development of the nervous system is the guidance of the neuronal growth cones to their appropriate targets. Finnish university researchers have identified a novel sequence induced in neurons by the neurite-promoting protein amphoterin. This amphoterin-induced gene and ORF (Open Reading Frames) has been named AMIGO. The research group is seeking pharmaceutical companies for license. Further research collaboration is also available.

Description:

Finnish university researchers have invented and cloned other genes homologous to AMIGO. The invention allows a possibility for regenerating neuronal connections.

The AMIGO proteins and AMIGO genes are believed to find ex vivo or in vivo therapeutic use for administration to a mammal, particularly humans, in the treatment of diseases or disorders, related to AMIGO activity on "growing the nerve".

Particularly preferred are neurological disorders, in particular central nervous system disorders like Parkinson's disease, Alzheimer's disease and multiple sclerosis. AMIGOs could also be used in the treatment of spinal cord injuries for regenerating neuronal connections into paralysed tissue. The expected applications have been disclosed in more detail in our recent patent application of the AMIGO family.

Innovative Aspects:

New invention where in neurological disorders, in particular central nervous system neuronal systems can be regenerated.

Main Advantages:

This invention represents a new novel possibility of treating neuronal disorders, particularly in central nervous system, like Parkinson's disease, Alzheimer's disease and multiple sclerosis by regenerating neuronal connections.

Current Stage of Development: Development phase - Laboratory tested

Intellectual Property Rights: Patent(s) applied for but not yet granted

Animal mouse model for drug evaluation in cardiovascular and nervous syndromes

Reference: 05 ES MAOT OCU3 (Open)

Organization: OTT - Consejo Superior de Investigaciones Científicas (Spain)

Abstract:

A Spanish public research group has developed a non-human knockout mammal that lacks detectable levels of vav3 protein expression. These animals show serious defects in the cardiovascular & nervous system and, therefore, are excellent experimental models to evaluate the effect of new drugs & molecules directed towards treatment of cardiovascular (hypertension) and nervous diseases (stress, schizophrenia, neurodegenerative, Parkinson). A biopharma company interested in such drugs is sought.

Description:

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Innovative Aspects:

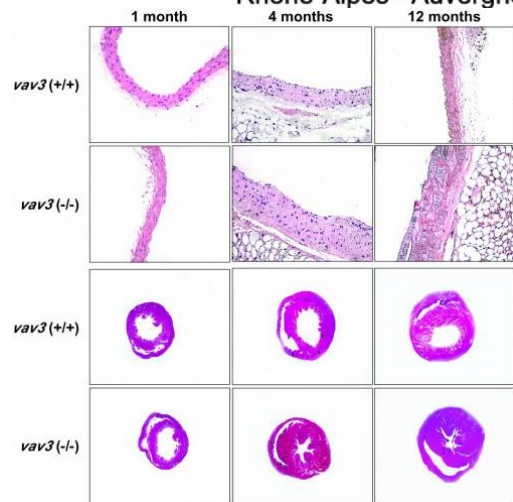
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Main Advantages:

The animals of the current invention can be used to screen and/or test new compounds (alone or in combination with others) aimed at treating the different manifestations of cardiovascular disease (essential or of genetic-base) or defects of the sympathetic nervous system. These screenings can be done in vivo (using different physiological and/or real-time-based procedures) or ex vivo (i.e., isolated smooth muscle cells). In the same context, this animal model is of interest to screen for inhibitors of specific regulatory steps of the cardiovascular system (such as the production of angiotensinogen or bradikinin, generation of angiotensin II, control of the enzyme activities of either renin or the angiotensin converting enzyme, etc).

In addition, the vav3 knockout animals can be of use to test the development of the sympathetic nervous system, the connection of sympathetic neurons with other cell types (i.e. inhibitory GABAergic neurons), and to study the effect of mutations in specific genes. Other uses include the prevention or treatment of sympathetic nervous system disorders such as stress syndromes. Also, given the overproduction of dopamine in these knockout mammals, these animals can be of interest to evaluate the effect of the vav3 gene in degenerative processes of dopamine-dependent cells, as is the case, for example, in Parkinson disease.

Finally these animals could be used to design compounds capable of prevent, reduce, or ameliorate pathologies derived from cell-cell interactions (i.e., motor coordination problems derived from the malfunctioning of the peripheral and/or central nervous system).



Rehabilitation system for vertigo and equilibrium disorders

Reference: 05 FR RAAR 0CKQ (Open)
Organization: OSEO anvar Rhône-Alpes

Abstract:

A French company has built a system for the purpose of neuro-sensorial rehabilitation of persons suffering from vertigo and equilibrium disorders. Operated by radio communication this device is able to generate opto-kinetic stimuli (visual illusion of movement) and kinetic stimuli to a patient, seated or standing on a turntable. Under a license agreement, the company is looking for partners to launch the industrialisation and the launch on the targeted market.

