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# ULg

# OPPORTUNITIES AGROFOOD

## Licensing opportunities

| | |
|---|---|
| **Title :** | Cold-active b-galactosidase |
| **Institution :** | Université de Liège |
| **Field :** | Agrofood<br>Other applications |
| **Keywords :** | Biotech, β-galactosidase, enzyme, dairy, lactose intolerance, lactose |
| **Description :** | A cold-active β-galactosidase has been purified from a strain of a psychrophilic bacterium. This cold-active enzyme enables hydrolysis of lactose at low temperature, therefore preventing the proliferation of bacteria. The gene which encodes for a polypeptide showing the biological activity of this cold β-galactosidase has been sequenced and subsequently cloned. At 25°C, the level of turnover (kcat) of cold-active β-galactosidase towards lactose is 15X higher than that of E. coli β-galactosidase. This β-galactosidase is specific for lactose, is active between 0°C and 30°C at a pH range from 6 to 10, in presence of calcium and/or galactose and is inactivated at pasteurization temperature. Recently, this cold β-galactosidase has been expressed in a mesophilic host in order to enable efficient scale-up of production of the enzyme. |
| **Potential applications and advantages :** | The ability of β-galactosidase to hydrolyse lactose into galactose and glucose is applied in food (human and pet-food) industry, particularly in the field of dairy products in nutrition (lactose-intolerant populations, increased sweetness, flavours enhancement, bakery, prevention of crystallization in ice cream, reduced processing time in fermented milk products), and diagnostic (reagent) and environment (lactose pollution). |
| **Patent :** | Biotech, β-galactosidase, enzyme, dairy, lactose intolerance, lactose |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | ULg 1999-10 |
| **Contact name :** | Antheunis Nicole N.Antheunis@ulg.ac.be |

## Licensing opportunities

**Title :** PCR method for sensitive environmental, human and agro-food diagnostics

**Institution :** Université de Liège

**Field :** Agrofood
Environment
Health

**Keywords :** RT-PCR, immuno-PCR, marker

**Description :** A method has been developed using real time PCR to detect microbiological entities, particular elements or target molecule. The detection method comprises a step which consists in fixing an entity A directly or via a capture agent to one or several surface(s) inside the receptacle(s) of a real time PCR measuring apparatus, a second step which consists in associating with said element A a coupling system with nucleic acid, for example a DNA marker, and finally a further step which consists in amplifying the marker nucleic acid. Successive quantitative measurements are carried out during the exponential phase of the amplification, in the presence of a capture agent and other optional intermediate fixing agents.

**Potential applications and advantages :** The method allows the sensitive detection and quantification of antigenic elements through quantitative immuno-PCR and is even applicable when the antigenic molecules are isolated from complex matrixes. The method can also be applied to study ligand systems, it allows the titration of a free ligand through the use of a labelled ligand (coupled to a DNA marker) by its capture on a specific binding molecule. In general, the method allows the detection of proteins, carbohydrates, hormones, bacteria, organic components, aromatic compounds, infectious agents, etc and has therefore many potential applications in the environmental, the human and the agro-food diagnostic fields.

**Patent :** EP 1232283 B1

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ULg 1999-05

**Contact name :** Houbrechts Annick a.houbrechts@ulg.ac.be

# ULg

# OPPORTUNITIES ELECTRONIC

## Licensing opportunities

**Title :** Electrografting method for forming and regulating a strong adherent nanostructuerd polymer coating

**Institution :** Université de Liège

**Field :** Electronic

**Keywords :** Electrografting, strongly adherent coating, electro conductive surface, nanometre and micrometre scale.

**Description :** Electrografting methods for forming a polymer coating are known in the art. This patented technology relates to novel process for forming and regulating a strongly adherent nanostructured polymer coating onto an electro-conductive surface. This method is comprising a step of nuclei deposition at a conductive surface regulating its surface profile and the polymeric coating properties before, during or resulting from electrografting.

This technology offers wide opportunities for applications concerning functional polymers, peptides, proteins, oligonucleotides, dyes, drugs, anti-bacterial compounds grafted from or onto the electrografted primer in a very simple and rapid process.

Contrary to the older technologies which used organic solvent, these is cheaper and less toxic for the environment. Furthermore, in the presence of such protic compounds, the formation of a strongly adherent polymer is impossible, that this method has solved. An other advantages that present this method is the regulation of several properties of the conductive surface profile such as the roughness.

**Potential applications and advantages :** The nanostructured polymer coating are widely used in different applications. Especially for :

- medical device
- biosensor
- coating and particularly antibacterial coating
- automobile sector
- micro electronics : sensors, biochips, micro fluidics

**Patent :** PCT filing under prosecution (WO/2007/090779).

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** 2005-13

**Contact name :** Antheunis Nicole N.Antheunis@ulg.ac.be

# ULg

# OPPORTUNITIES ENERGY

## Licensing opportunities

| | |
|---|---|
| **Title :** | Strongly adherent polymer coating onto electrically conductive surface |
| **Institution :** | Université de Liège |
| **Field :** | Energy |
| **Keywords :** | Polymers, strongly adherent coating, conductive surface, electrochemical grafting. |
| **Description :** | The technology relates to a method for depositing a strong adherent polymer coating onto an electrically conductive or semi-conductive surface by electrografting. According to such technology, a variety of compounds (functional polymers, peptides, proteins, oligonucleotides, dyes, drugs, anti-bacterial compounds) can be grafted "from" or "onto" the electrografted primer. |
| **Potential applications and advantages :** | Medical implants (such as stents), biosensors, barrier coatings, anti-scratching coatings, packaging, automotive (protection against corrosion…) special coatings (hydrophobic, hydrophilic, antibacterial). |
| **Patent :** | US, EP, JP pending (WO 02/098926) |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | 2002-12 |
| **Contact name :** | Antheunis Nicole N.Antheunis@ulg.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Uniform Ilumination devices and fan-out generator |
| **Institution :** | Université de Liège |
| **Field :** | Energy |
| **Keywords :** | Illumination device, micro-prism, guiding plate, fan-out, beam splitting |
| **Description :** | The present invention deals with illumination devices comprising an array of reflecting micro-prisms located inside the panel. Partial light extraction is performed by the micro-prism surfaces. This new concept is particularly advantageous since the light propagation is not perturbed by the micro-prism structure and the device can operate under white light illumination without restriction. This new concept is applicable to fan out generator and to uniform illumination devices. |
| **Potential applications and advantages :** | --- |
| **Patent :** | Illumination device, micro-prism, guiding plate, fan-out, beam splitting |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | 1999-02 |
| **Contact name :** | Antheunis Nicole N.Antheunis@ulg.ac.be |

# ULg

# OPPORTUNITIES ENVIRONMENT

## Licensing opportunities

**Title :** PCR method for sensitive environmental, human and agro-food diagnostics

**Institution :** Université de Liège

**Field :** Agrofood
Environment
Health

**Keywords :** RT-PCR, immuno-PCR, marker

**Description :** A method has been developed using real time PCR to detect microbiological entities, particular elements or target molecule. The detection method comprises a step which consists in fixing an entity A directly or via a capture agent to one or several surface(s) inside the receptacle(s) of a real time PCR measuring apparatus, a second step which consists in associating with said element A a coupling system with nucleic acid, for example a DNA marker, and finally a further step which consists in amplifying the marker nucleic acid. Successive quantitative measurements are carried out during the exponential phase of the amplification, in the presence of a capture agent and other optional intermediate fixing agents.

**Potential applications and advantages :** The method allows the sensitive detection and quantification of antigenic elements through quantitative immuno-PCR and is even applicable when the antigenic molecules are isolated from complex matrixes. The method can also be applied to study ligand systems, it allows the titration of a free ligand through the use of a labelled ligand (coupled to a DNA marker) by its capture on a specific binding molecule. In general, the method allows the detection of proteins, carbohydrates, hormones, bacteria, organic components, aromatic compounds, infectious agents, etc and has therefore many potential applications in the environmental, the human and the agro-food diagnostic fields.

**Patent :** EP 1232283 B1

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ULg 1999-05

**Contact name :** Houbrechts Annick a.houbrechts@ulg.ac.be

## Licensing opportunities

| | |
|---|---|
| **Title :** | Short antiangiogenic peptides derived from the Prolactin/Growth hormone family |
| **Institution :** | Université de Liège |
| **Field :** | Environment |
| **Keywords :** | Angiogenesis, cancer, diabetic retinopathy, tilted peptide. |
| **Description :** | Antiangiogenic therapy appears as a promising approach for treating many pathologies i.e. cancer, diabetic retinopathy, age-related macular degeneration, rheumatoid arthritis, etc.<br><br>We have previously identified N-terminal 16K fragments of the human prolactin/growth hormone family as potential angiogenesis inhibitors. In particular, 16K prolactin has been shown to prevent tumor growth (prostate, colon...) and retinopathy in mouse models. 16K prolactin-isolated peptide inhibits angiogenesis both in vitro and in vivo. Later, in collaboration with the University Faculty of Gembloux, structurally-related peptides, comprising 11 to 40 amino acids and based on a tilted peptide structure, have been identified as angiogenic inhibitors. Experimental tumor studies are underway.<br><br>The present invention refers to a pharmaceutical composition comprising such an isolated antiangiogenic peptide or a recombinant protein comprising the antiangiogenic peptide. |
| **Potential applications and advantages :** | Treatment of angiogenesis related diseases such as cancer, diabetic retinopathy, age-related macular degeneration, rheumatoid arthritis, etc. |
| **Patent :** | Patent application under prosecution WO 2006/018418 A2 |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | 2003-12 |
| **Contact name :** | Houbrechts Annick a.houbrechts@ulg.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Preparation method of biodegradable polyester foams with improve mechanical properties |
| **Institution :** | Université de Liège |
| **Field :** | Environment |
| **Keywords :** | Polymer, foam, biodegradable, biocompatible, nanocharges, supercritical fluids |
| **Description :** | The patented technology relates to a method for preparing nanocharged biodegradable polyester foams that are fully biodegradable and biocompatible, non toxic, have improved mechanical properties due to the addition of 1 to 15% of nanocharges (better insulation properties, higher thermal oxidation resistance, higher elongational viscosity), and show a homogeneous matrix.<br><br>The production process relies on the use of supercritical fluids (CO2/N2) as foaming agents and as solvents. This particular technique allows working at a relatively low temperature (40°C), reduces the purification process to a single and simple step, generates no toxic residues like solvents or by-products, has a very limited energy demand, is safe. |
| **Potential applications and advantages :** | The polymer can be used as additive to improve the properties of other plastics. The foam has many applications: external coatings, food and beverage packaging, bottles, disposable forks and spoons, thermoformed objects, fibers, films, biodegradable medical implants, transplantation pot for agriculture, plants fixation and marking, medical plates, biomaterials, etc. |
| **Patent :** | EP pending (WO 2004/108806) |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | 2001-17 |
| **Contact name :** | Antheunis Nicole N.Antheunis@ulg.ac.be |

# ULg

# OPPORTUNITIES HEALTH

## Licensing opportunities

| | |
|---|---|
| **Title :** | Synthesis and pharmacological evaluation of new sulfonylureas as promising antiplatelet, antithrombotic, antimetastatic or antiasthmatic agents. |
| **Institution :** | Université de Liège |
| **Field :** | Health |
| **Keywords :** | Thromboxane A2 receptor antagonists, thromboxane synthase inhibitors, antiplatelet, antithrombotic, antiasthmatic, myocardial infarction, septic shock, pulmonary embolism, antimetastatic, angiogenesis. |
| **Description :** | Since torasemide, a loop diuretic designed in our pharmaceutical research laboratories, presenting a slight thromboxane A2 (TXA2) receptor antagonism on canine coronary artery, we developed a series of TXA2 modulators. TXA2 is an arachidonic acid metabolite derived from the cyclooxygenase pathway and characterized by potent proaggregatory, vaso- and bronchoconstrictor properties. This eicosanoid is involved in various cardiovascular, pulmonary and renal pathologies. More than sixty molecules were synthesized and their affinity for TP receptors determined. This work led to the synthesis of original drugs with a dual mode of action: thromboxane receptor antagonist and thromboxane synthase inhibitor such as BM-573. |
| **Potential applications and advantages :** | Demonstrated to prevent myocardial infarction.<br><br>In several physiopathological models performed in pigs, BM-573 was demonstrated to prevent myocardial infarction induced by occlusive thrombus of the LAD, to reduce the early toxic phase (pulmonary hypertension) of both the septic shock induced by LPS injection and pulmonary embolism. Moreover, BM-567 was demonstrated to prevent bronchoconstriction induced in vivo in guinea pigs. Finally, our thromboxane modulators were found active in preventing angiogenesis in different in vitro models and to inhibit platelet aggregation induced by tumor cells, suggesting an interesting potential as anti-metastatic agents. |
| **Patent :** | EPxxxxxxx |
| **Stage of development :** | --- |
| **Type of collaboration :** | Research collaboration |
| **File number :** | ULg 1998-95 |
| **Contact name :** | Debois Valérie v.debois@ulg.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | New Pyrimidinetrione derivatives as promising matrix metalloproteinase inhibitors |
| **Institution :** | Université de Liège |
| **Field :** | Health |
| **Keywords :** | Biphenyl-acylaminophenyl-piperazinyl-pyrimidinetrione derivatives, zinc metalloendopeptidases, matrix metalloproteinase, inflammation, cancer, angiogenesis. |
| **Description :** | Pyrimidinetrione derivatives are inhibitors of zinc metalloendopeptidases, especially those belonging to the class of matrix metalloproteinases (MMPs). The MMPs are known for their role in numerous physiological processes such as wound healing, ovulation, endometrial cycle, embryo development trophoblast implantation and bone and cartilage remodelling. Pyrimidinetrione derivatives are already known as inhibitors of MMPs but such compounds have in general a low solubility in water which compromise their oral biodisponibility. Toxicity by photosensitization of some of them is also well-known. The University of Liège has now found new pyrimidinetrione derivatives with improved activity as matrix metalloproteinase inhibitors, putatively lower toxicity by photosensitization and better solubility in water. |
| **Potential applications and advantages :** | Derivatives with improved activity as matrix metalloproteinase inhibitors, putatively lower toxicity by photosensitization and better solubility in water. |
| **Patent :** | xxxx |
| **Stage of development :** | --- |
| **Type of collaboration :** | Research collaboration |
| **File number :** | ULg 2004-08 |
| **Contact name :** | Debois Valérie v.debois@ulg.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Anti-angiogenic peptides |
| **Institution :** | Faculté universitaire des Sciences agronomiques de Gembloux<br>Université de Liège |
| **Field :** | Health |
| **Keywords :** | Angiogenesis, antiangiogenesis, cancer, peptide, tilted peptide |
| **Description :** | The use of inhibitors of angiogenesis appears as a promising therapeutic treatment in many pathologies such as rheumatoid arthritis, diabetic retinopathy, psoriasis or cancer. The present invention discloses the use of a pharmaceutical composition comprising isolated antiangiogenic peptides or a recombinant protein comprising the antiangiogenic peptides. The peptides are between 11 and 40 amino acids in length and show typical anti-tilted peptide activity. Compared to some antiangiogenic polypeptides tested so far, the peptides of the invention are easy to produce and easy to purify. They are also more stable in pharmaceutical preparations. |
| **Potential applications and advantages :** | Treatment of angiogenesis related diseases such as rheumatoid arthritis, diabetic retinopathy, psoriasis, obesity or cancer. |
| **Patent :** | EP 20040103920 WO2006018418 |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | --- |
| **Contact name :** | Hecq André hecq.an@fsagx.ac.be |

