New photosensitizers to block tumor growth by photodynamic therapy

Summary

A Belgian University (a group of academic researchers from this university) has identified a new family of photosensitizers with unique properties that circumvent the low activity of photodynamic therapy in hypoxic environments. This makes them excellent candidates for novel cancer therapies. The university is currently looking for industrial partners with expertise in the photodynamic therapy field for license agreements or technical co-development of these patented compounds.

Creation Date	12 May 2015
Last Update	26 June 2015
Expiration Date	05 July 2016
Reference	TOBE20150429001

Details

Description

This group of researchers from a Belgian university has identified a new family of photosensitizers, of interest for the photodynamic therapy (PDT) of cancer.

Less invasive than surgery and less heavy than chemotherapy, PDT is a therapeutic approach based on the combined action of light and photoactivatable drugs, called photosensitizers, and thus allows treating localized lesions by photochemical reaction.

The photosensitizers are able to produce cellular damage by the formation of singlet oxygen when they are activated by light, leading to the inhibition of tumor growth.

Three conditions support the efficient anticancer activity of current reference photosensitizers:
- the presence of oxygen,
- the need of local illumination and
- the inactivation of tumor-specific targets.

Further to a phenotypic screening campaign exploring 200 potential new PS (photosensitizers) scaffolds, this group of researchers further pursued several hit-to-lead programs that led them to identify a new family of photosensitizers that exquisitely fulfil the PDT requirements.

As current photosensitizers rely on tumor oxygenation level for their activity, tumor hypoxia encountered in most cancers is thus in theory an obstacle for cancer PDT. The selected photosensitizers beat this limitation and are able to work under hypoxia conditions.

The need for light activation must be as strict as possible to avoid the risk of off-targets. The action of the selected photosensitizers was evaluated under hypoxia-light vs. normoxia-dark conditions. A >3-log differential activity in favour of the hypoxia-light setup was evidenced.

The exquisite accumulation of the identified photosensitizers in the endoplasmic reticulum compartment was documented using proteomics and confocal microscopy. These specific subcellular targeting accounts for the preferential development of toxic effects in cancer cells that already face intrinsic endoplasmic reticulum stress, particularly in the hypoxic environment of tumors.

Therapeutic implications:

The capacity of photosensitizers to exert their activity independently of the level of tumor oxygenation reduces the risk of resistance.

The lack of off-targets in the absence of light activation provides photosensitizers with a safe profile even when systemically distributed.
The exclusive enrichment in the endoplasmic reticulum makes these photosensitizers particularly suited to selectively and efficiently kill tumor cells.

These photosensitizers have been lab tested.

Advantages and Innovations

The family of photosensitizers with innovative breakthroughs has been developed to overcome the constraint of hypoxia:

- Cytotoxic effects under hypoxia conditions (1% O2),
- High potency in light conditions (low IC50, inhibitor concentration),
- No off-target activity in the absence of light,
- Good in vitro ADME-Tox properties (ADME= absorption, distribution, metabolism, and excretion)
- In vivo proof of concept in human tumor xenograft,
- Accumulation in the endoplasmic reticulum,
- Known mechanism of action.

These criteria position the photosensitizers above the current reference products such as porphyrins and thiazine derivatives.

Stage of Development

Under development/lab tested

IPR Status

Patents granted

Comment Regarding IPR status

This work resulted in the identification of new chemical entities (PCT patent application field – USA and EU).

Profile Origin

Regional R&D programme

Keywords

Technology

006001003	Clinical Research, Trials
006001004	Cytology, Cancerology, Oncology
006001005	Dentistry / Odontology, Stomatology
006001013	Medical Research
006001016	Pharmaceutical Products / Drugs

Market

002007012	Medical/health
004008	Biochemistry / Biophysics
004010	In vitro Testing, Trials
004012	Cellular and Molecular Biology
005003002	Pharmaceuticals/fine chemicals

NACE

M.72.1.1	Research and experimental development on biotechnology

Dissemination

Send to Sector Group

Bio Chem Tech

Client

Type and Size of Organisation Behind the Profile

University

Year Established

0

Already Engaged in Trans-National Cooperation

No.

Languages Spoken

English
French

Client Country

Belgium

Partner Sought

Type and Role of Partner Sought

Type of partner: industry

Area of activity: pharmaceutical companies with expertise in the photodynamic therapy field

Role of the partner: technical co-development of these patented compounds in their portfolio of pharmaceutical products or license agreements

Type and Size of Partner Sought

>500 MNE,251-500,SME 51-250,>500

Type of Partnership Considered

License agreement
Technical cooperation agreement

Biomarker for the diagnosis and prognosis of heart failure

Summary

A Catalan biomedical research group has developed a method for the diagnosis and prognosis of heart failure based on the determination of the soluble form of a protein in serum. The group is seeking an industrial partner working in the diagnostics sector for technology cooperation or lisence agreement to further develop the test.

Creation Date	05 May 2015
Last Update	01 July 2015
Expiration Date	04 October 2015
Reference	TOES20150505002

Details

Description

Heart failure (HF) is a syndrome characterized by the shortness of breath at rest or during exertion. HF prevalence is between 2% and 3% and rises sharply at 75 years of age, being the prevalence in 70-80 year old people between 10% and 20%.
HF is currently diagnosed by clinical examination, electrocardiogram, chest X-Ray, echocardiography and laboratory testing, being the determination of B type natriuretic peptide (BNP) and N-terminal pro-BNP (NT-proBNP) the gold standard in blood analysis. However, BNP and NT-proBNP are unstable peptides and their determination results in many false positives. These blood tests also lack specificity in non-treated HF patients.