Description:

EQUILIS is composed of a hollow sphere (2.85m in diameter) with a turntable in the middle. An electrically operated projector is positioned on the ceiling (height of 2.46m), producing moving spotlights on the interior wall of the entire sphere, as in a 360° screen. The two electric elements (turntable and projector) are operated by radio communications and are programmable for precise cycles of rotations. EQUILIS is a system capable of simultaneously generating opto-kinetic and kinetic stimuli, both of which facilitate central nervous system adaptation in order to stabilise gaze as well as head and body position in space. EQUILIS must be operated by a physiotherapist or another qualified medical professional in accordance with patient's specific diagnosis. This type of neurosensorial rehabilitation can be used to treat patients suffering from dizziness, vertigo and equilibrium and coordination disorders.

The related medical specificities able to benefit from this technology include neurology, otorhinolaryngology, geriatrics, sports medicine and rehabilitation medicine. EQUILIS can easily be used in rehabilitation centres, convalescent homes, retirement centres and physical therapy offices.

Innovative Aspects:

Coupled with neurosensorial exploration systems (of vestibulo-ocular and somesthetics reflexes) EQUILIS has the potential to become a true, dynamic leader in the diagnosis and treatment of vestibulo-spinal disorders, something that does not currently exist on the market.

Main Advantages:

Particularly to point out are:

- Stimuli of vestibular system in stand-up position
- Personal adaptation of the stimuli programs



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Centre Relais Innovation
Suisse Ouest / France
Rhône-Alpes - Auvergne

Current Stage of Development: Available for demonstration - field tested (a prototype has been achieved and could be seen and transferred to partners that would resume the project for their own purpose)

Intellectual Property Rights: Patent(s) granted and a trade mark has been granted

New Recording Methodologies for the Study in Mice of Neurodegenerative Processes (Dementia, Alzheimer)

Reference: SEIRC-TO10(B) (Open)

Organization: Centro de Innovación y Transferencia de Tecnología de Andalucía S.A.U. (Spain)

Abstract:

An Andalusian research group has developed several recording systems to study learning and memory processes in behaving mice. The main advantage is these recording systems allow the study of neural activity in cerebral cortex or deep cerebral structures during motor learning, in chronically implanted animals. They are looking for technical co-operation with pharmaceutical companies.

Description:

An Andalusian research group has developed different recording systems to study learning and memory processes in behaving mice. They offer an experimental set-up for classical and instrumental conditioning in "in vivo" mice (transgenic, knock-out, mutant) by telemetric stimulation and recording techniques. This recording set-up is susceptible to be used in animal models of Parkinson, Alzheimer, dementia, pharmacological screening, and memory and learning studies. This recording system allows the study of neural activity in cerebral cortex or deep cerebral structures during motor learning, in chronically implanted animals. Microinjection, microdialysis and microstimulation techniques are also available. Patch-clamp, immunohistochemistry, in situ hybridisation, cloning, and transient transfection can be applied too. They are able to carry out a complete set of behavioural, learning and memory studies in "in vivo", chronic animals to determine the effect of selected drugs. They are looking for pharmaceutical companies interested in the study of long-term effects of drugs aimed to cure neurodegenerative diseases as dementia and Alzheimer and interested in checking the effects of pre-cognitive or psychoactive drugs on animal models of neurodegenerative diseases.

Innovative Aspects:

Long-term recording of neural and motor activities in freely moving mice together with complementary, multidisciplinary "in vitro" techniques.

Main Advantages:

The technique allows the study of long-term effects of drugs on the central nervous system in experimental (mice) models of neurodegenerative diseases.

Current Stage of Development: Available for demonstration - field tested

Intellectual Property Rights: Secret know-how

Determination of biological activities of compounds on nervous cells

Reference: 05 FR RACA OCIL (Open)

Organization: Chambre Régionale de Commerce et d'Industrie Auvergne

Abstract:

A French company provides cellular systems dedicated to the discovery of new active compounds on the nervous system. These in vitro tests have been developed from a key know-how in data acquisition from cell-based assays, and provide a relevant drug-screening tool for identification of potential therapeutics particularly in the field of central nervous system regeneration. The company is looking for technical cooperation, joint venture agreement, commercial agreement, R&D.