## Licensing opportunities

**Title :** Complementary peptides for the β-amyloid 29-42 peptide

**Institution :** Faculté universitaire des Sciences agronomiques de Gembloux
Université de Liège

**Field :** Health

**Keywords :** ß-Amyloid peptide, Alzheimer, diagnosis, senile plaques, kit

**Description :** The major component of senile plaques observed in the brain of Alzheimer patients is the ß-Amyloid peptide (Aß), more particularly, the ß-Amyloid 1-42 peptide (Aß 1-42). It is well known that the Apoliprotein E (ApoE) polymorphism plays a role in the susceptibility to Alzheimer, with the ε4 allele carriers being the most susceptible and the ε2,3 allele carriers, the least. It is hypothesized that the protective effect of the ε2,3 genotypes is due to the interaction of the ApoE with the C-terminal portion of the Aß (Aß 29-42), preventing its aggregation. The scientists of the University of Liège and the University of Gembloux have designed new peptides which are complementary to the C-terminal portion of the Aß peptide.

**Potential applications and advantages :** Potential applications :

These new peptides can be used in a diagnostic kit in order to detect the presence of reactive ß-Amyloid 1-42 peptides well before the apparition of symptoms of Alzheimer's disease. They offer an interesting therapeutic route for preventing and treating the Alzheimer disease at its earliest development stage.

Competitive advantages :

- Early detection of the development of Alzheimer disease, even prior to the apparition of the first symptoms;

- New route for the treatment of Alzheimer disease based on the use of peptides and/or peptidomimetics;

- Optimized molecular structure of peptides or peptidomimetics based on the understanding of the underlying mechanisms of senile plaque deposition.

**Patent :** EP patent application n° EP 04077735.

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ---

**Contact name :** Hecq André hecq.an@fsagx.ac.be

## Licensing opportunities

**Title :** PCR method for sensitive environmental, human and agro-food diagnostics

**Institution :** Université de Liège

**Field :** Agrofood
Environment
Health

**Keywords :** RT-PCR, immuno-PCR, marker

**Description :** A method has been developed using real time PCR to detect microbiological entities, particular elements or target molecule. The detection method comprises a step which consists in fixing an entity A directly or via a capture agent to one or several surface(s) inside the receptacle(s) of a real time PCR measuring apparatus, a second step which consists in associating with said element A a coupling system with nucleic acid, for example a DNA marker, and finally a further step which consists in amplifying the marker nucleic acid. Successive quantitative measurements are carried out during the exponential phase of the amplification, in the presence of a capture agent and other optional intermediate fixing agents.

**Potential applications and advantages :** The method allows the sensitive detection and quantification of antigenic elements through quantitative immuno-PCR and is even applicable when the antigenic molecules are isolated from complex matrixes. The method can also be applied to study ligand systems, it allows the titration of a free ligand through the use of a labelled ligand (coupled to a DNA marker) by its capture on a specific binding molecule. In general, the method allows the detection of proteins, carbohydrates, hormones, bacteria, organic components, aromatic compounds, infectious agents, etc and has therefore many potential applications in the environmental, the human and the agro-food diagnostic fields.

**Patent :** EP 1232283 B1

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ULg 1999-05

**Contact name :** Houbrechts Annick a.houbrechts@ulg.ac.be

## Licensing opportunities

| | |
|---|---|
| **Title :** | Tolerogenic approach for type 1 diabetes |
| **Institution :** | Université de Liège |
| **Field :** | Health |
| **Keywords :** | Thymus, self-tolerance, IGF-2, type 1 diabetes, negative vaccine |
| **Description :** | A new method for the prevention and/or cure of type 1 diabetes based on :<br><br>- intrathymic expression of IGF2 (Insulin-like growth factor 2) as the dominant gene of the insulin family;<br><br>- defect of IGF2 expression in the thymus of animal model for type 1 diabetes;<br><br>- regulatory/tolerogenic profile of cytokine secretion induced by DQ8 presentation of IGF-2 B11-25 in cultures of PBMCs isolated from DQ8+ type 1 diabetic adolescents. |
| **Potential applications and advantages :** | Design of a novel type of tolerogenic (negative) vaccine to inhibit the development of the autoimmune response selective of insulin-secreting islet β cells. |
| **Patent :** | xxx |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | ULg 2002-17 |
| **Contact name :** | Antheunis Nicole N.Antheunis@ulg.ac.be |

## Licensing opportunities

**Title :** Recombinant N-Proteinase and methods and uses thereof

**Institution :** Université de Liège

**Field :** Health

**Keywords :** ADAMTS-2, angiogenesis, cancer, fibrosis, N-prote(in)ase, Ehlers-Danlos syndrome

**Description :** ADAMTS-2 (also called N-protease) belongs to a novel family of metalloproteases, the ADAMTS (A Disintegrin and Metalloprotease with ThromboSpondin type I repeats). The primary function of ADAMTS-2 is the maturation of procollagen type I, II and III by excising the amino-propeptide. Deficiency in ADAMTS-2 activity results in the formation of abnormal collagen fibers that are more susceptible to degradation. Recently, it has been suggested that ADAMTS-2 could also modulate angiogenesis. Results obtained by in vitro testing, ex vivo model, and in vivo model support the hypothesis that ADAMTS-2 is an anti-angiogenic factor.

Knock-out mice for ADAMTS2 gene have been created. Beside symptoms related to the absence of procollagen maturation, an unexpected observation was the sterility of males. The mechanisms causing this alteration have not been identified yet.

**Potential applications and advantages :** ADAMTS-2 could be used in pathologies linked to increased angiogenesis, such as cancer, diabetic retinopathy, and rheumatoid arthritis.

Development of inhibitors that would interfere with the procollagen processing and lead to the disorganization of the collagen fibers.

Identification of alterations causing male sterility and development of relevant therapies.

**Patent :** ADAMTS-2, angiogenesis, cancer, fibrosis, N-prote(in)ase, Ehlers-Danlos syndrome

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ULg 1999-19

**Contact name :** Houbrechts Annick a.houbrechts@ulg.ac.be

## Licensing opportunities

**Title :** Novel, potent, naturally occurring and proteolysis-resistant human VEGF (vascular endothelial growth factor) isoform, VEGF111, for the treatment of (chronic) wounds, severe burns and ischemic diseases

**Institution :** Université de Liège

**Field :** Health

**Keywords :** VEGF, proteolytic-resistant, angiogenesis, wound, cardiovascular, ischemic

**Description :** A newly described human VEGF-A isoform (VEGF111) has been cloned from UV-B treated cells. The protein lacks the sequence encoded by exon 5, which contains the main site of cleavage by plasmin. Recombinant VEGF111 retains full biological activity and is resistant to degradation by plasmin and wound fluid exudates collected from chronic ulcers. In nude mice, the effect of local expression of various isoforms of VEGF-A was investigated by subcutaneous injection of HEK293 cells expressing VEGF111, VEGF121 or VEGF165. Expression of the three isoforms resulted in an intense angiogenesis. Of particular interest, VEGF111 was able to induce a dense network of functional capillaries in a much larger area than VEGF165 and VEGF121. It also resulted in enlargement of the diameter of the existing vasculature at distance of the site of injection of the cells.

**Potential applications and advantages :** In the past, the use of VEGF has been investigated for the treatment of severe burns and chronic wounds as venous, pressure and diabetic ulcers. Increased proteolytic degradation of VEGF in chronic wounds is regarded as one of the reasons of unsatisfactory results. Our data suggest that VEGF111 should allow overcoming these limitations, due to both its high resistance to proteolysis and its capability of inducing angiogenesis.

Taking advantage of the properties of VEGF111 could also benefit to the treatment of other pathologies for which the use VEGF has already been reported (cardiovascular diseases such as angina pectoris, intermittent claudication) or is under investigation (erectile dysfunctions, amyotrophic lateral sclerosis and hair loss).

**Patent :** Patent application under prosecution WO2007/083246A2.

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** 2005-08

**Contact name :** Houbrechts Annick a.houbrechts@ulg.ac.be

## Licensing opportunities

| | |
|---|---|
| **Title :** | Tolerogenic approach for type 1 diabetes |
| **Institution :** | Université de Liège |
| **Field :** | Health |
| **Keywords :** | Thymus, self-tolerance, IGF-2, type 1 diabetes, negative vaccine |
| **Description :** | A new method for the prevention and/or cure of type 1 diabetes based on :<br><br>- intrathymic expression of IGF2 (Insulin-like growth factor 2) as the dominant gene of the insulin family ;<br><br>- defect of IGF2 expression in the thymus of animal model for type 1 diabetes ;<br><br>- regulatory/tolerogenic profile of cytokine secretion induced by DQ8 presentation of IGF-2 B11-25 in cultures of PBMCs isolated from DQ8+ type 1 diabetic adolescents. |
| **Potential applications and advantages :** | Design of a novel type of tolerogenic (negative) vaccine to inhibit the development of the autoimmune response selective of insulin-secreting islet β cells. |
| **Patent :** | US (US2004/0138116), AU, CA, JP, EP pending (WO 2004/019965) |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | 2002-17 |
| **Contact name :** | Antheunis Nicole N.Antheunis@ulg.ac.be |

## Licensing opportunities

**Title :** A new aerosol treatment for asthma using a non-steroidal complex which prevents bronchial remodelling

**Institution :** Université de Liège

**Field :** Health

**Keywords :** Medicine, aerosol therapy, asthma, allergy, airway remodeling, non-steroidal, bronchial inflammatory diseases.

**Description :** As of today, the market for asthma products represents about 5 billions dollars in the U.S. As of today, asthma therapy is most often conducted using inhaled steroids or derivatives. However, that classical therapy can not prevent bronchial remodeling, which increases the rate of lung function loss during the life. The present licensing opportunity relates to a new medicinal composition designed in order to control both asthma (bronchial inflammation and hyper-responsiveness) and airway remodeling. Based on data from basic research indicating that MMPs (Matrix Metalloproteases) are involved in airways inflammation and remodeling in asthma, we designed a therapeutic approach based on selective MMP inhibition.

**Potential applications and advantages :** The drawbacks of long-term steroidal treatment of asthma are now well documented. Additionally, this therapy does not prevent airway remodeling and its respiratory complications. This new pharmaceutical composition has been designed to be aerosolized, allowing a preferential topical approach and thus reducing potential toxicities. It has also been shown to significantly reduce the occurrence of airway inflammation and remodeling when administered to animals.

**Patent :** PCT pending (WO2005/097133) : EP, AU, BR, CA, CN, IN, JP, KR, MX, RU, SG, USA pending

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** 2002-01

**Contact name :** Antheunis Nicole N.Antheunis@ulg.ac.be

## Licensing opportunities

| | |
|---|---|
| **Title :** | Pharmaceutical composition for the treatment and/or the prevention of atherosclerosis from infectious origin |
| **Institution :** | Université de Liège |
| **Field :** | Health |
| **Keywords :** | Atherosclerosis, resveratrol, flavonoid, glucocorticoid. |
| **Description :** | The pharmaceutical composition is proposed for the prevention and/or long-term treatment of atherosclerosis (especially atherosclerosis due to infection by intracellular micro-organisms) by subcutaneous administration (patches).The patented pharmaceutical composition comprises a pharmaceutical carrier, resveratrol (a polyphenolic phyto-alexin derived from stilben) associated to a flavonoid, both at 10-6M, with or without the association with a glucocorticoid (hydrocortisone or methylprednisolone at 10-7M). The long term treatment will alternate the administration of the pharmaceutical composition with corticosteroid and without corticosteroid, and will be accompanied by short period (10 days) of administrations of antibiotics in cases of atherosclerosis from infectious origin. |
| **Potential applications and advantages :** | Prevention and long term treatment of atherosclerosis |
| **Patent :** | EP & US pending (WO 2004/105769) |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | 2002-14 |
| **Contact name :** | Antheunis Nicole N.Antheunis@ulg.ac.be |

## Licensing opportunities

**Title :** Designed peptides complementary to the ß-Amyloid 29-42 peptide

**Institution :** Université de Liège

**Field :** Health

**Keywords :** ß-Amyloid peptide, Alzheimer, diagnosis, senile plaques, kit

**Description :** The major component of senile plaques observed in the brain of Alzheimer patients is the ß-Amyloid peptide (Aß), more particularly, the ß-Amyloid 1-42 peptide (Aß 1-42). It is well known that the Apoliprotein E (ApoE) polymorphism plays a role in the susceptibility to Alzheimer, with the ß4 allele carriers being the most susceptible and the ß2,3 allele carriers, the least. It is hypothesized that the protective effect of the ß2,3 genotypes is due to the interaction of the ApoE with the C-terminal portion of the Aß (Aß 29-42), preventing its aggregation. The scientists of the University of Liège and the University of Gembloux have designed new peptides which are complementary to the C-terminal portion of the Aß peptide.

**Potential applications and advantages :** These new peptides can be used in a diagnostic kit in order to detect the presence of reactive ß-Amyloid 1-42 peptides well before the apparition of symptoms of Alzheimer's disease.

