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Technology Transfer in Leiden

Facilitating effective access to the research base

Leiden University / Leiden University Medical Centre (LUMC)

Technologies available for licensing **January 2012**

Contents

Universiteit Leiden
The Netherlands

Leiden University. The university to discover.

Therapies:

Novel opportunity

Method for detoxifying the gluten protein gliadin (ref. MC195)

Scientists from the Leiden University Medical Center and Wageningen University have identified a single and identical amino acid substitution that completely eliminates the toxic properties of all three 9-amino acid sequences of alpha-gliadin, which is part of the gluten protein.
This provides an opportunity to generate modified alpha-gliadins which can aid to produce baked goods which would be safe for consumption by celiac disease patients while maintaining the industrial quality associated with gluten molecules.

Celiac disease – Gluten - Alpha Gliadin - Gluten free foods

Novel opportunity

Inhibition of TGF-beta/myostatin receptor signalling by AON-mediated exon skipping (ref. MC263)

Scientists at the Leiden University Medical Center have developed antisense oligonucleotides (AONs) that disrupt the part encoding for ligand binding or kinase domain in ALK4 or ALK5, generating non-functional receptors, and abrogate TGF-beta/myostatin signaling.

Antisense Oligonucleotides (AON) - Exon skipping - Acvr1b - Tgfbr1

Application of AON mediated exon skipping in the treatment of Rheumatioid Arthritis (ref. MC210)

Scientists at the Leiden University Medical Center have designed two types of AONs for the treatment of inflammatory diseases. One is able to specifically decrease the levels of C5a and the second is able to increase the levels of sIL-1RAcP.

Rheumatoid arthritis - Exon-skipping - C5 - IL-1RAcP

New approach for AON-mediated exon skipping in neurodegenerative diseases (ref. MC238)

Researchers at the Leiden University Medical Center have now developed a new approach for antisense oligonucleotide(AON)-mediated exon skipping in neurodegenerative diseases. This method allows the removal of exons causing the neurodegeneration. The AONs are readily taken up by cells in the brain and cannot cross the blood brain barrier, thus reducing greatly the chances of unwanted side-effects.

Exon skipping – Neurodegeneration therapeutics – Proteolytic cleavage

New myeloperoxidase (MPO) inhibitor identified (ref. MC243)

Scientists at the Leiden University Medical Center have recently identified a peptide that interacts with human MPO and inhibits its enzymatic activity. This specific inhibitor binds to MPO with a high affinity. It has also already been shown to be safe in humans, which makes the compound very interesting for clinical applications.

Therapeutics – Cardiovascular – Inflammatory – Neurodegenerative - Kidney disease Immune-mediated disease

Novel prodrug for tumor treatment with minimized side effects (ref. LU261)

Scientists at Leiden University are developing new ruthenium-based photoactivatable prodrugs, which can be converted upon visible light irradiation into species active against cancer cells. Like in photodynamic therapy, such prodrugs can be used as poorly toxic antitumor treatments capable of stopping tumour growth of inducing tumour regression when light is irradiated on the tumour, which will ultimately minimize side effects for cancer patients.

Anti-Cancer Treatment– Phototherapy

Drug candidate for autoimmune diseases or cardiac ischemic conditions (ref. LU199)

Researchers from Leiden University have identified a new allosteric enhancer for the adenosine receptor A3 which increases significantly the intrinsic efficacy and potency of adenosine agonist thus a good drug candidate for ischemic damages and inflammation

Lead compound – Cardiovascular – Inflammatory diseases

New human polyomavirus identified (ref. MC209)

Researchers at the Leiden University Medical Center have now succeeded in the isolation, characterisation and identification of a new polyomavirus, causing a rare skin disease. Since several polyomaviruses have already been identified as tumour-causing viruses, the scientists acknowledge the chance that certain cancers could be caused by this new virus.

Target – Cancer

The development of therapeutics for CADASIL patients. (ref. MC142)

Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy (CADASIL) is a condition causing ischemic brain lesions, which gradually leads to cognitive decline and eventually to dementia. Currently there is no treatment available for this disease. A new lead to develop gene therapeutic strategies for CADASIL patients has now been found.

Gene therapy – Mental health disorders

Polypeptide Block Copolymers and Polymersomes (ref. LU212)

A class of novel amphiphilic polypeptide block copolymers has been developed. The copolymers self-assemble into polymersomes which can be used as targeted drug delivery vehicles.

Drug delivery – Vaccine

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Skin barrier repair/Wound healing (ref. LU184)

A novel biofilm with superior skin barrier repair and skin hydration properties has been developed. This synthetic biofilm is based on a naturally occurring biofilm (Vernix Caseosa) that covers the fetus during development protecting its skin.