Description:

The search for new drugs or targets for disease is of particular interest in the field of nervous system affections. The use of cell culture is a common approach for characterisation of the biological activities of compounds. The company provides tools for examining the efficiency of compounds for neurodegenerative diseases. The company's services include a technological platform based on know-how in cellular testing and in vitro evaluation for identification of potential therapeutics for the central nervous system. This platform provides the screening of molecules through a cell-based process, focused on measure of cellular phenomena, which makes it possible to envisage the potential role of molecules and pharmacological properties early during the process of discovery. A wide range of analyses is available, from neuroprotection to cell differentiation, and particularly neuritic outgrowth.

Innovative Aspects:

A French company has developed a cell-based process able to quickly highlight biological activities of compounds in the nervous system. Particular protocols provide by the company amount to a non-destructive approach allowing living cell analysis and a multi-parametric and kinetic analysis of the effect of an efficient agent. This approach is particularly dedicated for the screening of neuro-active compounds based on morphological modifications of nervous cells directly analysed and followed daily during the observation period. The different parameters measured are relevant pieces of information on physiological response and allow characterising the biological activity of compounds in a global cellular context.

The originality and innovative aspects are, in particular:

- The effect is analysed and followed in time providing a time-course effect of a compound
 - The effect is analysed according to different parameters and in a global cellular context
- Consequently, there will be more information on the effects of the compounds tested.

Main Advantages:

The company has a wide experience in Central Nervous System biology and, in addition to the screening capacities, the company is also able to develop customised study in the area of in vitro test on nervous cells and has a strong network of Excellence Centres with complementary competences such as in vivo evaluation providing to the company access to relevant animal models for various disorders of the nervous system and allowing to quickly validate the potentiality of compounds.

Current Stage of Development: Already on the market

Intellectual Property Rights: Secret know-how

New drug candidate for treatment of central nervous system affections

Reference: 05 FR RACA OCIM (Open)

Organization: Chambre Régionale de Commerce et d'Industrie Auvergne

Abstract:

A French SME has developed a family of peptides with very powerful neuroregenerative activities discovered following cellular screening. The different activities observed suggest a broad range of potential neurological applications that can't be cured today. Preliminary in vivo results with animal models of spinal cord injury have been obtained. They predict a strong potential of the peptides in the traumatic lesions of the nervous system in human. License, joint venture, commercial agreement.

Description:

Unlike lower vertebrates, human beings are unable to regenerate damaged or destroyed nerves in their Central Nervous System (CNS). Thus, severe injuries of the spinal cord and brain generally result in permanent disability. Treatment for these conditions is presently limited to haemodynamic support, steroids to reduce inflammation, and no cure is available today. A French company believes that its products have the potential for new or more effective treatments covering a wide range of acute and chronic degenerative CNS disorders, such as spinal cord injury (SCI), Parkinson's Disease, neuropathies, ataxia or stroke.

Innovative Aspects:

Particular patented peptides are candidate-drugs with very powerful neuroregenerative activities. These compounds, derived from a brain natural protein preserved throughout the evolution and involved in the development and the maintenance of the nervous system integrity, have been shown to act on neuritic outgrowth and neuronal survival.

Currently in preclinical stage, chemical optimisation studies of the peptidic sequence have been performed with the main objective to obtain a more stable and efficient product in order to prepare pharmaceutical development.

Main Advantages:

Following experiments on different neural cells, peptides have led to the prevention of cell mortality and spatial organisation or their differentiation. Particular effects have been observed for these peptides: they promote neural survival, neuritic outgrowth and their fasciculation. These different activities argue in favour of a therapeutic effect, particularly in spinal cord injuries. Preliminary results have been obtained on animal models with spinal cord injury, consisting of a hemi-transsection of the corticospinal tract made in adult rats. Microscopic examination has shown a stimulated re-growth of nerve fibres through the area of experimental injury in all animals treated whereas the absence of nerve fibres was observed in control animals. These confirmed that these peptides are able to induce axonal regeneration in vivo.

Current Stage of Development: Already on the market

Intellectual Property Rights: Patent(s) granted

New Procedure to Generate Transgenic Animals

Reference: 05 ES MAOT 0C2Z (Open)

Organization: OTT - Consejo Superior de Investigaciones Científicas (Madrid, Spain)

Abstract:

Two Spanish public research institutions have developed a new procedure to generate transgenic animals with exogen DNA sequence or transgenes of variable length. The main advantage of the invention is the generation of transgenic animals, from DNA constructs of variable size, more rapidly and efficiently. The institutions are interested in establishing license agreements with biotechnology companies having among their objectives or services offered the generation of transgenic animals.