**Patent :** PCT pending (PCT/EP2005/055050)

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** 2005-02

**Contact name :** Antheunis Nicole N.Antheunis@ulg.ac.be

## Licensing opportunities

**Title :** New Benzopyran derivatives, their method of preparation and therapeutic uses

**Institution :** Université de Liège

**Field :** Health

**Keywords :** Benzopyran derivatives, potassium channel activators, relaxant activity on smooth muscle, inhibitors of insulin secretion.

**Description :** The patented technology relates to novel benzopyran derivatives, to their method of production, to pharmaceutical composition comprising the derivatives and their therapeutic uses.

ATP-sensitive potassium channels (KATP channels) are present in multiple cell types including endocrine cells, skeletal and smooth muscle cells, cardiac cells and central neurons. KATP channels are involved in main physiological processes such as hormone secretion, smooth muscle cell contractile activity, myocardial protection and neurotransmitters release.

Several compounds are known to activate KATP channels and have been named "potassium channel openers" (PCOs).

Potassium channel openers are known to be able to relax vascular smooth muscles and have therefore been used for the treatment of hypertension. We have now found benzopyran derivatives useful as potassium channel activators which surprisingly are active on the pancreatic endocrine tissue as inhibitors of insulin secretion.

**Potential applications and advantages :** The new benzopyran derivatives could be useful as therapeutically acceptable substances, preferably in the treatment of hyperinsulinaemia and obesity as well as in the treatment or prevention of diabetes.

**Patent :** EP, US, CA, JP filing under prosecution

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** 2003-01

**Contact name :** Antheunis Nicole N.Antheunis@ulg.ac.be

# ULg

# OPPORTUNITIES INSTRUMENTATION

## Licensing opportunities

| | |
|---|---|
| **Title :** | Wide dynamic and higher cut off frequency I/V converter |
| **Institution :** | Université de Liège |
| **Field :** | Instrumentation |
| **Keywords :** | I/V converter, electrometer amplifier, charge amplifier |
| **Description :** | The present invention deals with an original method applied to I/V converter. Such I/V converter comprises a device specially configured to compensate the resonance peak present in the gain versus frequency curve as illustrated in the figure below, without reducing the cut off frequency. For example: such a device applied to a photometer (electrometer amplifier) allows for an increase by a 10 factor (curve 2) of the cut off frequency (curve 3) off the electrometer amplifier at a very reasonable cost. The invention can be used in many different sectors as instrumentation, test and measurement, lamp manufacturing or environment protection (CO or CO2 measures), optics, etc. |
| **Potential applications and advantages :** | --- |
| **Patent :** | BE, DE, FR, GB patent granted (EP 1214569); US patent granted (US 6,404,488); JP, KR filing in prosecution |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | 1999-06 |
| **Contact name :** | Antheunis Nicole N.Antheunis@ulg.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Apparatus and method for modelling the deformation of an object |
| **Institution :** | Université de Liège |
| **Field :** | Instrumentation |
| **Keywords :** | Deformable objects, discontinuities, cuts, retraction, resection, finitie element methods, meshing, image-guided surgery, surgical navigation, interventional MRI, image processing, mechanics, electromagnetics, data processing |
| **Description :** | A method and apparatus for modelling the effect on a "deformable object" of an imposed discontinuity without remeshing. Discontinuity can be a physical discontinuity such as a cut or the boundary between different materials, or an abrupt change in a field such as an electromagnetic field. Method can also handle more complex operations on a deformable object such as retractions and resecetions. The basic method starts by creating a volume mesh of the deformable object in its initial form using standard finite element analysis meshing techniques, defines enrichment nodal shape functions of the mesh elements that are intersected by the discontinuity, and assembles a global stiffness matrix of the elements in the volume mesh using the stiffness matrix of the elements and the enrichment nodal shape functions. An electronic data processing apparatus operating according to the method is also provided. |
| **Potential applications and advantages :** | Medical: surgical simulation, image-guided surgery, interventional MRI.<br>Mechanics: deformation problems including discontinuities such as phase changes.<br>Electromagnetics: parts moving in a field. |
| **Patent :** | PCT filing in prosecution |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | 2004/12 |
| **Contact name :** | Antheunis Nicole N.Antheunis@ulg.ac.be |

# ULg

# NICT

## Licensing opportunities

| | |
|---|---|
| **Title:** | SAFIR - modelling software for constructions under fire |
| **Institution:** | Université de Liège |
| **Field:** | NICT<br>Other applications |
| **Keywords** | safir, modelling, software, metallic structures, fire, heat, finite elements |
| **Description:** | SAFIR is a computer software for the simulation of the behaviour of building structures subjected to fire.<br><br>The fire is introduced as a data (in term of a curve giving either the evolution of the gas temperature in the fire compartment or the evolution of the net flux on the surface of the structure) and the software calculates the evolution of the temperature in the structural elements witch can be discretized in 2D or 3D.<br><br>The structure is then discretized by means of truss, beam or shell finite elements and the evolution of the structure's displacements, stresses and strains.<br><br>For the mechanical analyses based on 3D beam finite elements, the software can calculate the elastic torsional stiffness of the section. |
| **Potential applications and advantages:** | Dozen of users among the world, Entreprises and Universities, have already made the choice of SAFIR, for the modelling of buildings under fire.<br><br>Commercial license : 5000€<br><br>Academic license : 1000€<br><br>Note that members of the "Secure with Steel" network beneficiate of a special price for the commercial license. |
| **Patent:** | Safir, modelling, software, metallic structures, fire, heat, finite elements |
| **Stage of development:** | Software used in lab and industry |
| **Type of collaboration:** | License agreement |
| **File number:** | L2005-030 |
| **Contact name:** | Fays Jérémie j.fays@ulg.ac.be |

# UMH

# OPPORTUNITIES ELECTRONIC, MATERIALS & NICT

## Licensing opportunities

| | |
|---|---|
| **Title :** | Authentication method and device for protecting manufactured goods |
| **Institution :** | Université de Mons-Hainaut |
| **Field :** | Electronic<br>Materials<br>NICT |
| **Keywords :** | counterfeiting, authentication, traceability |
| **Description :** | The present invention relates to a anti-counterfeiting method and device for protecting manufactured goods, and specially to an authentication method and an authentication device providing information to verify the authenticity of the goods. The invention consists in inserting information at the micrometric and nanometric scale. The information is embedded on the surface of the object in the form of controlled roughness together with an authentication protocol derived from it. An optical reading device to retrieve the information has also been developed. |
| **Potential applications and advantages :** | Present invention provides a method and a device enabling an easy authentication of an object or article, with high security, involving low cost equipment and material. It provides a large number of information and/or authentication data, which are not directly accessible or readable, and which are difficult to reproduce. Marking of an article on a large area, with a high precision and no distortion, and without altering the article physical properties, becomes possible. |
| **Patent :** | 1 EP and 1 PCT patent application filed |
| **Stage of development :** | Lab scale |
| **Type of collaboration :** | Research collaboration<br>License agreement |
| **File number :** | --- |
| **Contact name :** | Cayemittes Sonia sonia.cayemittes@umh.ac.be |

# UMH

# OPPORTUNITIES HEALTH

## Licensing opportunities

| | |
|---|---|
| **Title :** | Cancer diagnostic and therapy |
| **Institution :** | Université libre de Bruxelles<br>Université de Mons-Hainaut |
| **Field :** | Health |
| **Keywords :** | HLTF, cancer, early stage diagnosis |
| **Description :** | The invention is based on the elucidation of a mechanism by which HPV promotes oncogenesis and provides a method of diagnosing malignant tumors and methods of preventing the development of malignancies or inhibiting tumor growth. A method for diagnosing a neoplasm in a mammal is carried out by measuring the level of helicase-like transcription factor (HLTF) in tissue of the mammal. An increase in the level of HLTF in the tissue compared to the level in a normal control tissue indicates the presence of a neoplasm in the tissue. |
| **Potential applications and advantages :** | Cancer therapy and diagnostic at an earlier stage |
| **Patent :** | 1 delivered US patent and 1 EP patent application filled |
| **Stage of development :** | Early stage |
| **Type of collaboration :** | Research collaboration<br>License agreement |
| **File number :** | --- |
| **Contact name :** | Cayemittes Sonia sonia.cayemittes@umh.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Sea cucumber in vitro fecundation |
| **Institution :** | Université libre de Bruxelles<br>Université de Mons-Hainaut |
| **Field :** | Agrofood<br>Health |
| **Keywords :** | Sea cucumber, aquaculture, in vitro fecundation. |
| **Description :** | The invention concerns the culture of aquatic invertebrates and more specifically sea cucumber. |
| **Potential applications and advantages :** | The technology permits to obtain sea cucumber during the entire year and is an alternative solution to massive exploitation responsible for the species rarefaction. There is a great demand for sea cucumber in Asian countries which represent an important market. |
| **Patent :** | 1 PCT patent application filed |
| **Stage of development :** | Lab scale |
| **Type of collaboration :** | License agreement |
| **File number :** | --- |
| **Contact name :** | Di Stefano Patrick pdistefano@admin.ulb.ac.be |

# UMH

# OPPORTUNITIES MATERIALS

## Licensing opportunities

| | |
|---|---|
| **Title :** | PDLC Films |
| **Institution :** | Université de Mons-Hainaut |
| **Field :** | Materials |
| **Keywords :** | Liquid crystal, composite films, intelligent glazing |
| **Description :** | The present invention relates to the field of polymer/liquid crystal composites films, and in particular to PDLC films (polymer dispersed liquid crystal) applied to the field of light transmission. A new very thin polymeric film containing liquid crystal microdroplets whose optical properties can be manipulated by applying a small voltage has been designed. |
| **Potential applications and advantages :** | Present invention permits to design PDLC films with improved electro-optical performances, with an easy to implement preparation method which is non-polluting and cost effective. System produced can be applied to large surfaces as well as non-planar surfaces, without sophisticated treatment. |
| **Patent :** | 1 international PCT application filed |
| **Stage of development :** | Lab scale |
| **Type of collaboration :** | Research collaboration<br>License agreement |
| **File number :** | --- |
| **Contact name :** | Cayemittes Sonia sonia.cayemittes@umh.ac.be |

# FUNDP

# OPPORTUNITIES AGROFOOD

## Licensing opportunities

| | |
|---|---|
| **Title :** | Enzyme with xylanase activity and its use in the pulp and paper industries and agrifood |
| **Institution :** | Facultés universitaires Notre-Dame de la Paix de Namur |
| **Field :** | Agrofood<br>Environment<br>Health<br>Other applications |
| **Keywords :** | Xylanase, acidic pH, enzymatic activity, agrofood, paper |
| **Description :** | The present invention relates to an enzyme with xylanase activity at acidic pH identified by its amino acid and nucleotide sequence and variants thereof. The present invention relates also to their uses in the pulp and paper industries and in the agrofood. |
| **Potential applications and advantages :** | There is a need for xylanase whose biological properties, and in particular whose optimum of activity is at acidic pH, would be adapted to new industrial processes in the paper, pulp, biofood, or textile industries. |
| **Patent :** | Patent pending (WO2004106510) |
| **Stage of development :** | Early stage |
| **Type of collaboration :** | License agreement |
| **File number :** | 2002-03 |
| **Contact name :** | Roussel Fabienne fabienne.roussel@fundp.ac.be |

# FUNDP

# OPPORTUNITIES HEALTH

## Licensing opportunities

| | |
|---|---|
| **Title :** | Antiviral activity of 2-pyridinone analogues against clinically important HIV mutant strains |
| **Institution :** | Facultés universitaires Notre-Dame de la Paix de Namur |
| **Field :** | Health |
| **Keywords :** | AIDS, virus, antiviral drug, reverse transcriptase, viral mutant, pyridinone, non nucleosides |
| **Description :** | Non-nucleoside reverse transcriptase inhibitors (NNRTI) are potent inhibitors of human immunodeficiency virus type 1 (HIV-1). They inhibit the reverse transcriptase of HIV-1 and have the advantage of being less toxic than other antiviral agents, especially the protease inhibitors. The currently marketed NNRTI are nevirapine, delavirdine and efavirenz. We have developed 2-pyridinone analogues as a new class of anti-HIV, targeting, in common with other NNRTI, the hydrophobic pocket of reverse transcriptase. Our leader compound is active against WT enzyme and against HIV strains bearing mutation in RT, which are clinically relevant. Our most promising compound is actually as or more active than efavirenz against our panel of resistant strains. Our compounds are minimally toxic to cells and this translates into very high selectivity index. |
| **Potential applications and advantages :** | Due to its very high affinity and specificity, these inhibitors could be used in the treatment of AIDS patients which have developed viral mutants and are resistant to conventional treatments. |
| **Patent :** | Patent pending in Europe (EP1663977), US and Canada (CA2540329) |
| **Stage of development :** | Early stage |
| **Type of collaboration :** | License agreement |
| **File number :** | 2002-02 |
| **Contact name :** | Roussel Fabienne fabienne.roussel@fundp.ac.be |

## Licensing opportunities

**Title :** Genetically modified Brucella cells and pharmaceutical composition containing these cells

**Institution :** Facultés universitaires Notre-Dame de la Paix de Namur

**Field :** Health
Other applications

**Keywords :** Brucella, vaccine, genetically modified, virulence, pharmaceutical composition

**Description :** Brucellosis is still an important human and animal health problem and is considered as the most widespread zoonosis in the world, severely threatening livestock and public health. The key to control human brucellosis is to reduce the animal reservoir, vaccination being the only effective strategy. The current vaccine for Brucella melitensis (called Rev.1) is a live attenuated strain, for which the basis of attenuation is unknown. Most importantly Rev1 is not fully efficacious, can still cause abortion in animals, is occasionally excreted in milk and is fully pathogenic for humans.

Therefore, we have developed genetically modified Brucella cells, which could act as an efficacious vaccine against Brucellosis.

**Potential applications and advantages :** The best approach to obtain vaccines against brucellosis with humoral and cellular responses strong enough to induce an efficient protection is by using live attenuated vaccines. In this technique, antigens are presented to the immune system during a time long enough to induce humoral as well as cell mediated response in the host. To this end, we have obtained well defined (rationally) attenuated vaccine strains.