Wound healing – Drug delivery – Skin disorders – Cosmetics

Drug discovery:

High throughput 3D cell culture assay (ref. LU286)

Researchers at Leiden University have found a novel 3-dimensional cell culture assay that is highly suited for the study of cell behaviour and high throughput drug screening or other in vitro cell culture systems. Currently, it is used for cancer research.

Compound/drug screening, tissue engineering and anti-cancer research

Novel reporter assays for genotoxicity and oxidative stress (ref. LU255)

Scientists at the Leiden University Medical Center and Leiden University have now identified genes that can serve as biomarkers for exposure to genotoxic or oxidative stress. Fluorescent reporters based on these biomarker genes were incorporated into highly sensitive mouse embryonic stem (mES) cells, which can be used as a high throughput toxicity assay in early stages of drug development.

Assay – Drug screening – Genotoxicity- Oxidative stress

Novel Tray Design Allowing Automated Single Cell Microinjection (ref. LU257)

A highly effective, automated method for targeted, uniform and controllable microinjection of cells and zebrafish embryos without the need for optical guidance has been developed. This novel approach provides faster turn around times and a greater success rate than devices currently on sale.

Device – Drug discovery

New model, expressing human Fc receptors, to test the efficacy of therapeutic antibodies (ref. MC223)

Scientists at the Leiden University Medical Center have developed two new mouse models, which, when crossed, will generate a mouse model with human FcR in the absence of mouse FcR. ('Humanized mouse'). The scientists are looking for a commercial partner to develop the desired mouse model to be able to study the effects of therapeutic antibodies in the human body.

In vivo model – Immunotherapy

Mouse models available for Polycystic Kidney Disease (PKD) (ref. MC201)

Scientists at the Leiden University Medical Center have now generated two separate mouse models, based on the genetic defects as seen in PKD patients, in combination showing all the subsequent phases of disease progression.

In vivo model – Renal disorders

Diagnostics:

Genetic biomarkers predict susceptibility and treatment efficacy to depression (ref. LU247)

Researchers at Leiden University have identified common functional variants in the mineralocorticoid receptor (MR) gene that predict susceptibility to depression and efficacy of antidepressant treatment.

Diagnostics – Depression – Anxiety - Drug development

New specific genetic markers identified for hypervirulent Clostridium difficile PCR ribotypes (ref. MC267)

In the past decade, the incidence, complications and mortality of Clostridium difficile associated infection (CDI) have increased dramatically due to the emergence of the hypervirulent strains PCR ribotype 027 and PCR ribotype 078. Researchers in the Leiden University Medical Center now identified unique and very specific loci in the PCR ribotypes 027 and 078. They already developed a very specific PCR based on these inserts and are now looking for an industrial company to further develop and market the diagnostic tests.

Diagnostics - Bacterial Infections - PCR

New diagnostic assay to predict risk, progression and response to treatment in Rheumatoid Arthritis (ref. MC247)

Researchers at the Leiden University Medical Center (LUMC) have established a novel diagnostic method which involves determining levels of antibodies directed against a specific group of proteins in sera or synovial fluids of RA patients.

Diagnostics - Rheumatoid Arthritis – Biomarkers – Antibodies - ACPA

Antibody test for the diagnosis of Small Cell Lung Cancer (SCLC) (ref. MC145)

Scientists have succeeded to produce a number of tumour specific proteins in an E.coli expression system that can be used in an antibody test for the diagnosis of Small Cell Lung Cancer (SCLC).

Assay – Protein – Cancer – Respiratory disorders

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Medical Devices:

Coating of microneedles (ref. LU312)

Scientists at the Leiden University have recently developed a new coating and releasing application for the microneedles. The coating of the microneedles is a homogeneous, controlled reaction with high efficiency and reproducibility.

Chemical Adhesion Coating – Microneedles – Electrostatic Interaction – Surface Charge – Drug delivery

Pressure sensor for use in an artery (ref. MC004)

The invention includes an in vivo wireless pressure sensor for measuring the pressure within the aneurismal sac. The data can be stored in the transponder allowing data to be taken from the pressure sensor over a prolonged period of time.

Monitoring device – Diagnostics – Cardiovascular disorders

Other Devices:

Dynamic and re-usable surface enhanced RAMAN scattering sensor (ref. LU256)

Scientists at Leiden University have developed a novel Surface Enhanced Raman Spectroscopy (SERS) Sensor which they have named SERSOR. This SERS-based sensor allows for dynamical and re-usable measurements and can be used with standard RAMAN equipment.