Description:

This invention contributes with a method to obtain transgenic animals, for constructs with large DNA molecules (> 170 kb), preferentially yeast and mammalian artificial chromosomes. Briefly, this invention consists in the generation of transgenic embryos by co-microinjection, in unfertilised oocytes, of spermatozoa that have been previously bound to the transgenic DNA molecule. In this method, the inventors describe, for the first time, the specific fragmentation of both the membrane and DNA of spermatozoa, by using a freezing-thawing procedure, to increase the efficiency of transgene integration. The methodology of this invention can be applied to non-human mammals, though, conceptually, can also be applied to all animal species where fertilisation requires spermatozoa and oocytes, not only vertebrates but also invertebrates. With this methodology, here described, the research group achieved an increase in the efficiency of the integration of transgenics produced by spermatozoa injection, and they have produced, for the first time, transgenic animals that are capable of transmitting a 250 kb YAC (Yeast Artificial Chromosome) transgene to their progeny, producing a phenotype demonstrative of its entire integration.

Innovative Aspects:

The innovative aspects of the present Patent, with regard to similar documents are:

- 1.- Use of a new freezing method, probably producing micro breakages in the sperm DNA. For the first time the inventors show that breakage of not only of the membrane but also the sperm DNA increase the efficiency of transgene integration.
- 2.- Differences in co-incubating time with DNA and spermatozoa.
- 3.- Use of large Yeast Artificial Chromosomes (YACs) (not small molecules, plasmids or BACs - Bacterial Artificial Chromosome) to produce transgenics in combination with items 1 and 2. None of the previous patents have reported any experience with YACs.
- 4.- New type of microinjection pipettes with a specific diameter allowing the introduction of large DNA molecules without their breakage.
- 5.- The invention is the only system that selects spermatozoa that have suffered a more dramatic fragmentation (heads without tails, post thawing) to increase the transgenic efficiency.
- 6.- The system is the only available system that has produced transgenics with yeast artificial chromosomes > 250 kb by sperm injection, and has demonstrated, for the first time, its entire integration, stability, transmission to the progeny and production of the desired phenotype.

Main Advantages:

Generation of transgenic animals, from DNA constructs of variable size (including YACs, BACs, PACs-P1 derived artificial Chromosome- and MACs - Mammalian Artificial Chromosome) more rapidly and efficiently, in comparison to the standard pro-nuclear DNA microinjection.

Current Stage of Development: Development phase - Laboratory tested

Intellectual Property Rights: Patent(s) applied for but not yet granted



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New compounds for treatment of degenerative diseases

Reference: 05 ES MAOT 0C3B (Open)

Organization: OTT - Consejo Superior de Investigaciones Científicas (Madrid, Spain)

Abstract:

A Spanish public research centre has developed a series of biologically active compounds that can be interesting for the pharmaceutical industry. These compounds can be useful for treatment of degenerative diseases, especially neurodegenerative diseases, such as multiple sclerosis, Alzheimer and cerebral ischaemia. This group is searching for pharmaceutical companies that would be interested in financing and help with further research.

Description:

A Spanish research group has synthesised a variety of novel compounds that have been tested biologically, finding that they are highly powerful and selective inhibitors of the protein calpain. Calpain is a protein involved in a variety of physiological processes. Nevertheless the overactivation of calpain is involved in many patho-physiological processes that are related to cellular degeneration. This fact is especially striking on the neuron, and the overactivation of calpain is involved in aetiology and development of several neurodegenerative diseases, such as multiple sclerosis, Alzheimer, cerebral ischaemia, and several others.

Therefore, the use of selective inhibitors of calpain can be a therapeutically useful strategy for the treatment of such diseases. They have obtained compounds that are the most powerful and selective calpain inhibitors reported up to now.

Innovative Aspects:

Therapeutic applications of calpain inhibitors have not been developed by the pharmaceutical industry.

However, since calpain is involved in several important physiological processes, this enzyme can be an important therapeutic target for the treatment and prevention of different diseases, especially neurodegenerative diseases.

An advantage of selective inhibitors of calpain in neurodegeneration versus other therapeutic strategies (for instance, the antagonism of neurotransmitters, such as glutamate or NMDA - N-Methyl-D-Aspartate) is that it is expected to cause fewer side effects.

Main Advantages:

As indicated above, it is a novel strategy that has not been fully developed by the pharmaceutical industry, with a potential big market.

Another competitive advantage of this technology is based on the syntheses of the calpain inhibitors, which is easy, being some of its characteristics the following:

- 1) Short: less than three synthetic steps, although usually one step is enough.
- 2) Easy to perform at large scale.
- 3) High yield and selectivity.
- 4) Compounds are easily purified.