**Patent :** Patent pending (WO2005003353)

**Stage of development :** Early stage

**Type of collaboration :** License agreement

**File number :** 2003-01

**Contact name :** Roussel Fabienne fabienne.roussel@fundp.ac.be

## Licensing opportunities

| | |
|---|---|
| **Title :** | Radioactive Nanoclusters for more efficient radiotherapy |
| **Institution :** | Facultés universitaires Notre-Dame de la Paix de Namur |
| **Field :** | Health |
| **Keywords :** | Nanotechnology, cancer, vector, medical imaging, targeting, radionuclide |
| **Description :** | The present invention relates to radioactive nanoclusters for diagnostic and therapeutic uses. They have been designed for treating tumorous tissues while leaving surrounding healthy tissues untouched. Simultaneously with the treatment, the distribution of nanoclusters into the body of a patient can be visualised over time. Such nanoclusters for targeted radiotherapy comprise a core including at least two radioactive or radioactivable atoms and a coat built in a material selected in such a way that a maximum of 20% of the radiation produced by the core is stopped or absorbed. |
| **Potential applications and advantages :** | Targeted radiotherapy uses the biological differences between cancerous and healthy cells for selectively delivering the radionuclides so that a tumour receives an appreciably higher quantity of radiation than the healthy cells. Nanostructures of a few nanometres can contain up to 1000 atoms. Consequently, by grafting a nanostructure on a targeting agent, the specific activity achieved is largely higher than that of the current products. In the case of large tumours, a radionuclides with short or long radiation range can be combined. This applies also to weakly vascular tumours presenting occlusions. |
| **Patent :** | Patent pending (WO2006063418) |
| **Stage of development :** | Early stage |
| **Type of collaboration :** | License agreement |
| **File number :** | 2004-02 |
| **Contact name :** | Roussel Fabienne fabienne.roussel@fundp.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Brachytherapy using a composite source for a better controlled cancer treatment |
| **Institution :** | Facultés universitaires Notre-Dame de la Paix de Namur |
| **Field :** | Health |
| **Keywords :** | Brachytherapy, cancer treatment, radionuclide |
| **Description :** | Brachytherapy is a general term covering medical treatments which involve the positioning of a radioactive source near a diseased tissue and may involve the temporary or permanent implantation or insertion of a radioactive source into the body of a patient. This technique is currently used for the treatment of prostate cancer and avoids surgery. The radioactive source is thereby located in proximity to the area of the body which is being treated. The invention provides the use of a radiation source, which comprises at least two types of radioisotopes presenting different characteristics. |
| **Potential applications and advantages :** | The composite source allows taking advantages of the two isotopes, but also obtaining a synergy in the treatment of cancer. The combination of several radionuclides for brachytherapy enables the treatment of various kinds of disease, that are mainly cancer but also stenosis and necrosis of biological canals such as coronary arteries. Furthermore, the radiation characteristics can be precisely tuned for different tumour morphologies, particularly in case of breast and prostate cancer. |
| **Patent :** | Patent pending (WO2006063419) |
| **Stage of development :** | Early stage |
| **Type of collaboration :** | License agreement |
| **File number :** | 2006-01 |
| **Contact name :** | Roussel Fabienne fabienne.roussel@fundp.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Enzyme with xylanase activity and its use in the pulp and paper industries and agrifood |
| **Institution :** | Facultés universitaires Notre-Dame de la Paix de Namur |
| **Field :** | Agrofood<br>Environment<br>Health<br>Other applications |
| **Keywords :** | Xylanase, acidic pH, enzymatic activity, agrofood, paper |
| **Description :** | The present invention relates to an enzyme with xylanase activity at acidic pH identified by its amino acid and nucleotide sequence and variants thereof. The present invention relates also to their uses in the pulp and paper industries and in the agrofood. |
| **Potential applications and advantages :** | There is a need for xylanase whose biological properties, and in particular whose optimum of activity is at acidic pH, would be adapted to new industrial processes in the paper, pulp, biofood, or textile industries. |
| **Patent :** | Patent pending (WO2004106510) |
| **Stage of development :** | Early stage |
| **Type of collaboration :** | License agreement |
| **File number :** | 2002-03 |
| **Contact name :** | Roussel Fabienne fabienne.roussel@fundp.ac.be |

# FUSAGx

# OPPORTUNITIES HEALTH

## Licensing opportunities

**Title :** Complementary peptides for the β-amyloid 29-42 peptide

**Institution :** Faculté universitaire des Sciences agronomiques de Gembloux
Université de Liège

**Field :** Health

**Keywords :** ß-Amyloid peptide, Alzheimer, diagnosis, senile plaques, kit

**Description :** The major component of senile plaques observed in the brain of Alzheimer patients is the ß-Amyloid peptide (Aß), more particularly, the ß-Amyloid 1-42 peptide (Aß 1-42). It is well known that the Apoliprotein E (ApoE) polymorphism plays a role in the susceptibility to Alzheimer, with the ε4 allele carriers being the most susceptible and the ε2,3 allele carriers, the least. It is hypothesized that the protective effect of the ε2,3 genotypes is due to the interaction of the ApoE with the C-terminal portion of the Aß (Aß 29-42), preventing its aggregation. The scientists of the University of Liège and the University of Gembloux have designed new peptides which are complementary to the C-terminal portion of the Aß peptide.

**Potential applications and advantages :** Potential applications :

These new peptides can be used in a diagnostic kit in order to detect the presence of reactive ß-Amyloid 1-42 peptides well before the apparition of symptoms of Alzheimer's disease. They offer an interesting therapeutic route for preventing and treating the Alzheimer disease at its earliest development stage.

Competitive advantages :

- Early detection of the development of Alzheimer disease, even prior to the apparition of the first symptoms;

- New route for the treatment of Alzheimer disease based on the use of peptides and/or peptidomimetics;

- Optimized molecular structure of peptides or peptidomimetics based on the understanding of the underlying mechanisms of senile plaque deposition.

**Patent :** EP patent application n° EP 04077735.

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ---

**Contact name :** Hecq André hecq.an@fsagx.ac.be

## Licensing opportunities

| | |
|---|---|
| **Title :** | Anti-angiogenic peptides |
| **Institution :** | Faculté universitaire des Sciences agronomiques de Gembloux<br>Université de Liège |
| **Field :** | Health |
| **Keywords :** | Angiogenesis, antiangiogenesis, cancer, peptide, tilted peptide |
| **Description :** | The use of inhibitors of angiogenesis appears as a promising therapeutic treatment in many pathologies such as rheumatoid arthritis, diabetic retinopathy, psoriasis or cancer. The present invention discloses the use of a pharmaceutical composition comprising isolated antiangiogenic peptides or a recombinant protein comprising the antiangiogenic peptides. The peptides are between 11 and 40 amino acids in length and show typical anti-tilted peptide activity. Compared to some antiangiogenic polypeptides tested so far, the peptides of the invention are easy to produce and easy to purify. They are also more stable in pharmaceutical preparations. |
| **Potential applications and advantages :** | Treatment of angiogenesis related diseases such as rheumatoid arthritis, diabetic retinopathy, psoriasis, obesity or cancer. |
| **Patent :** | EP 20040103920 WO2006018418 |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | --- |
| **Contact name :** | Hecq André hecq.an@fsagx.ac.be |

# FUSAGx

# OPPORTUNITIES AGROFOOD

## Licensing opportunities

**Title :** Novel Inuline Fractions, Preparation and Use

**Institution :** Faculté universitaire des Sciences agronomiques de Gembloux

**Field :** Agrofood

**Keywords :** Inulin, hydrocolloid, gelatine substitution, gel

**Description :** Inulin is a mixture of polysaccharides of various degree of polymerization and is extracted from plants (e.g. chicory roots). The polysaccharide chains of inulin consist of fructose units with β 1-2 bonds and bear a glucose unit at their end. The present invention discloses new fractions of inulin raising specific physicochemical features. The process for isolating them is described. The invention also covers a synergistic composition of such inulin fractions with another hydrocolloid (e.g. gellan) enabling to reach unexpected rheological behaviors. Special attention has been paid to a transparent and thermoreversible gel able, for instance, to replace gelatine in food preparations

**Potential applications and advantages :** - Inulin is approved for use as a food additive in many countries. Inulin fractions enter into the composition of low calories, low fat and/or fibre rich food or functional food. Inulin is also applicable in cosmetic and pharmaceutical products. Final product characteristics are tightly related to the specific properties of the used inulin fractions.

- Preparation of food, cosmetic or pharmaceutical formulations with tunable rheological properties.

**Patent :** EP 1203028

**Stage of development :** Lab scale

**Type of collaboration :** Research collaboration
License agreement

**File number :** ---

**Contact name :** Hecq André hecq.an@fsagx.ac.be

## Licensing opportunities

**Title :** Process For The Purification of Electrically charged Polysacharides

**Institution :** Faculté universitaire des Sciences agronomiques de Gembloux

**Field :** Agrofood

**Keywords :** Charged polysaccharides, pectin, carrageenan, xanthan, chitosan, casein, caseinate, purification process

**Description :** The application covers a new purification process of electrically charged polysaccharides (such as pectin, carrageenan, alginate, xanthan, chitosan, etc.) at room temperature, in a limited number of steps and without using solvents. The process is based on the binding/non-binding properties of the charged polysaccharide to be purified with certain proteins (named “protéines réversibles” in the application, i.e. casein, caseinate, pea protein such as pisan …) depending on the pH of the medium adjusted during the process. As a matter of fact, the first step of the process consists in the formation, at low pH, of a complex between the charged polysaccharide and a protein bearing the opposite charge at that pH value. Resulting complex is then recovered by centrifugation and further solubilised by raising the pH. Finally, lowering the pH to the isoelectric point of the protein enables the protein to precipitate, the purified polysaccharide being left in solution in water. The protein is removed by centrifugation and can be further injected in the purification loop.

The process is able to produce not only purified charged polysaccharides but also various complexes between the charged polysaccharide and the protein which stoechiometry can be fine-tuned. Those latter products possess interesting emulsification properties.

**Potential applications and advantages :** Potential applications :

In numerous agro-food and cosmetic formulations where specific texturing, thickening, stabilisation as well as emulsification properties are developed.

Competitive advantages :

This new process is environmentally friendly and cost effective. No solvents are used and the process is performed at room temperature. The method is highly selective since according to the proper choice of the protein, only the polysaccharide able to associate with it, will be purified.

**Patent :** Charged polysaccharides, pectin, carrageenan, xanthan, chitosan, casein, caseinate, purification process

**Stage of development :** Lab scale

**Type of collaboration :** Research collaboration
License agreement

**File number :** Patent application n° EP 050447159.4

**Contact name :** Hecq André hecq.an@fsagx.ac.be

## Licensing opportunities

| | |
|---|---|
| **Title :** | Reconstitued Dairy Cream |
| **Institution :** | Faculté universitaire des Sciences agronomiques de Gembloux |
| **Field :** | Agrofood |
| **Keywords :** | Recomposed dairy cream, buttermilk, anhydrous milk fat, proteose-peptone fraction, rheology, emulsion, lipase. |
| **Description :** | The invention concerns recomposed dairy creams and the method for obtaining them. The recomposed dairy creams comprise buttermilk, anhydrous milk fat, water and a heat resistant proteose-peptone fraction derived from milk. The resulting emulsions are able to be whipped into stable foams. Their rheological behavior is tunable. Moreover, they show increased resistance to enzymatic degradation leading to undesirable free fatty acids. |
| **Potential applications and advantages :** | New products for the food industry. New milk-derived products having good emulsification properties and increased resistance to enzymatic lipolysis. |
| **Patent :** | Patent granted in Europe (EP 1356736) |
| **Stage of development :** | Prototype |
| **Type of collaboration :** | License agreement |
| **File number :** | --- |
| **Contact name :** | Hecq André hecq.an@fsagx.ac.be |

# UCL

# OPPORTUNITIES AGROFOOD

## Licensing opportunities

**Title :** Combining enzyme-antibody conjugates and antibiotics as medium additive for the selective growth of pathogenic bacteria in food analysis and medical diagnostics

**Institution :** Université catholique de Louvain

**Field :** Agrofood
Health

**Keywords :** Diagnostic, pathogen, foodborne, biological fluids, elisa, immunoassay

**Description :** Food analysis and medical diagnostics are the main application fields of the invention. When analyzing samples for the detection of a pathogenic bacterium, the first step is to amplify the pathogen in a culture before the subsequent detection. This amplification has to be rapid and selective. Ideally, only the pathogen should grow at its maximal rate. Some selective media have been developed by optimizing their composition but they are usually poorly selective and/or poorly nutritive. This invention intends to allow rapid and selective growth of a target pathogenic bacterium by the use of a rich medium supplemented with an enzyme-antibody conjugate and an antibiotic. The enzyme is able to degrade the antibiotic (example : the enzyme is a b-lactamase and the antibiotic is a penicillin) and the antibody recognizes specifically the target bacterium. As the enzyme and the antibody are associated in a conjugate, the enzyme will cover the surface of the target bacterium via the specific antibody recognition. Hence, the bacterium will be protected against the antibiotic and will grow normally whereas all the other bacteria will be sensitive to the antibiotic and will not grow.

**Potential applications and advantages :** The main advantage of the method compared to existing strategies is its simplicity. The medium comprised a standard rich medium and only two additives : the antibiotics and the enzyme-antibody conjugate. For some methods, the pathogen is separated from other cells present in the sample. Such a step is absent in this invention. Detection of pathogenic bacteria such as E. coli O-157:H7, Salmonella, Listeria, Shigella (...) in food samples is probably the main application of this invention. In medical diagnostics, the strategy can also be used to detect pathogens in blood, urine or stool samples. As the invention is a method for the selective growth or selective survival of a target cell, it can eventually find applications in toxic therapies such as chemotherapy of cancer. In this case, the antibody-enzyme conjugate will be used to selectively protect healthy cells from the toxic effect of an anticancer drug.