Spectroscopy – Raman - Sensor Technology – Chemistry - Life Science - Inline monitoring

Novel Instrument for Positioning and Manipulation on Nanoscales (ref. LU211)

A novel NanoManipulator device that can position very small objects with great accuracy has been developed. The instrument is ideally suited to manipulate and position nanostructures in real-time under a scanning electron microscope.

Device – Nanotechnology - Microscopy

High Precision Electric Motor Based on the Reverse Piezoelectric Effect (ref. LU232)

A novel compact Piezoelectric Motor compatible in magnetic and ultra high vacuum environments has been invented. The device is capable of sub-nanometre resolution within a range of several millimetres, while eliminating all undesired movement.

Device – Nanotechnology

Extreme radiation and temperature resistant electronic amplifier (ref. LU121)

A novel MEMS (micro-electromechanical systems) based amplifier has been developed by scientists at Leiden University. The amplifier is free of semiconductor-based electronics and is therefore very suitable for use in extreme temperature and high ionizing radiation environments.

Device – Telecommunication – Electronics - MEMS

Chemicals / Materials:

Novel opportunity

Natural ionic liquids and deep eutectic solvents (ref. LU267)

Researchers from Leiden and Delft University have identified novel natural ionic liquids and deep eutectic solvents (NADES). Solvents based on NADES technology have unique properties which makes them applicable in numerous industrial processes and products. Possible applications range from drug delivery and enzyme stabilization, to extraction and storage of novel compounds that were previously not extractable from e.g. natural sources. NADES technology may replace synthetic and classical solvents, some of which are known to be toxic.

Natural products - Drug delivery

Novel opportunity

Micro-scale purification and enrichment of IgG glycopeptides with cotton microtips (ref. MC256)

Scientists from Leiden University Medical Center have developed novel methodologies for purification and enrichment of IgG glycopeptides. They introduce the use of cotton wool for the preparation of filter-free HILIC SPE microtips.

Chemistry – Methodology - Mass spectrometry – Glycans - purification.

Pentose transporters – increasing C5 (arabinose and xylose) transport (ref. LU250)

Researchers from Leiden and Utrecht University have identified specific L-arabinose and D-xylose transporters from Aspergillus niger. Such transporters are able to increase pentose uptake in micro-organisms for increased fermentation, protein production, or bio-ethanol production.

Chemical –Oil – Agriculture - Bio-Fuel

Production of highly concentrated tuliposide from natural sources (ref. LU269)

Researchers from the Natural Products Laboratory (NPL) at Leiden University together with Wageningen University have identified a novel way of obtaining highly concentrated 6-Tuliposide B from a natural source. The NPL in Leiden is a unique facility bringing together expertise in natural products research, traditional medicine, plant metabolomics, quality control of medicinal plants, phytochemistry and state-of-the-art characterization of secondary metabolites on both analytical and preparative scale.

Tulips – Tuliposide – Tulipalins – Gummosis – Synthetic Intermediates – Antibacterial – Antifungal

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Electrochemical process to prepare metal nanoparticles or metal oxide nanoparticles (ref. LU280)

Scientists at Leiden University have developed a simple, efficient, robust, cheap and fast method of producing nanoparticles of a wide variety of metals with high catalytic activity. It creates small, clean, highly pure and active nanoparticles that are directly usable as catalysts.

Catalyst – Metal Nanoparticles – Alloys – Electrochemical process

New method for producing bright-fluorescent gold nanoparticles (ref. LU285)

Scientists at Leiden University found the way to produce gold nanoparticles (<60nm diameter) showing bright and long lasting fluorescence. These nanoparticles can be used as durable and non-toxic labels compatible with biological labelling.

Nanoparticles – Gold – Fluorescence – Label

New highly efficient Water Oxidation Catalyst (ref. LU291)

Researchers at Leiden University have developed a simple and robust water oxidation catalyst which shows, in a wide range of pH conditions, outstanding turnover performances (orders of magnitude greater than the best results published so far in the literature), while working at a low overpotential.

Catalyst – Water oxidation– Hydrogen productions – Artificial leaf

Computer science:

Fingertip-Based Universal Tactile I/O Device for Interactive Surfaces (ref. LU270)

A novel input/output interface, named Cyclotactor, has been developed at Leiden University. The Cyclotactor technology can extend an arbitrary device surface with a freely programmable force field, instantiated in the open space outside and above the surface. This invisible but powerful and interactive force field can then be explored and manipulated using a small fingertip attachment.

Human-machine interface – Haptic interface– Tactile interface – (Programmable) tactile I/O – Musical controller – Haptic surface component

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