Current Stage of Development: Development phase - Laboratory tested

Intellectual Property Rights: Patent(s) applied for but not yet granted

Generic neurostimulator for VNS (Vagus Nerve Stimulation) and DBS (Deep Brain Stimulation) therapy

Reference: 05 BE WLGI OCJS (First Contact)

Organization: GIE-CEI Groupement d'Intérêt Economique des Centres d'Entreprises et d'Innovation de Wallonie (EIG-BIC)-CRIW (Belgium)

Abstract:

A Belgian SME has a large expertise in active implantable devices for human applications. The company is preparing the development of an innovative neurostimulator for therapy of epilepsy, depression, Parkinson and other related diseases. The SME is looking for a partner for joint venture to provide financial and technical assistance to complete the development and commercialisation of the technology.

Description:

A Belgian company develops innovative products in the field of neural technology mainly for the stimulation and the control of the nervous system. The company has a large expertise in applied biomedical technology, more specifically in the field of implantable medical devices such as neural stimulators and high-speed telemetry systems.

The company is now working in an innovative generic neurostimulator for VNS (Vagus Nerve Stimulation) and DBS (Deep Brain Stimulation) therapy. The product is the result of:

- Intensive scientific research at European level
 - A market analysis demonstrating the economical interest of the project
 - In addition to the fact of being generic, the product presents several technological advantages in comparison with other existing products.

The company is looking for a partner preferably with resources in implantable medical devices manufacturing (e.g. pacemakers, cochlear implants, etc.) for:

- Complementary funding of the project
- Participation to the development phase (2-3 years) mainly regarding the mechanical (e.g. implantable packaging and connectivity) and regulation aspects
- Industrialisation and production of the final product

Innovative Aspects:

Generic neurostimulator that could be used for several diseases (epilepsy, depression, Parkinson, etc.).

Main Advantages:

The product presents several technological advantages in comparison with other existing products (easy to install, comfortable for the patient).

Current Stage of Development: Development phase - Laboratory tested

Intellectual Property Rights: Patent(s) applied for but not yet granted, secret know how

Mobile biosignal data acquisition and processing system

Reference: 05 AT ATAP OCEA (First Contact)

Organization: APS - Verein zur Förderung der Europäischen Kooperationen in Forschungs- Entwicklungs- und Bildungsprogrammen (Austria)

Abstract:

An Austrian SME has developed a mobile biosignal acquisition and analysis system. The system can be used for bio signal recording. The key advantage is that it is fully battery supplied and works with a Pocket PC or notebook. Main application areas are neuroscience, cardiology, brain-computer interface communication, neuropsychology and neurophysiology. The device is certified as medical product. The company is looking for partners interested in commercial or technical co-operation agreements.

Description:

g.MOBIIlab - an Austrian company's portable bio signal acquisition and analysis system - is the perfect tool for recording multimodal biosignal data on a standard Pocket PC, PC or notebook. This allows investigating brain-, heart-, muscle-activity, eye movement, respiration, galvanic skin response, pulse and other body signals. The device is certified as medical product and can be used in humans and animals.

g.MOBIIlab comes with 4 EEG (Electroencephalogram)/EOG (Electrooculogram), 2 ECG (Electrocardiogram)/EMG (Electromyography) channels and 2 analogue inputs which can be utilised for other sensors. A switch can be connected for external triggering of the data. g.MOBIIlab is fully battery-supplied and operates up to 170 hours (i.e. about 1 week).

The system displays the acquired data on the screen for visual control and stores the data to a flash memory. Each channel is sampled with 256 Hz. Using a memory of 256 MB allows to acquire and store 8 channels of data for 17 h. With the 1 GB storage it is possible to record about 70 h of data.

In addition to the data acquisition module, g.MOBIIlab offers paradigms used in biofeedback applications based on EEG, EMG, respiration and GSR (Galvanic Skin Resistance) data. An increasing/decreasing balloon e.g. allows the direct feedback of the respiration. g.MOBIIlab features also brain-computer interface experiments.

An optional C++ Application Program Interface (API) allows setting up proprietary applications on a Pocket PC, PC or notebook. A plug in for the MATLAB (Matrix Laboratory) data acquisition toolbox is available to acquire and process data directly under MATLAB. A Simulink g.MOBIIlab driver block allows setting up real-time analysis by drag and drop.

g.MOBIIlab can also be remote controlled over a TCP/IP(Transmission Control Protocol/Internet Protocol) network. Just plug g.MOBIIlab to the company's Remote Control Unit and connect it to a standard network connection. g.MOBIIlab will be visible on every other PC in the network and can be used as connected to the user's own PC.

g.MOBIIlab works with a standard serial interface or USB (Universal serial Bus) interface of the common computer.

Innovative Aspects:

g.MOBIIlab is fully portable and can be used with a Pocket PC or normal notebook.

The full driver support for C++, MATLAB and Simulink allows to easily realising own on-line and real-time analysis within a very short time frame. The total development environment speeds up the development cycle significantly. Especially Simulink allows building complicated real-time analysis models within hours.