**Patent :** Priority : EP 00870139.3 filed on 21/06/2000,
PCT: International patent application filed on 07/06/2001 and published on 27/12/2001 under No. WO 01/97854,
(http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=WO0197854&F=0),
US patent granted on 29/11/2005 unde

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-112

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# UCL

# OPPORTUNITIES ELECTRONIC

## Licensing opportunities

**Title :** Ultra-low power circuits

**Institution :** Université catholique de Louvain

**Field :** Electronic

**Keywords :** Microelectronics, ultra-low power electronic CMOS circuits, semiconductors, sensors, transistors, etc.

**Description :** Considering ultra-low power low-frequency applications, the power consumption of digital circuits is no longer dominated by dynamic consumption. Indeed, the increase in leakage current of nanometre-scale devices leads to very high static power dissipation. The present invention relates to a new family of ultra-low power (ULP) electronic CMOS circuits, which dissipate at least 10 times and up to 10000 times less static power than their standard CMOS counterparts. It enables to benefit from the low area and low power dynamic consumption of advanced nanometre-scale technologies in ultra-low power low-frequency applications, without the high static power dissipation penalty.

The basic cell is made of a series connection of an n-MOS transistor on top of a p-MOS transistor with the gate of the p-MOS connected to the drain of the n-MOS. This basic cell operates as a transistor (transconductance) with very low leakage (IOFF) current. This basic cell is used to build digital gates, implementing any logic function with extremely low static power dissipation. The gate delay is quite high (in the µs range) but enables ultra-low power low-frequency applications (in the range of tenths to hundredths of kHz) like biomedical implantable devices, radio-frequency identifier tags (RFID), wireless smart sensors, wristwatches, etc. The basic inverter gate built with this technique presents hysteresis. Therefore, it enables the design of high-noise margin memory circuits, keeping the extremely low static consumption feature. The relatively high-delay value of the gates is also used to build high-precision and low-area time-to-digital converters for various sensor architectures like flux, gas or pressure sensors.

**Potential applications and advantages :**

- Low-frequency logic circuits: biomedical implantable devices, radio-frequency identifier tags (RFID), wireless smart sensors, wristwatches, etc. with ultra-low power consumption;
- Memory circuits: SRAM for portable applications with ultra low stand-by power consumption;
- Sensor circuits: Flux, gas, pressure, etc.;
- very low static power consumption;
- low area;
- standard devices – no extra-fabrication costs;
- robustness against operating conditions (process, voltage and temperature);

**Patent :** EP Patent Application n° GB0708324.9

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ADRE 15

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## Licensing opportunities

**Title :** Ultra-low power CMOS analog basic blocks

**Institution :** Université catholique de Louvain

**Field :** Electronic

**Keywords :** Microelectronics, ultra-low power electronic CMOS circuits, SOI, semiconductors, sensors, transistors, etc.

**Description :** The present invention relates to a new family of ultra-low power (ULP) electronic CMOS circuits which dissipate at least 10 times and up to 10000 times less energy than their standard CMOS counterparts. The basic cell is made of a series connection of an n-MOS transistor on top of a p-MOS transistor. As a first option, the gates of the two transistors may be driven at different but close voltages, to implement a number of analog applications, like voltage references, bandgap references, temperature sensors, comparators with offset… or even watchdogs with record ultra-low-power consumption. As a second option, the gate of each transistor is connected to the source of the other one, leading to a two-terminal diode. In reverse bias mode, the device features a region with a negative resistance and an extremely low leakage current. Such diode may be used as a latch in logic applications, memory cells… as well as a low leakage switch in rectifiers, power electronics circuits, ESD protection, etc.

A SRAM test vehicle implementing our ULP concept in 0.13µm SOI CMOS technology has experimentally demonstrated a reduction of the static power dissipation by a factor of at least 40 when compared to the standard design. Another field of applications concerns RF tags or magnetic induction wireless systems, as well as circuits using energy harvesting from the environment as their primary power supply, avoiding the need for batteries.

**Potential applications and advantages :**

- Analog circuits: biomedical implantable devices, low power embedded sensors and systems, wireless magnetic induction, rectifiers, power management, etc.:
- Logic circuits: CMOS logic families, RAM, embedded processors… with extremely low stand-by consumption;
- Mixed analog and digital systems: mobile or portable equipments, instrumentation, audio, microcontrollers with built-in analog I/0, etc.

**Patent :** EP1344253 A1 and US6870229 B2

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-123

**Contact name :** Debuigne Fabienne fabienne.debuigne@uclouvain.be

**Title :** Method & device for high sensitivity detection of the presence of DNA and other probes

**Institution :** Université catholique de Louvain

**Field :** Electronic

**Keywords :** Microelectronics, semiconductors, capacitance measurement, DNA and other biochemical species targets, detection, conductive labels, microarrays,…

**Description :** The technology relates to a method and an array-based detection device for sensing the presence of biochemical species. It relies on a capacitive detection following the interaction between sample targets and host molecules immobilized at the sensor surface and marked by conductive labels.

The system is composed of a set of electrodes with interdigitated fingers, the distance between them typically ranging from 1 to 3 µm. Instead of using gold or platinum electrodes – as is often the case in biochemical electrical detection – non-noble metals such as aluminum are used and further protected (with alumina for instance) against chemical and mechanical damages.

The reporter of the molecular interaction between targets and host molecules takes advantage of a proprietary method consisting in labeling the targets with metal particles (e.g. gold nanoballs, possibly subsequently revealed through silver enhancement at their surface). In the present technology, silver precipitation is advantageously used to build metallic bridges between the insulated fingers of the electrodes, changing in some way the electrodes' topology and proximity. A capacitance measurement is then performed, which is directly related to the presence of metallic precipitates over the electrodes' dielectric coating. Therefore, instead of monitoring the capacitance change due to a modification in the properties (permittivity, resistivity) of interacting molecules (which is usually difficult to calibrate and to interpret in terms of equivalent target molecules concentrations), our system most likely counts the number of metallic bridges connecting the electrodes and directly corresponding to the concentration of target molecules.

**Potential applications and advantages :**

- Fast readout;
- Highly sensitive, quantitative & reproducible detection;
- Easy detection even at very low test molecules concentrations (< 100 femtomoles).
- Easy calibration in absence of target/host interaction;
- Use of non-noble metals coated electrodes, fully compatible with standard low-cost silicon integrated circuit fabrication methods.;
- Electronic sensing of external analytes avoiding detection limitations imposed by more classical optical methods;
- Straightforward miniaturization of the device to enable lab-on-a-chip design.

**Patent :** EP1516174 B1 and US2005227373 A1

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-155

**Contact name :** Debuigne Fabienne fabienne.debuigne@uclouvain.be

Licensing opportunities

**Title :** Low swing current mode logic family (LSCML)

**Institution :** Université catholique de Louvain

**Field :** Electronic

**Keywords :** LSCML logic circuits, low power applications, encryption devices,…

**Description :** The LSCML logic style is a low-swing dynamic differential self-timed logic family. It features the use of a feedback to achieve both the low swing and the self-timing and only two pMOS transistors are needed to realize this feedback. This contrasts with the complexity and constraints brought by some methods used in another logic families to produce the low swing.

Dynamic logic styles operating with a low swing feature a lower dynamic power consumption which is meaningful in dynamic logic circuits. Also, it has been widely demonstrated in the open literature that systems and large chips using asynchronous techniques and self-timed logic styles consume a lower power than systems using synchronous design. Those two advantages make the LSCML logic family highly interesting for low power applications.

Another advantage of the LSCML logic circuits lies in the fact that the power consumption is independent of the data inputs, this makes the LSCML logic family particularly interesting to prevent differential power analysis (DPA) attacks in encryption devices.

On the other hand, the LSCML logic family combined with a specific self-timing circuit that we propose, leads to a speed performance as high as that in DDCVSL logic family in large circuits.

**Potential applications and advantages :** Advantages :

- Low power consumption;
- Self-timed dynamic logic style;
- High speed performance logic style when combined with the proposed self-timing circuit;

Applications :

- Hardware implementation of secure encryption operators against power and electromagnetic attacks;
- Low power applications;
- High performance applications;

**Patent :** US2007222475 A1

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-185

**Contact name :** Debuigne Fabienne fabienne.debuigne@uclouvain.be

## Licensing opportunities

**Title :** Method of manufacturing a multilayer semi-conductor structure with reduced OHMIC losses

**Institution :** Université catholique de Louvain

**Field :** Electronic

**Keywords :** Microelectronics, SOI, semiconductors, RF, OHMIC losses, HR substrate

**Description :** This invention relates to a process for manufacturing a multilayered structure based upon SOI technologies and permitting their use in RF (Radio-Frequency) applications well beyond 100 MHz. To this end, it is important to greatly reduce ohmic losses in the substrate. Let us remember that a SOI slice is typically made of a silicon substrate with a thickness of a few hundred micrometers, a very thin (a few tens of nanometers) isolating layer, and an active layer whose thickness ranges for a few hundreds of nanometers to a few micrometers. The use of SOI wafer in RF applications requires a high resistivity (HR) substrate in order to reduce ohmic losses at their level. An accepted rule is that such losses are suppressed when the substrate resistivity reaches 3 kW cm. Nevertheless, HR-SOI wafers are very sensitive to fixed electrical charges (Qox) present in the isolating layer, whose number depends on the various processing step of the SOI wafer. Those fixed charges attract free carriers close to the interface between the substrate and the isolating layer and thus lead to the formation of a low resistivity layer and thus increased ohmic losses. The purpose of the invention is to propose a method in order to lower ohmic losses in the HR silicon substrate by raising the density of charge traps (Dit) at the interface between the substrate and the isolating layer. This method implies to deposit a thin layer between the isolating layer and the substrate, this layer comprising grains having a size of about 50 nm, in order to greatly increase the density of grains boundaries. This layer can in particular be made of polysilicon obtained from amorphous silicon deposited on the substrate at 525 °C and later submitted to an annealing step (RTA) under well defined operating conditions. The resulting polysilicon is made of silicon grains whose size and number are under control.

**Potential applications and advantages :** Advantages :

■ Important lowering of ohmic losses in the substrate of HR-SOI wafer by optimizing the effective resistivity of the SOI substrate;

■ Does not require substantial modifications of the industrial process;

■ Only one extra layer which does not require gluing nor polishing;

■ Stable reduction of the ohmic losses, it is not deteriorated by the processing steps (thermal budget, implantations, etc.) applied later to the delivered SOI wafer.

Applications :

■ Radio-Frequency circuits;

■ High Speed circuits;

■ High perfomance mixed-mode IC.

**Patent :** US2007032040 A1 and EP1665367 A2

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-190

**Contact name :** Debuigne Fabienne fabienne.debuigne@uclouvain.be

## Licensing opportunities

**Title :** Selective etching for semiconductors devices

**Institution :** Université catholique de Louvain

**Field :** Electronic

**Keywords :** Microelectronics, semiconductors, selective etching, MEMS

**Description :** Damaged silicon dioxide has been proven to be more reactive to hydrofluoric acid (HF). Ion implantation of any specie is thus a technique to enhance the etch rate of silicon dioxide in HF. Any species can be implanted to enhance the etch rate of silicon dioxide as the relevant parameter characterizing the damage creation is the nuclear deposited energy.

HF etching of oxide is an autocatalytic reaction. One water molecule is needed for HF dissociation in order to dissolve oxide. The dissolution of oxide produces then two water molecules. In aqueous solution the water produced by the reaction is immediately dissolved in the solution, and does not contribute to further etching. The etching selectivity is therefore limited to a value of 4. The selectivity can be increased to a value of 200, by etching with HF in vapor phase (VHF). In VHF, water is present in limited amount, therefore the water issue from the reaction is re-used to sustain further reacting. Tuning the etching temperature yields conditions were in the unimplanted area all the water produced by the slow rate reaction is evaporated, whether in the implanted area the etch rate being higher, evaporation cannot evacuate all the water produced, which is then re-used for reaction and increases drastically the etch rate by avalanche effect. This controlled autocatalytic reaction yields very high etching selectivity.

Selective etching of implanted oxide is a foreseen technique for creation of buried mask in oxide layer. The field of applications is wide, from under etch reduction of anchors in MEMS fabrication, to definition of bottom gate in double gate MOSFET fabrication and microchannels creation in oxide layer.

**Potential applications and advantages :** Advantages :

- High etching selectivity;
- Any species can be implanted to modify the etch rate (avoid contamination of the top layer when implanting in a buried layer);
- Possibility to modify the etching properties of a buried layer.

Applications :

- Buried mask fabrication;
- Definition of bottom gate of self-aligned double gate MOSFETs;
- Reduction of anchors underetch in MEMS microfabrication;
- Definition of microchannels in oxide layer.

**Patent :** PCT/EP2007/000413

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ADRE 10

**Contact name :** Debuigne Fabienne fabienne.debuigne@uclouvain.be

## Licensing opportunities

**Title :** Insulated substrate impedance transducers

**Institution :** Facultés universitaires Notre-Dame de la Paix de Namur
Université catholique de Louvain

**Field :** Electronic

**Keywords :** PCT/EP2007/007861

**Description :** In parallel to geometries down-scaling in semiconductors industry, modern electronic systems ask for increased smartness involving new functionalities and in situ signal or data processing. With this regards, insulated substrate impedance transducers (ISIT) combine an innovative semiconductor's transduction principle to a dielectric impedance measurement method derived from electrochemistry and telecommunication. As in Ion-Sensitive FET, the ISIT working principle involves the conductance change of a semiconductor in response to an extrinsic physico-chemical stimulus. In contrast to ISFET however, this conductance change is sensed through an insulator thereby inducing a modification of the ISIT intrinsic dielectric relaxation constant.

Depending on the application, information retrieval from the ISIT's complex impedance can be done either by equivalent resistance(s) and capacitance(s) identification or by dielectric relaxation spectroscopy. Instead of scalar data obtained by purely resistive or capacitive systems, the first identification principle provides a couple of complementary frequency-dependent parameters for subsequent signal processing such as sources separation and noise reduction. Following the dielectric relaxation approach, several parallel-connected ISITs could be multiplexed in frequency/time domains, each being optimized to work in its own range. First ISIT demonstrators, based on a field-effect action of metallic grains on the sensitive substrate, allowed detecting silver-labelled 530 bp DNA targets below 1 nM in concentration.

**Potential applications and advantages :**

Advantages :

- simplified CMOS-compatible manufacturing process;
- higher performances (detection limit, sensitivity) at a given integration scale;
- ready for dielectric impedance spectroscopy and multiparametric analyses.

Applications :

- biochemical analysis;
- smart electronic devices and systems;
- distributed conductance sensors to detect light, pressure, temperature, electromagnetic fields, electrochemical reactions, etc.;
- substances characterization regarding their workfunction, Fermi level or redox potential.