The Catalan research group working in cardiac biomarkers has developed a new method for the prognosis and diagnosis of heart failure easy to perform and more reliable than the current tests.

This method is based on the determination of a soluble protein in serum. The high levels of expression and the stability of this soluble protein in plasma lead to think in a more accurate and reliable biomarker, which is translated in high specificity and less false positives.

The method may be used in diagnosis in the acute and non-acute setting, prognosis, patient stratification, guidance to patient treatment and as screening test.

The research group is seeking an industrial partner with the expertise in biomarkers to co-develop the test and/or license agreement.

Advantages and Innovations

- Non-invasive method.

- The protein is stable in serum, therefore the test is easy to handle and more reliable than the current tests (B type natriuretic peptide (BNP) or N-Terminal-proBNP (NT-proBNP).
- It is useful as a prognostic marker for treated patients.
- More specific biomarker.
- Broader application field: diagnosis in the acute and non-acute setting, prognosis, patient stratification, guidance to patient treatment, screening test.

Stage of Development

Under development/lab tested

IPR Status

Patent(s) applied for but not yet granted

Comment Regarding IPR status

National phase in Europe

Profile Origin

Other

Keywords

Technology

006001006	Diagnostics, Diagnosis
006001011	Heart and blood circulation illnesses

Market

005001010	Molecular diagnosis
005001012	In-vitro diagnostics
005006019	Cardiology

NACE

M.72.1.1	Research and experimental development on biotechnology
Q.86.1.0	Hospital activities
Q.86.2.2	Specialist medical practice activities

Dissemination

Send to Sector Group

Healthcare

Client

Type and Size of Organisation Behind the Profile

R&D Institution

Year Established

0

Already Engaged in Trans-National Cooperation

Yes

Languages Spoken

English
Spanish

Client Country

Spain

Partner Sought

Type and Role of Partner Sought

- Type of partner sought: Industrial partner with expertise in biomarkers

- Specific area of activity of the partner: Diagnostics sector

- Task to be performed by the partner sought: co-develop the test

Type of Partnership Considered

License agreement
Technical cooperation agreement

Commercialisation of diagnostics on a shared risk basis

Summary

An East of England company has world leading expertise and facilities for undertaking full projects in developing and commercialising point-of-care tests. Having good networks with large companies and academia, they now seek strategic partnerships with SMEs for shared risk product development and commercialisation. The type of collaborations will depend on the stage of development and may include technical and/or research cooperation agreement or licensing.

Creation Date	22 June 2015
Last Update	07 July 2015
Expiration Date	06 July 2016
Reference	TOUK20150622001

Details

Description

An East of England company used to be a contract R&D centre for blue chip companies in the field of point-of-care and over-the-counter diagnostic tests.
Since a management buy-out last year, the company is fully independent but they have retained good links with major corporates but also charities. They now have a portfolio of R&D programmes, notably in the fields of chronic diseases and inflammation. The company have also just launched a first own brand ELISA kit (enzyme-linked immunosorbent assay).
As the company are still relatively small (30 employees), they are interested in additional strategic partnerships with SMEs to jointly bring new tests to the market.
The East of England company has world leading expertise and facilities for the development of assays, including:
- New, point of care in vitro diagnostic (IVD) concept & design;
- Prototyping & testing;
- Antibodies with unparalleled performance to challenging targets (carbohydrates, small molecules, small epitopes);
- Assay & reagent development, with particular expertise in lateral flow;
- Peptide design & synthesis;
- Clinical evaluation studies;
- Regulatory approval.

In short, there is competence to carry out bespoke projects from start to finish. The finish may include commercialisation through licensing to existing large company network, or sales under own brand.

The areas of interest may include but are not limited to inflammation, chronic diseases, wounds, metabolic disease.

The type of collaborations will depend on the stage of development and may include technical cooperation, licensing and EU R&D programmes. The company has been successful with a European grant proposal.

Advantages and Innovations

The offering is strengthened by the company's world leading technical expertise, strong scientific and IP portfolio, and connections with blue chip companies.

Stage of Development

Available for demonstration

IPR Status

Patents granted

Comment Regarding IPR status

Patents granted both on devices and assays.

Profile Origin

Private (in-house) research

Keywords

Technology

006001006	Diagnostics, Diagnosis
006002002	Cellular and Molecular Biology
006002005	In vitro Testing, Trials
006002012	Protein Engineering

Market

004002	Monoclonal Antibodies and Hybridomas
004010	In vitro Testing, Trials
005001010	Molecular diagnosis
005001012	In-vitro diagnostics

NACE

M.72.1.1	Research and experimental development on biotechnology

Client

Type and Size of Organisation Behind the Profile

Industry SME 11-49

Year Established

0

Already Engaged in Trans-National Cooperation

Yes

Languages Spoken

English

Client Country

United Kingdom

Partner Sought

Type and Role of Partner Sought

Type of partner sought: industry, SMEs;
- Type of activity of the partner: biomarker development;
- Task to be performed by the partner sought: to provide non-confidential information on high priority projects and the type of collaboration envisaged.

Type and Size of Partner Sought

SME 11-50,SME <10,SME 51-250

Type of Partnership Considered

License agreement
Technical cooperation agreement
Research cooperation agreement