Main Advantages:

- Acquire EEG, ECG, EOG, EMG, GSR, pulse and respiration simultaneously on a standard Pocket PC, PC or notebook
- On-line visualisation and storage of up to 8 channels
- Transmit the acquired data with GSM or WLAN (Wireless Local Area Network) to the hospital
- Allows real-time analysis under MATLAB and/or Simulink
- Biofeedback applications supported
- Brain computer interface supported



Rehabilitation device for patients with mobility impairment and walking disability

Reference: 05 FR IFAN 0BYQ (Open)

Organization: Agence Nationale de Valorisation de la Recherche - Ile de France

Abstract:

A French inventor has developed a rehabilitation patented device that combines an anti-fall system, a body weight support system and a treadmill. The inventor is looking for a license agreement and/or manufacturing agreement and a partner with financial resources, who wants to implement the technology in industry.

Description:

In a rehabilitation unit, the patients with mobility impairments and walking disabilities, especially of neurological origin, can use the treadmill with a body weight support system to start walking again. The patient wears a harness connected to a body weight support system to compensate for problems with balance and mobility and to avoid falling. These classical devices are bulky and cumbersome. The invention proposed is a device that combines an anti-fall system, a body weight support and a treadmill, its height is no higher than the patient's chest, and it is less voluminous than the classical systems found in the rehabilitation units. When a patient practices walking on this new device, as well as with the classical device, he is well secured and sure not to fall; the treadmill insures an intensive and programmed walk with regular footsteps.

Innovative Aspects:

At present, the classical devices combining a body weight support system and a treadmill take up a lot of space and means that their use at home is impractical and, because of this, they are only found in hospitals. The particularity of this invention is its reduced volume by the innovating addition of a new trunk support system and a new anti-fall system. Thanks to its reduced size this new device may be used at home and not only in a hospital unit.

Main Advantages:

Most patients do not walk enough when they return home because they can't walk alone in the street and because the space at home is not large enough to practice walking. Due to its reduced size, the device can be installed at home or in a physiotherapy room. With this device at home the patients can exercise without having to face the complications of having to go to and fro to a hospital or clinic. The treadmill insures an intensive and programmed walk with regular footsteps. On a long-term basis, this home treadmill rehabilitation would improve walking and physical fitness. With this new device, the patient can practice walking rehabilitation at home, alone or with a member of his family or with a physiotherapist who keeps regular surveillance. The patient can exercise as much as he wants without a time schedule. With this motivation he can carry out his rehabilitation easily, and though alone, will have no fear of falling. Rehabilitation is consequently easy to understand and motivating, the patient can practice with the device as much as he wishes without the constraints of a fixed timetable, in short the patient is in control of the process of his



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own physical rehabilitation. The improvement to the quality of movement in the patient's walk, his balance, his physical fitness and self-determination could have a positive impact on his quality of life. The potential market is bigger than the one open to the current devices that can only be used in hospital rehabilitation services; it is of relevance to elderly patients who are unable to walk due to a neurological or other disorder.

Current Stage of Development: Available for demonstration - field tested
Intellectual Property Rights: Patent(s) applied for but not yet granted



Centre Relais Innovation
Suisse Ouest / France
Rhône-Alpes - Auvergne

Novel Diagnostic Method for Idiopathic Generalized Epilepsy (IGE)

Reference: IMG-FHG023 (Open)

Organization: IMG Innovations-Management GmbH (Germany)

Abstract:

Scientists integrated in the National Genome Research Network (NGFN) at a German university have developed a novel diagnostic method for idiopathic generalized epilepsy. The corresponding Technology Transfer Agency TT-NGFN offers the invention. The invention allows to diagnose special kinds of epilepsy in human body fluids. This diagnostic method is much more convenient for the patient than common method. The university is looking for licensees and / or co-operation partners.

Description:

Epilepsy is one of the most frequent neurological diseases affecting about 3% of the population world-wide. One form of epilepsy is the idiopathic generalized epilepsy.

No single epilepsy gene whose mutations are associated with the entire spectrum of common IGE subtypes has been identified to date.

One of the candidate genes is CLCN2 which encodes the voltage-gated chloride channel CIC-2 (CIC-2 is strongly expressed in brain, in particular in γ -aminobutyric acid (GABA)-inhibited neurons). Several experimental results suggest an important role of this channel in establishing and maintaining a low intracellular chloride concentration, which is necessary for an inhibiting GABA response.

The invention utilizes the fact that three defined CLCN2 mutations are associated with the entire spectrum of common subtypes of idiopathic generalized epilepsy. Each mutation causes functional alterations that can explain neuronal hyperexcitability and the occurrence of epileptic seizures. The inventors, which work for a long time in the field of epilepsy and neurological disorders, show that CLCN2 is a disease gene for IGE. Thus, the invention enables the diagnosis of IGE and its subtypes.