**Patent :** Microelectronics, semiconductors, dielectric impedance measurement, DNA targets, detection, microarrays, etc.

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ADRE 13

**Contact name :** Debuigne Fabienne fabienne.debuigne@uclouvain.be

## Licensing opportunities

**Title :** Wireless architecture for interfacing MEMS tag sensors at ultra low power

**Institution :** Université catholique de Louvain

**Field :** Electronic

**Keywords :** Wireless, instrumentation, inductive coupling, Micro-Electro-Mechanical-Systems (MEMS), radio-frequency-identification (RFID)

**Description :** THE world of integrated sensors is in constant evolution. Amongst the different technologies developed, the Micro-Electro-Mechanical-Systems (MEMS) earned an important place these last 25 years. Indeed, the diversity of MEMS sensors and so, their conceivable applications kindled the curiosity of scientists and industrials. Nowadays, the possibility of use of MEMS sensors is steadily increasing, for the "daily user" as well as in the industrial world. The new architecture that we propose here allows for interfacing MEMS sensors while sensibly reducing the power consumption and reducing design complexity and size.

The architecture aim is to realize the sending of data from the transponder to the reader. Those data, coming from the transponder are provided either by one or few MEMS sensors, or are memorized first (physically or not, for example, as a capacitance, resistance or current value, leading to identification applications). Those data are sent to the reader at short distance, via an inductive link, still consuming very low power.
The information is recovered in the reader by demodulation. The transponder is powered by the reader through the RF link; the reader powered itself, either thanks to a battery, or via an energy scavenging system.

**Potential applications and advantages :**

- Low-consumption, low-area and wireless sensing devices: biomedical implantable monitoring devices, radio-frequency identifier tags (RFID), measurement in vacuum, on rotating shafts or blades etc.;
- interfacing of all kinds of MEMS sensors;
- wireless sensing device;
- very low power consumption;
- low area sensing device;

**Patent :** GB patent application 0801130.6

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** ADRE 17

**Contact name :** Debuigne Fabienne fabienne.debuigne@uclouvain.be

# UCL

# OPPORTUNITIES HEALTH

## Licensing opportunities

**Title :** Peroxisome-associated polypeptide (peroxiredoxin 5), nucleotide sequence encoding said polypeptide and their uses in the diagnosis and/or the treatment of lung injuries and diseases, and of oxidative stress-related disorders

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** Antioxidant, ROS, oxidative stress, aging, cancer, cardiovascular, respiratory, diagnosis, genomics

**Description :** Oxygen metabolism in mammalian cells and tissues generates reactive oxygen species (ROS). ROS induce oxidative stress and damages to cells by reacting with cellular lipids, proteins and nucleic acids. ROS have been implicated in a variety of human diseases such as atherosclerosis, asthma, Alzheimer's disease, Parkinson's disease but also in stroke, aging and inflammation. Researchers of both the Catholic University of Louvain and the University of Mons-Hainaut hereby present a novel antioxidant enzyme (peroxiredoxin 5) widely expressed in human tissues including tissues affected by the aforementioned diseases. This enzyme protects human cells against oxidative damages caused by ROS. Moreover, the gene that encodes this protein has been identified and cloned in human and mouse.

**Potential applications and advantages :** The discovery of this novel antioxidant enzyme and its encoding gene may lead to the development of therapeutic strategies for the treatment or the prevention of oxidative stress-related disorders in human. This enzyme used in the form of a recombinant protein may serve as antioxidant to protect tissues against oxidative attacks. Moreover, cloning of the peroxiredoxin 5 gene may lead to new gene therapy approaches in the treatment of stress-related disorders or in the diagnosis of diseases linked to single nucleotide polymorphism and/or mutations of this gene. Mouse knocked-out for peroxiredoxin 5 gene may be used as animal model for oxidative stress-related diseases.

**Patent :** Priority : BE 09700692 filed on 20/08/1997 // PCT filed on 20/08/1998 and published on 25/02/1999 under No. WO 99/09054 // US patent granted on 06/07/2004 under No. 6,759,194

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-058

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## Licensing opportunities

**Title :** Use of compound or pharmaceutical composition for the prevention and/or the treatment of ischemic heart and peripheral vascular diseases, tumour development and for wound healing

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** Ischemia, angiogenesis modulation, caveolin, HSP90, Akt, NO, screening

**Description :** It is known that the decrease and even more the blocking of blood circulation in specific parts of the human body may induce the necrosis of tissues that are no longer irrigated by specific affected blood vessels. Many diseases result from such kind of deprivation. Therapeutic angiogenesis favors the development of collateral vessels to revascularize ischemic territories. Administration of angiogenic cytokines was recently proposed, but this approach is hampered by two major limitations: (a) the altered sensitivity of the dysfunctional endothelium to these cytokines; (b) the difficulty to maintain a high local concentration of cytokines without side effects. Therefore it is essential to find some tools enabling the modulation of angiogenesis.
The inventors showed for the first time that angiogenesis can be modulated directly through change in endogenous caveolin-1 abundance and its effect on NO production. In particular, exposure to high cholesterol concentrations decreases NO production and angiogenesis: with a sterol regulatory element in its promoter region, caveolin-1 is upregulated and forms a complex with eNOS, inhibiting the activity of this endothelial enzyme that produces NO. Secondly, the invention proposes HSP90 and Akt as new targets for modulating angiogenesis. Finally, the invention illustrates the cooperative effect of caveolin-1, HSP90, Akt and known angiogenetic factors such as statins and VEGF on angiogenesis.
The present invention is therefore related to a pharmaceutical composition for use as a medicament in the modulation of angiogenesis, and to a method of testing, screening and manufacturing of new compounds or compositions which influence the angiogenesis.

**Potential applications and advantages :** This invention may find applications in the prevention and/or the treatment of various diseases and pathologies, without the limitations of state of the art methods, an increase in angiogenesis being beneficial in a variety of ischemic cardiovascular diseases, while a decrease in angiogenesis is beneficial in angiogenesis-dependent tumor growth and metastatic diseases.

Another important application is the screening of compounds or compositions which stimulate angiogenesis, by a method comprising the step of trapping the endogenous caveolin-1 thereby preventing its binding to eNOS. In particular, caveolin protein expression levels can be studied after incubation of increasing doses of the compounds or compositions to be screened with endothelial cells.

**Patent :** EP99870171.8, WO01/11038, US CIP 2004/0110684

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-072

**Contact name :** Hody Michèle michele.hody@uclouvain.be

## Licensing opportunities

**Title :** Positional cloning of the gene (VMGLOM) and its mutations causing dysmorphogenesis of blood vessels, venous malformations with glomus cells (glomangiomas)

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** Pediatric, dermatological and cardiovascular diseases, angiogenesis, immunotherapy, diagnostics, genomics

**Description :** This research is part of a larger program, the goal of which is to get insights into the ethiopathogenesis of cardiovascular disorders. At the same time, the program also aims at getting a better understanding of the mechanisms that regulate blood vessel growth, angiogenesis. In acquired vascular disorders, such as atherosclerosis, normal blood vessel walls undergo changes that create life-threatening damages. In cancer induced angiogenesis, increased localized blood vessel growth, important for tumor growth and metastasis, is observed. Thus, identification of the factors that regulate e.g. vascular endothelial cell and smooth muscle cell growth and differentiation, are of primary importance. They could serve as factors to be used as treatment or as targets of treatment. To identify such factors, relevant to human angiogenic disorders, we use a genetic approach, by studying families with inherited vascular disorders. This approach should lead to the identification of genes, and the proteins they encode that are important for blood vessel development and function in humans. Molecular biological studies are subsequently performed to reveal the function and interactions of the identified protein(s).

**Potential applications and advantages :** The results of this research have lead to the identification of a novel factor involved in blood vessel development, and more precisely in vascular smooth muscle cell differentiation. As the factors regulating vascular smooth muscle cell recruitment and differentiation are not well characterized, this novel factor gives an important insight and tool to study and influence these processes. This factor is expressed in vascular endothelial cells, and thus reveals new data on vascular endothelial cell-regulated smooth muscle recruitment. The factor may have important applications for regulating, inhibiting and/or increasing, vascular smooth muscle cell growth, which is an important step e.g. in atherosclerotic plaque formation and maturation. The protein may also be involved in other processes, namely in regulating immune response in the skin, such as in e.g. atopic dermatitis. The identification of the gene gives a direct diagnostic tool for detecting individuals who carry mutations in this gene, enabling thereby prenatal diagnosis.

**Patent :** Priority: EP 00870022.1 filed on 16/02/2000, US 60/195,777 filed on 10/04/2000 PCT: International patent application filed on 16/02/2001 and published on 23/08/2001 under No. WO 01/60856 US patent application pending (published on 18/09/2003 under No. 2

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-101

**Contact name :** Hody Michèle michele.hody@uclouvain.be

## Licensing opportunities

**Title :** Methods for preparing perfluorinated [18F]-radiolabelled nitroimidazole derivatives for cellular hypoxia detection

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** Cellular hypoxia, nuclear medicine techniques, PET, [18F]-radiolabel

**Description :** Cellular hypoxia is a typical feature in various physiopathological processes as frequent as malignant tumor development, heart disease, stroke, diabetes and wound healing. Accurate determination of the magnitude of tissue hypoxia has always been a focus of intensive research. Such information is indeed of great value as a prognostic factor of the severity of the disease, and as a tool to select for alternative therapies and to monitor the response to therapeutic interventions.

The present invention relates to :

- the synthesis of radiolabelled perfluorinated bioactive compounds and more particularly [18F]-EF3 and [18F]-EF5 , for in vivo detection of hypoxia. These markers are nitroheterocyclic compounds which, under hypoxic cellular conditions, covalently bind to intracellular macromolecules;

- the use of these markers for in vivo detection of hypoxia by nuclear medicine techniques like Positron Emission Tomography (PET).

**Potential applications and advantages :** In comparison with the existing methods for measuring hypoxia (e.g. microelectrode, immunofluorescence and/or flow cytometry to detect hypoxia-binding chemical markers), the PET detection is a non-invasive technique that would allow individual measurements in any tumors and tissues. In comparison with other nuclear medicine techniques (e.g. single photon emission computed tomography), the PET camera detection offers the advantage of a better spatial resolution and a much more accurate quantification of the radioactivity. In comparison with other hypoxia-binding chemical markers, [18F]-EF3 and [18F]-EF5 would maintain both their superior specificity and sensitivity for both hypoxic cells as observed for unlabelled parent compounds. Such a technique could be easily combined with anatomic imaging modalities (e.g. CT Scanner and magnetic resonance imaging) allowing a better mapping of the distribution of hypoxia in a specific tissue/organ. In addition, the detection of hypoxia by the PET method could also be combined with other functional imaging techniques (e.g. functional magnetic resonance imaging, PET with other markers) investigating other important physiological parameters such as tissue proliferation or metabolism.

**Patent :** Priority: EP 99870172.6 filed on 11/08/1999, PCT: International patent application filed on 22/05/2000 and published on 22/03/2001 under No. WO 01/12575, (http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=WO0112575&F=0), EP patent granted on 17/08/2005 unde

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-102

**Contact name :** Hody Michèle michele.hody@uclouvain.be

## Licensing opportunities

**Title :** Combining enzyme-antibody conjugates and antibiotics as medium additive for the selective growth of pathogenic bacteria in food analysis and medical diagnostics

**Institution :** Université catholique de Louvain

**Field :** Agrofood
Health

**Keywords :** Diagnostic, pathogen, foodborne, biological fluids, elisa, immunoassay

**Description :** Food analysis and medical diagnostics are the main application fields of the invention. When analyzing samples for the detection of a pathogenic bacterium, the first step is to amplify the pathogen in a culture before the subsequent detection. This amplification has to be rapid and selective. Ideally, only the pathogen should grow at its maximal rate. Some selective media have been developed by optimizing their composition but they are usually poorly selective and/or poorly nutritive. This invention intends to allow rapid and selective growth of a target pathogenic bacterium by the use of a rich medium supplemented with an enzyme-antibody conjugate and an antibiotic. The enzyme is able to degrade the antibiotic (example: the enzyme is a b-lactamase and the antibiotic is penicillin) and the antibody recognizes specifically the target bacterium. As the enzyme and the antibody are associated in a conjugate, the enzyme will cover the surface of the target bacterium via the specific antibody recognition. Hence, the bacterium will be protected against the antibiotic and will grow normally whereas all the other bacteria will be sensitive to the antibiotic and will not grow.

**Potential applications and advantages :** The main advantage of the method compared to existing strategies is its simplicity. The medium comprised a standard rich medium and only two additives: the antibiotics and the enzyme-antibody conjugate. For some methods, the pathogen is separated from other cells present in the sample. Such a step is absent in this invention. Detection of pathogenic bacteria such as E. coli O-157:H7, Salmonella, Listeria, Shigella (...) in food samples is probably the main application of this invention. In medical diagnostics, the strategy can also be used to detect pathogens in blood, urine or stool samples. As the invention is a method for the selective growth or selective survival of a target cell, it can eventually find applications in toxic therapies such as chemotherapy of cancer. In this case, the antibody-enzyme conjugate will be used to selectively protect healthy cells from the toxic effect of an anticancer drug.

**Patent :** Priority : EP 00870139.3 filed on 21/06/2000, PCT : International patent application filed on 07/06/2001 and published on 27/12/2001 under No. WO 01/97854, (http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=WO0197854&F=0), US patent granted on 29/11/2005 unde

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-112

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## Licensing opportunities

**Title :** Method for treating neuropathic pain and pharmaceutical preparation therefor

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** Neuropathic pain, alpha2-adrenergic agonist, clonidine, peripheral nerve block

**Description :** Chronic pain resulting from peripheral nerve injury (consecutive to cancer invasion, surgery, radiotherapy, chemotherapy, trauma…) is not uncommon in clinical practice. Such injury provokes spontaneous pain, thermal hyperalgesia, mechanical allodynia or hyperalgesia…, features that are particularly distressing for the patient and difficult to relieve with classical drugs. Neuropathic pain is reported to be "opioid-poorly-responsive-pain". When oral medications fail, the use of spinal drugs represents the last alternative to alleviate pain. However, spinal route is an invasive therapy that is not devoid of dangerous side effects both related to the technique and to the spinally administered drugs. Very few spinal substances are available for human use today, mainly because of the risks of neurotoxicity and the small therapeutic ratio. The technology developed in our university proposes the injection of an alpha2-adrenergic agonist (clonidine, dexmedetomidine…) close to the injured nerve using a peripheral nerve block technique to relieve chronic neuropathic pain. The alpha2-adrenergic agonist administered by this route induces a long-lasting pain relief both in validated animal models of neuropathic pain and in human cases. In animal models, clonidine produces a maximal antihyperalgesic effect after 3 days and a pain relief that lasts for 10 to 14 days. Very similar results have been observed in patients.