Innovative Aspects:

The common diagnostic method by epilepsy are long and not convenient for the patient. Also, the diagnostic statement is often not clear.

For the novel diagnostic method only a blood sample is required. The invention takes the advantage of the correlation between the mutation and the specifically subtype of IGE.

Main Advantages:

A novel, fast, simple, one-step diagnosis for IGE.

The method is more economic than common methods.

Current Stage of Development: Development phase - Laboratory tested

Intellectual Property Rights: Patent(s) applied for but not yet granted

Neuro-electronic hybrids for drug screening

Reference: 05 ES CACI 0C0B (Open)

Organization: Centre d'Innovació i Desenvolupament Empresarial (Spain)

Abstract:

A Catalan research group has developed neuro-electronic hybrids for drug screening. They provide a system-level tool for evaluation of drugs prior to or in place of animal experimentation. The group is looking for partners interested in licensing the technology.

Description:

Neuro-electronic hybrids are devices capable of long-term (weeks to months) monitoring of activity in all neurons forming a cultured neuronal network as it develops, reacts to injury, becomes pathological or responds to potentially therapeutic drugs. This is a major improvement with respect to single-neuron or traditional multi-unit physiology tools, which are inadequate to monitor neuronal activity in complete networks, making difficult the prediction of drug effects at network level.

Moreover, neuro-electronic hybrids avoid animal experimentation altogether, in line with EU directives. From dissociated tissue, neurons are plated within neuro-electronic hybrids, which constrain network topology by means of polymeric microstructures. Subsequently, extra-cellular potentials are monitored by substrate-integrated electrodes, so that electrical access to all neurons for drug testing is feasible.

The research group from a Catalan university who proposes the technology has extensive experience in multi-channel electrophysiology technologies, particularly involving the use of micro-fabricated sensors for study of activity in cultured neuronal networks.

Innovative Aspects:

Traditionally, the initial phases of drug screening for neuropathologies have relied heavily on electrophysiology or dye-based optical technologies at the single-cell level. Candidate drugs are often identified by their specific effects on a specific membrane channel. Unfortunately, the impact of a drug at system level, i.e. when used on humans or animals and, therefore, involving large aggregates of neurons, is often difficult to predict from single-cell studies and frequently results in drugs deemed useful at single neuron level but dropped later due to opposite, complex or adverse side effects. Animal experimentation has been used extensively to identify drugs with desirable effects at system level. However, cost, ethical issues and increasingly restrictive EU legislation make an alternative approach desirable. Neuro-electronic hybrids offer a middle ground where system (network)-level drug effects can be explored beyond single-cell studies, by reconstructing simple networks in vitro within microchips to serve as non-living model systems, in this way avoiding or minimising animal experimentation.

Main Advantages:

Neuro-electronic hybrids offer a

- 1.- low-cost
- 2.- system-level (as opposite to single-cell) tool for evaluation of drugs prior to or in place of animal experimentation
- 3.- reduction or even replacement of animal experimentation

Current Stage of Development: Development phase - Laboratory tested

Intellectual Property Rights: Patent(s) applied for but not yet granted

Highest-accuracy biosignal data acquisition and processing system

Reference: 05 AT ATAP OBYM (Open)

Organization: APS - Verein zur Förderung der Europäischen Kooperationen in Forschungs- Entwicklungs- und Bildungsprogrammen (Austria)

Abstract:

An Austrian company has developed a very flexible biosignal acquisition and analysis system. The system allows investigating brain, heart, muscle activity, eye movement, respiration, galvanic skin response and other body signals. The key advantage is that it is based on MATLAB (MATrix LABORatory) and therefore can easily be adapted to new applications. The device is certified as medical product and can be used in humans and animals. Partners are sought for commercial or technical cooperation.

Description:

g.USBamp - an Austrian company's latest 24-bit biosignal acquisition device - is the perfect tool for recording multimodal biosignal data with highest quality. This allows investigating brain, muscle activity, eye movement, respiration, galvanic skin response and other body signals. It can also be used for recordings made directly on the brain (EcoG: Electrocorticogram) and heart. g.USBamp is USB 2.0 (Universal Serial Bus)-enabled and comes with 16 simultaneous sampled biosignal channels and 2 analogue output channels. A total of 4 independent grounds guarantee no interference between the recorded signals. The amplifier is simply connected to the USB socket on a PC/Notebook and can immediately be used for data recording. It is possible to build a multi-channel system using multiple g.USBamp devices. The amplifier has an input range of ± 250 mV (milliVolt), which allows digital filtering of the biosignal data without saturation. Each of the 16 analogue-to-digital converters is operating at 2.4675 MHz (Megahertz). An oversampling of 64 times yields the internal sampling rate of 38400 Hz (Hertz) per channel. A powerful floating-point Digital Signal Processor performs in addition oversampling and real-time filtering of the biosignal data (between 0 Hz – 2400 Hz). Therefore, a typical sampling frequency of 256 Hz yields to an oversampling rate of 9600. Hence, a very high signal to noise ratio is obtained especially needed in the recording of evoked potentials in Electroencephalogram (EEG) or in identifying small amplitude changes in high-resolution Electrocardiogram (ECG) recordings. Additionally the device has an internal calibration unit and a unit for measuring electrode impedance. The system can be used in humans and animals.

g.USBamp is available with three different device driver options: (i) C++ (programming language) Application Program Interface (API) for the development of custom acquisition and analysis software, (ii) MATLAB (MATrix LABORatory) API for data acquisition and analysis under MATLAB, (iii) High Speed Simulink driver block for real-time signal processing applications.

Innovative Aspects:

The full driver support for C++, MATLAB and Simulink allows easily realising own on-line and real-time analysis within a very short time frame. The total development environment speeds up the development cycle significantly. Especially Simulink allows building complicated real-time analysis models within hours.

Main Advantages:

- CE (Communauté Européenne) certified medical device for use in humans according to medical normative EN 60601-1
- EEG, ECoG, ECG, and EMG (Electromyography) recording via USB
- 16 analogue inputs with 24 Bit and a sampling frequency of up to 4800 Hz per channel
- Digital filtering of the biosignal data
- Over-sampling to achieve a high signal-to-noise ratio
- Simultaneous sample and hold for all channels



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- Direct connection of electrodes with standard safety connectors or system connectors for a very fast electrode application
- Can be used for recordings directly on the brain (ECoG) or heart (CF-system)

Current Stage of Development: Already on the market

Intellectual Property Rights: Patent(s) applied for but not yet granted



Centre Relais Innovation
Suisse Ouest / France
Rhône-Alpes - Auvergne

Know-how related to experimental models of neurotoxicology and psychopathology

Reference: SEIRC-TO46 (Open)

Organization: Centro de Innovación y Transferencia de Tecnología de Andalucía S.A.U. (Spain)

Abstract:

An Andalusian research group has developed a technology that combines different animal models (anxiety, impulsivity, locomotor activity, memory, reward...) that can be used to test the neurotoxicological effects of chemical agents from a perspective of cerebral systems. The best advantage is that the group knows the best methodology to test neurotoxicological effects on the short and long term, and a few of them have been tested with toxic substances. They are looking for technical co-operation.

Description:

An Andalusian research group has developed a technology that combines different animal models that allows, under the frame of a System Neuroscience perspective as a principal advantage, to test the neurotoxicological potential of chemical agents in several animal models with the best methodology for short and long term effects. The toxicant neurobehavioral effects induced by the chemicals, that is, specific altered behaviours, would be indicative of specific cerebral regions targeted by the compounds. The same substance can be tested by all the models, offering an entire picture of the neurotoxicological effects in emotion and cognition and consequently, pointing to specific cerebral systems insulted by the compound:

- Models of anxiety (elevated plus-maze, elevated T-maze): measuring the time spent by rats in open arms (aversive) versus closed arms.
- Models of impulsivity-hyperactivity (obsessive - compulsive disorder): schedule-induced polydipsia is a kind of excessive behaviour, rats drink large amounts of water when they are presented food intermittently.
- Models of memory (water-maze, radial maze, T-maze): measuring spatial memory.
- Models of reward (alcohol intake) (conditioned place preference): measuring the time spent in a place conditioned with food or drug.
- Drug-discrimination operant task: in Skinner boxes it is possible to test if a drug or toxic have stimulate properties similar or opposite to another substance. Cognitive processes can be simulated through different phenomena (latent inhibition, spatial delayed alternation, etc.) in Skinner boxes.

Innovative Aspects:

The research group knows how to test subtle cognitive and emotional alterations in animals after acute or chronic toxic exposure. They can test subtle cognitive and emotional disorders as a consequence of acute and chronic toxic exposure. The experimental approach employed with that models, resembling that used with lesion models, allows to the experimenter to specifically predict which cerebral systems have been damaged. Schedule-induced polydipsia as a model of obsessive-compulsive disorders.

Main Advantages:

It is the first time that all these models have been used together to test neurotoxic substances. The research group knows the best methodology to test neurotoxicological effects on the short and long term, and a few of them have been tested with toxic substances and they offer the possibility to test several models with the same substance.

Current Stage of Development: Development phase - Laboratory tested

Intellectual Property Rights: Others No intellectual property rights