**Potential applications and advantages :** The technique is relatively safe, devoid of major drug's side effects and allows chronic pain relief without the use of too invasive technique. Alpha2-adrenergic agonists are devoid of most of the major side effects that result from chronic administration of the classical substances used to relieve neuropathic pain.

The main advantages of peripheral nerve blocks are to selectively restrict the analgesic effect to one sensitive territory and to allow loco-regional analgesia in patients for whom the coagulation parameters are not optimal. Furthermore, the perineural injection of alpha2-adrenergic agonist is easily realizable and provides long-lasting effect. In consequence, the problems related to placement of an invasive drug delivery system can be strongly minimized. Health-related quality of life, patient satisfaction and economic assessment might be improved with such a treatment, especially in chronic pain conditions.

**Patent :** Priority : US 60/289,063 filed on 07/05/2001, US patent application pending (filed on 07/05/2002 and published on 30/01/2003 under No. 20030022926 : http://appft1.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearchbool.ht

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-134

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## Licensing opportunities

**Title :** Medical use of ras antagonists for the treatment of capillary malformation

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** Inherited capillary malformations, arteriovenous malformation, arteriovenous fistula, Parkes Weber syndrome, p120-RasGAP, Ras antagonists, Ras activity modulators, gene therapy

**Description :** Defective cutaneous vascular development manifests as malformed vessels that vary in size, location, blood flow, and clinical severity. Capillary malformation (CM), or “port-wine stain”,is the most common vascular malformation, occurring in 0.3% of newborns. CM is a flat, cutaneous, slow-flow lesion that is composed of dermal capillary-venular–like channels that are dilated and/or increased in number. Arteriovenous malformation (AVM) and arteriovenous fistula (AVF) are fast-flow vascular anomalies that can arise in skin, muscle, bone, internal organs, and the brain and can cause life-threatening complications such as bleeding, congestive heart failure, or neurologic consequences.
The invention relates to the identification of mutations in the RASA1 gene that are linked to these abovementioned vascular anomalies. The gene RASA1 encodes p120 Ras GTPase-activating protein (p120-RasGAP), best known for its function as a negative regulator of Ras/MAPK signaling pathway that mediates signals for cellular growth, differentiation and proliferation from various receptor tyrosine kinases on the cell surface.

**Potential applications and advantages :** The present invention provides thus new tools for diagnosing severe vascular malformations at the molecular level. It relates to :

- a method and a kit for the in vitro diagnosing of vascular anomalies in a subject carrying a mutation in the RASA1 gene;

- methods for treating, preventing or alleviating vascular anomalies by restoring or replacing the lost protein function, more particularly restoring or replacing RASA1 activity;
- the use of a substance for treating, preventing or alleviating vascular anomalies, said substance (Ras antagonist or a Ras activity modulator) being able to modulate the status of p120-RasGAP in a cell resulting in the presence of p120-RasGAP protein in said cell in an amount effective to inactivate GTP bound Ras protein.

**Patent :** Priority : PCT (International patent application) filed on 20/03/2003 and published on 30/09/2004 under No. WO 04/083458 (http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=WO2004083458&F=8)
US patent application pending (published on 29/06/2006 under No. 2006

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-167

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## Licensing opportunities

**Title :** Glycosylated triketide delta lactones

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** Polyketides, biostatic, infections, phytopharmaceutics

**Description :** Polyketides represent a large family of diverse compounds presenting various activities. Some are antibiotic agents such as tetracyclines, anticancer agents such as daunomycin, or immunosuppressants such as FK506 and rapamycin. The inventors surprisingly found that new glycosylated triketide d-lactones had biostatic and biocide activities. For example, cornicinine, a glycosylated triketide d-lactone contained in extracts of Nephrotomacornicina (Linnaeus, 1758) (Tipulidae, Diptera) was able to induce the differentiation at nanomolar concentrations of all the vegetative cells of Anabaena.azollae into akinetes that are resting, spore-like cells.

**Potential applications and advantages :** Glycosylated triketide d-lactones described are novel compounds that present a clear biostatic action. These compounds could be used as phytopharmaceutical and pharmaceutical agents in the treatment of plants and animals against microbial infections including bacterial, yeast, fungal, viral and protozoan infections. They can be involved in the synthesis or biosynthesis of a high diversity of secondary metabolites with very high therapeutic potential. Cornicinine and derivatives thereof can also be good tools for studying the fundamental process of cell differentiation.

**Patent :** Priority : PCT (International patent application) filed on 28/11/2003 and published on 16/06/2005 under No. WO 2005/054267 (http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=WO2005054267&F=8)
National phases in CA, EP and US (pending)

**Stage of development :** ---

**Type of collaboration :** Research collaboration
License agreement

**File number :** SOP-179

**Contact name :** Hody Michèle michele.hody@uclouvain.be

## Licensing opportunities

**Title :** Assay for detecting and identifying micro-organisms

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** Detection, identification, genotyping, bacteria, Gram, molecular markers

**Description :** In the medical and veterinary clinical setting, detection and species identification of harmful bacteria infecting biological fluids or tissues is a pre-requisite for appropriate and timely relevant antibiotherapy. Such identification is classically performed by conventional microbiological methods, i.e. culture on solid medium or in liquid phase, followed by phenotypic identification based on the biochemical features of the bacteria. Usually, the whole process requires 48 to 72 hours to be completed. This period is unfortunately too long, considering the speed of bacterial growth in infected tissues, the pathological effects related the toxins that some bacteria produce and the rapid epidemic spreading of other in the environment. There is therefore a need for the rapid detection and identification of pathogenic bacterial agent(s) involved in human or animal infections or present in the environment. In accordance with the present invention two series of conserved molecular markers (preferentially conserved in Gram-positive or Gram-negative bacteria) were identified and characterized which are extremely suitable for permitting the detection and genotyping of micro-organisms, and in particular of bacteria, in a Gram-specific way.

**Potential applications and advantages :** The present invention now allows, by a combined use of these two types of conserved molecular marker sequences, to detect the molecular presence of bacteria in a sample and to genotype these bacteria in a Gram-specific way as well as in a genera-, species-, and even sometimes, strain-specific manner. As a consequence, the most suitable antibiotherapy to be applied can be rapidly determined. This method is far more sensitive than the conventional Gram staining procedure. It circumvents the lack of bacterial growth that appears sometimes in routine microbiological detection, and that generates a false negative result. It can be used in samples from tissues showing bacterial background. In addition, the use of different markers that are mapped on different loci in the bacteria also improves the quality of the diagnosis in that it can more easily circumvent false positive reactions due to accidental PCR contamination hampering the use of one particular marker.

**Patent :** Priority : BE 2004/0152 filed on 19/03/2004
PCT: International patent application filed on 18/03/2005 and published on 29/09/2005 under No. WO 2005/090596
(http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=WO2005090596&F=8)
National phases in CA, EP and US

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-182

**Contact name :** Hody Michèle michele.hody@uclouvain.be

## Licensing opportunities

**Title :** Use of agonists and antagonists of beta-adrenoceptors for treating arterial diseases

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** Cardiovascular diseases, metabolic syndrome, beta-adrenoceptors

**Description :** There remains a need in the art for providing improved methods and compositions for treating cardiovascular diseases, ischemic and failing cardiac diseases and/or diseases related thereto as well as conditions leading to such diseases, such as e.g. metabolic syndrome.

The present invention is partly based on the finding that compounds having a beta3-adrenoceptor agonistic effect according show a strong and long-lasting coronary artery vasodilating action, peripheral blood vessel vasodilating action, and celebral blood vessel vasodilating action on mammals. Moreover, when these compounds are administered in combination with one or more compounds having a beta1/beta2-adrenoceptor antagonistic activity, such combination provides a double effect: an improvement of perfusion of the heart muscle (vasodilating mediated by the beta3-adrenoceptor agonistic activity) and a reduction of the contraction force of the cardiac muscle (mediated by the beta1/beta2-adrenoceptor antagonistic activity). The present invention relates therefore to the use of agonists and antagonists of beta-adrenoceptors, and also to methods and compositions of said compounds, for treating cardiovascular diseases and diseases related thereto.

**Potential applications and advantages :** Such compounds having a beta3-adrenoceptor agonistic effect can be effectively combined with compounds having a beta1/beta2-adrenoceptor antagonistic effect, such combination providing particularly advantageous effects. The present compounds may therefore be used as preventive or curative agents for diseases such as diseases of circulatory systems, for example, coronary artery diseases, peripheral and cerebral circulatory disorders (e.g. cerebral infarction and transient cerebral ischemic attack), failing and ischemic cardiac diseases (e.g. angina pectoris and myocardial infarction), conditions related to metabolic syndrome, etc. As a result, administration of this type of compounds permits to greatly improve perfusion of the heart muscle, beneficiating its integrity and functionally.

**Patent :** Priority : US provisional specification filed on 09/08/2004 under No. 60/600,093
PCT:(International patent application) filed on 08/08/2005 and published on 16/02/2006 under No. WO 2006/015830
(http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=WO2006015830&F=

**Stage of development :** ---

**Type of collaboration :** License agreement

**File number :** SOP-189

**Contact name :** Hody Michèle michele.hody@uclouvain.be

## Licensing opportunities

| | |
|---|---|
| **Title :** | Method and kit for determining antigen content in a sample using double immunohistochemical detection |
| **Institution :** | Université catholique de Louvain |
| **Field :** | Health<br>Instrumentation |
| **Keywords :** | Immunohistochemistry, immunohistodensitometry, antigen quantification |
| **Description :** | The present invention relates to the field of immunohistochemistry and immunohistodensitometry. The present invention provides a method for determining antigen content in a region of interest of a sample. The method comprises a double immunohistochemical detection of the antigen to be quantified and the region of interest and image-based computerized analysis thereof by the application of a specific algorithm. The present invention further relates to a kit for determining antigen content in a region of interest of a sample. |
| **Potential applications and advantages :** | The present invention relates to an improved method and kit, for determining antigen content in a specific cell or tissue sample or compartment, which overcomes at least some of the problems of the prior art. |
| **Patent :** | Priority : International patent application (PCT) filed on 25/08/2006<br>PCT filed on 24/08/2007 and published on 28/02/2008 under No. WO2008023055 |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | SOP-200 |
| **Contact name :** | Hody Michèle michele.hody@uclouvain.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Method, device and kit for determining conditions related to a dysfunction of the renal proximal tubule |
| **Institution :** | Université catholique de Louvain |
| **Field :** | Health |
| **Keywords :** | renal proximal tubule dysfunction, diagnosis, urinary biomarker |
| **Description :** | The present invention relates to the field of diagnosis. In particular, the invention provides a method for diagnosing conditions related to a dysfunction of the renal proximal tubule (RPT), by using a new urinary biomarker. The present invention is therefore directed to a single measurement of this biomarker in urine samples, without any other analyte and allows evaluating RPT dysfunction irrespective of any glomerular deficiency.<br><br>The invention further provides a diagnostic kit for diagnosing conditions related to a dysfunction of the RPT. In addition, the invention provides methods for identifying agents useful in the treatment of said conditions, and methods for monitoring the efficacy of a treatment for said conditions. |
| **Potential applications and advantages :** | New urinary biomarker that enables an early and sensitive detection of RPT diseases. Its direct shedding into the urine, i.e. its apparition in the urine without the step of glomerular filtration overcomes at least some of the problems of known makers. |
| **Patent :** | PCT patent application filed on 12/02/2008 under No. PCT/EP2008/051690 (priority 12/02/2007) |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | SOP-203 |
| **Contact name :** | Hody Michèle michele.hody@uclouvain.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Method for the determination and the classification of rheumatic conditions |
| **Institution :** | Université catholique de Louvain |
| **Field :** | Health |
| **Keywords :** | rheumatic conditions, arthritis, differential diagnosis |
| **Description :** | This invention concerns an arthritis discrimination test, which allows early identification of several rheumatic conditions.<br><br>The present inventors have identified a series of genes useful in screening for and differentiating several arthritis diseases. The expression profiles of these genes in a particular biological sample can be used in identifying whether the individual has a rheumatic condition selected from several inflammatory conditions. |
| **Potential applications and advantages :** | The point of the present invention is that rheumatologists are not confronted to a differential diagnosis between only two conditions but to a differential diagnosis between several inflammatory conditions. The present invention addresses the simultaneous differential diagnosis of all these conditions. |
| **Patent :** | PCT patent application filed on 29/02/2008 under No. PCT/EP2008/052532 |
| **Stage of development :** | --- |
| **Type of collaboration :** | License agreement |
| **File number :** | SOP-204 |
| **Contact name :** | Hody Michèle michele.hody@uclouvain.be |

## Licensing opportunities

**Title :** Methods and agents for the treatment of cancer

**Institution :** Université catholique de Louvain

**Field :** Health

**Keywords :** anticancer treatment, tumor sensitization, botulinum toxin, BOTOX

**Description :** In order to enhance anticancer treatment, there is a need to develop effective chemotherapy, radiotherapy treatment and/or combination thereof, especially for cases where surgical operations are difficult and the risk of recurrence is high. Among anticancer drugs developed to date, it has been reported that taxol and cisplatin may be used as radiotherapy-enhancing agents (or so called "radio-sensitizer"). However, even though they are rather effective in enhancing radiotherapy, they still have some critical defects, especially causing toxicity to patients.
The inventors have surprisingly found that administering a botulinum toxin (BT) to cancerous cells or a tumor in combination with radiotherapy is synergistically effective in treating said cells in comparison with radiotherapy only, or with BT only. Using validated tumor models, he demonstrates that local administration of BOTOX dramatically increases tumor oxygenation and perfusion, leading to a substantial improvement in tumor response to radiotherapy and chemotherapy.

**Potential applications and advantages :** This invention concerns an anticancer treatment which can enhance the effectiveness of existing therapies such as radiotherapy and chemotherapy, while having a low toxicity effect.
The present invention is based on the surprising finding that tumors become sensitized to cytotoxic therapies when they are pre-treated with a botulinum toxin (BT). The pre-treatment may be with a single BT, or with two or more BTs together in a composition. Where there are two or more BTs, one BT may be administered simultaneously, separately or sequentially with respect to another BT. It therefore provides new applications in cancerology for the drug BOTOX.

**Patent :** PCT application filed on 17/10/2005 and published under No. WO 2006/094539; National phases in CA, EP and US

**Stage of development :** ---

**Type of collaboration :** Research collaboration
License agreement

**File number :** SOP-192

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# UCL

# OPPORTUNITIES INSTRUMENTATION

## Licensing opportunities

**Title :** Column design for analytical temperature rising elution fractionation

**Institution :** Université catholique de Louvain

**Field :** Instrumentation

**Keywords :** Polymer analysis, TREF, fractionation, elastic wires

**Description :** The technology relates to an improved ATREF (Analytical Temperature Rising Elution Fractionation) method and device for automatically performing rapid and sensitive separation of different types of polyethylene and polypropylene (semicrystalline polymers) according to their crystallizability which in turn depends on the structure heterogeneity and/or the distribution of short-chain branching.The device is composed of a column equipped with a temperature controlling system, an automatic sample injection system, a pump for eluting the polymer fractions and a Differential Refractive Index (DRI) detector. The column is packed with elastic wires most often made of stainless steel. Those wires have a mean diameter of 0.1 mm and a length ranging from 3 to 50 mm. The main advantage of this packing compared to others often used in traditional ATREF methods is the significantly improved baseline stability during the elution step allowing sensitive and quantitative composition profiles to be generated. Typical injected polymer volumes and concentrations used in the method range from 200 to 500µl and from 0.5 to 3 mg/ml, respectively. Total duration of one experiment does not exceed 5 hours, which is significantly lower compared to other ATREF methods.

**Potential applications and advantages :** Advantages :

Fully automatic ATREF device, High baseline stability, Rapid, sensitive and reproducible fractionation and quantification (DRI detector)Low amount of polymer needed.

Applications :

- Composition profiles of polymer sample fractions having different cristallizability;

- Polymerization process control, Evaluation of polymerization catalysts performances, Polymeric structure/macroscopic properties relationships.

**Patent :** WO2004/034047

**Stage of development :** Early stage

**Type of collaboration :** License agreement

**File number :** SOP-161

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# UCL

# OPPORTUNITIES MATERIALS

## Licensing opportunities

**Title :** Machinable metallic composites

**Institution :** Université catholique de Louvain

**Field :** Materials

**Keywords :** Invar, honeycomb structure, heatsinks, semiconductors, aluminum

**Description :** The invention concerns machinable metallic composites useful as heatsinks for electronic devices. Most electronic power devices are mounted on base plates which act as heatsinks and conduct heat away from the devices. However, theses plates should have both high thermal conductivity and a coefficient of thermal expansion (CTE) which matches that of the semiconductor materials.

Solutions provided, up to date, to obtain this kind of materials present major drawbacks such as high densities, hardness of the material and poor machinability.

The licensable technology concerns a manufacturing method of composite metallic plates presenting both a high thermal conductivity and a high dimensional stability over a wide range of temperatures (from room temperature to 150°C). These composite plates are made of an aluminum or an aluminum alloy matrix reinforced with a low CTE Co-based alloy i.e. Stainless Invar. The three dimensional architecture of the reinforcement is optimized to maximize the thermal conductivity transversely to the plane of the plate and to minimize the thermal expansion in the plane of the plate. In addition, the composite material presents a low density, an adequate strength and excellent machinability properties.

Composites are made of aluminum or aluminum alloy reinforced with periodic structures of Invar or Stainless Invar which are in honeycomb form (interstices of the honeycomb structure are filled with aluminum or aluminum alloy).

Composites exhibit low densities of less than 4g/cm3, transverse thermal conductivity of greater than 190 W/m/K, isotropic in-plane coefficients of thermal expansion of 5-10.106/K.

**Potential applications and advantages :** Advantages :

- High heat dissipation properties;
- High dimensional stability on a wide range of temperatures;
- Low density;
- Good machinability with conventional tools;
- Good weldability to aluminum packages.

Applications :

- Thermal management in power electronics packaging and aerospace.

**Patent :** WO2006/021385

**Stage of development :** ---

**Type of collaboration :** Research collaboration
License agreement

**File number :** SOP-188

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# UCL

# OPPORTUNITIES OTHER APPLICATIONS

## Licensing opportunities

**Title :** Ammoxidation of hydrocarbons and hydrogenated metallo oxynitride catalysts thereof

**Institution :** Université catholique de Louvain

**Field :** Other applications

**Keywords :** Ammoxidation, acrylonitrile, metallo oxynitride

**Description :** The technology relates to a process for the oxidative conversion of hydrocarbons to nitriles. The catalytic system used for the reaction is based on metallo oxynitride compounds containing aluminum and a second transition metal M (usually vanadium).
In a first step, the catalyst is prepared by reaction between a vanadate salt and an aluminum salt followed by a drying operation and a calcination process leading to a catalyst with a basic activity. The oxide precursor is then treated by nitridation in order to obtain the correct composition. Around one kilogram of the catalyst can be produced per batch.

The ammoxidation process takes place at 500°C as a vapor phase reaction, in presence of hydrocarbons, oxygen, ammonia and the above-mentioned catalyst. Even if, the optimum contact time between the reactants and the catalyst, depends on the hydrocarbon being reacted, the catalyst employed and the temperature, it ranges in general between 0.1 and 5 seconds. This high space velocity gives rise to the formation of a catalyst reaching higher productivity compared to known ammoxidation propane catalysts. The propane conversion is 55% with an overall acrylonitrile yield of 36%. The metallo oxynitride catalytic materials might be also modified by introduction of additional metallic sites (alkali metals oxides, alkali metals or transition metals) as to adapt the catalyst formulation. Finally, the process could be enhanced using a propane recycling step and can be advantageously used in a catalytic fluid bed reactor.

**Potential applications and advantages :** Advantages :

- Lower price of propane with respect to propylene;
- Limiting the risk of propylene shortage;
- Lowering propylene formation and undesirable COx compounds production;
- High productivity with comparable propane conversion and acrylonitrile selectivity.

Applications :

- Acrylonitrile and acetonitrile production;
- Chemical intermediate for synthetic fibers, rubbers, nitriles and resins.

**Patent :** WO03/053913

**Stage of development :** ---

**Type of collaboration :** Research collaboration
License agreement

**File number :** SOP-147

**Contact name :** Leca François francois.leca@uclouvain.be

# ULB

# OPPORTUNITIES INSTRUMENTATION

## Licensing opportunities

**Title :** The Tremor Coherence Analyzer (TCA): an automatic portable medical device for pathological tremor study and analysis

**Institution :** Université libre de Bruxelles

**Field :** Instrumentation

**Keywords :** TCA, Coherence function, Pathological tremor, EMG sensor

**Description :** The invention relates to a portable medical device which is non invasive, easy to use, of moderate cost and which provides automatically an assessment of the interlimb and intralimb muscular coherence.

The TCA uses surface EMG sensors which are located on forearm muscles to measure muscular activity due to pathological tremor. The coherence function between these signals is calculated and makes TCA a tool for characterizing tremors related to specific diseases.

**Potential applications and advantages :** The TCA is to be used by the physician to help the diagnostic of a pathological tremor.

The TCA may also be advantageously used as a tool for testing the effect of drugs on tremor.

The TCA is a reliable, pocket-sized device to be used on the bedside in the daily practice of a physician.

**Patent :** US, EP and JP pending (WO 2005/120347)

**Stage of development :** ---

**Type of collaboration :** Research collaboration
License agreement

**File number :** 2004-07

**Contact name :** Di Stefano Patrick pdistefano@admin.ulb.ac.be

# ULB

# OPPORTUNITIES HEALTH

## Licensing opportunities

| | |
|---|---|
| **Title :** | Cancer diagnostic and therapy |
| **Institution :** | Université libre de Bruxelles<br>Université de Mons-Hainaut |
| **Field :** | Health |
| **Keywords :** | HLTF, cancer, early stage diagnosis |
| **Description :** | The invention is based on the elucidation of a mechanism by which HPV promotes oncogenesis and provides a method of diagnosing malignant tumors and methods of preventing the development of malignancies or inhibiting tumor growth. A method for diagnosing a neoplasm in a mammal is carried out by measuring the level of helicase-like transcription factor (HLTF) in tissue of the mammal. An increase in the level of HLTF in the tissue compared to the level in a normal control tissue indicates the presence of a neoplasm in the tissue. |
| **Potential applications and advantages :** | Cancer therapy and diagnostic at an earlier stage |
| **Patent :** | 1 delivered US patent and 1 EP patent application filled |
| **Stage of development :** | Early stage |
| **Type of collaboration :** | Research collaboration<br>License agreement |
| **File number :** | --- |
| **Contact name :** | Cayemittes Sonia sonia.cayemittes@umh.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Sea cucumber in vitro fecundation |
| **Institution :** | Université libre de Bruxelles<br>Université de Mons-Hainaut |
| **Field :** | Agrofood<br>Health |
| **Keywords :** | Sea cucumber, aquaculture, in vitro fecundation. |
| **Description :** | The invention concerns the culture of aquatic invertebrates and more specifically sea cucumber. |
| **Potential applications and advantages :** | The technology permits to obtain sea cucumber during the entire year and is an alternative solution to massive exploitation responsible for the species rarefaction. There is a great demand for sea cucumber in Asian countries which represent an important market. |
| **Patent :** | 1 PCT patent application filed |
| **Stage of development :** | Lab scale |
| **Type of collaboration :** | License agreement |
| **File number :** | --- |
| **Contact name :** | Di Stefano Patrick pdistefano@admin.ulb.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Photoreactive Ru (II) complexes anchored on oligonucleotides for cancer therapy |
| **Institution :** | Université libre de Bruxelles |
| **Field :** | Health |
| **Keywords :** | Phototherapy, cancer therapy, antisense strategy. |
| **Description :** | The invention relates to a compound made of a photoreactive Ru (II) complex bound to G-containing oligonucleotides, the method for obtaining them and their use, notably for targeting specific nucleotide sequences involved in hyperproliferative disorders and cancer. |
| **Potential applications and advantages :** | The invention provides oligonucleotide compounds able to specifically induce photocrosslinking with selected complementary nucleotide sequences to be targeted and inactivated. Potential applications involve treatment of diseases induced by the expression of specific nucleotide sequences, notably oncogenes, with the perspective to selectively modulate their expression. This includes cancer and hyperproliferative disorders, preferably affecting epithelial cells of the skin, digestive track, lungs, and genital or urinary organs. |
| **Patent :** | Pending (PCT). |
| **Stage of development :** | --- |
| **Type of collaboration :** | Research collaboration<br>License agreement |
| **File number :** | --- |
| **Contact name :** | Di Stefano Patrick pdistefano@admin.ulb.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | New perspectives in the treatment of trypanosome infections |
| **Institution :** | Université libre de Bruxelles |
| **Field :** | Health |
| **Keywords :** | Trypanosome, Treatment, ApoL-I. |
| **Description :** | The invention relates to the use of the human apolipoprotein L-I, or a derived polypeptide, for the treatment and/or the prevention of diseases induced in mammals by Trypanosomes. This treatment could be used for the treatment of the African and Asian variants of trypanosomes. |
| **Potential applications and advantages :** | Treatment and/or prevention of diseases induced by African and Asian Trypanosomes. A proof of concept has already been established in a mouse model (Nat Med. 2006 May; 12(5):580-4). |
| **Patent :** | US pending, EP granted (EP1534320). |
| **Stage of development :** | --- |
| **Type of collaboration :** | Research collaboration<br>License agreement |
| **File number :** | --- |
| **Contact name :** | Brulet Jean-Marc Jean-Marc.Brulet@ulb.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | New, inducible/repressible AAV vectors for gene therapy |
| **Institution :** | Université libre de Bruxelles |
| **Field :** | Health |
| **Keywords :** | Gene therapy, AAV vector, inducible/repressible construct |
| **Description :** | The invention relates to an antibiotic inducible/repressible genetic construct for controlling the transcription of a gene of interest by a cell. The genetic construct comprises a bi-directional antibiotic controlled activator-responsive promoter/operator sequence which is located between the gene of interest and a cistron encoding a reverse antibiotic controlled transactivator and controls the transcription of the gene of interest and of the cistron. |
| **Potential applications and advantages :** | The vector allows rapid induction and extinction of the transgene expression upon respectively addition and removal of antibiotics of the tetracycline family (we used doxycycline). The amount of transgene product can be modulated by the dose of antibiotics. This makes the vector of the invention a particularly interesting candidate for gene therapy protocols, especially in the treatment of neurodegenerative diseases. |
| **Patent :** | US granted (6,780,639), EP pending (1 083 227) |
| **Stage of development :** | --- |
| **Type of collaboration :** | Research collaboration<br>License agreement |
| **File number :** | 1999-02 |
| **Contact name :** | Di Stefano Patrick pdistefano@admin.ulb.ac.be |

## Licensing opportunities

| | |
|---|---|
| **Title :** | Solid lipid particles as pharmaceutically acceptable |
| **Institution :** | Université libre de Bruxelles |
| **Field :** | Health |
| **Keywords :** | Pharmaceutical excipient, solid lipidic particles, inhaler compositions |
| **Description :** | The invention relates to new compositions of (active) solid lipidic particles (SLP), e.g. for inhalation, and their use as carriers or as fillers in pharmaceutical compositions.<br>It also relates to new formulations obtained by mixing a SLP composition of the invention and a (micronized) active compound.<br>It further relates to a method for fabricating said compositions of (active) solid lipidic particles. |
| **Potential applications and advantages :** | The invention proposes the possibility of obtaining different compositions for pulmonary administration having satisfactory properties in term of increasing drug deposition and/or delaying or accelerating drug release rate. |
| **Patent :** | Pending (WO 2006/066367) |
| **Stage of development :** | --- |
| **Type of collaboration :** | Research collaboration<br>License agreement |
| **File number :** | 2004-16 |
| **Contact name :** | Di Stefano Patrick pdistefano@admin.ulb.ac.be |