

# Novel methods to decrease methane production from ruminant livestock



One cow can produce between 500 and 600 litres of methane per day

The equivalent to almost 1000 pints of beer



Methane is formed as by product of fermentation in the rumen

Rumen fermentation allows cattle and sheep to thrive on fibrous substrates not suitable for monogastrics like man.

Methane is not beneficial to the animals

Up to 10% of the animals energy can be lost as methane

Nitrous Oxide 6%

Others 13%

Carbon Dioxide 49%

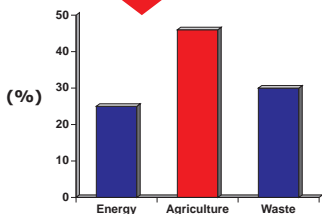
Methane 18%

CFCs 14%

**Methane is an important greenhouse gas responsible for almost 20% of the greenhouse gas effect.**

On a global scale ruminants are responsible for 1/5th of all the methane formed but in more rural environments such as Scotland they can be responsible for almost 50% of all methane formed.

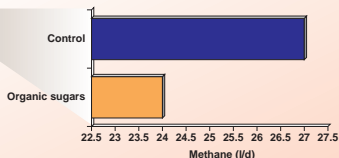
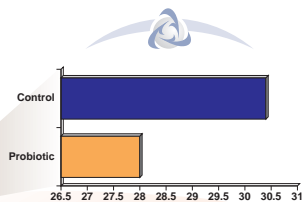
## 1. Proving the idea



At Rowett we have developed two technologies based on :

- The probiotic bacteria catalyses the oxidation of methane to CO<sub>2</sub>
- Organic sugars that promote the production of propionic acid in the rumen and which removes the hydrogen that might otherwise be converted to methane

We are looking for partners to develop these into commercial products for use within the animal feed industry



# Informed drug discovery targeting free radicals in disease



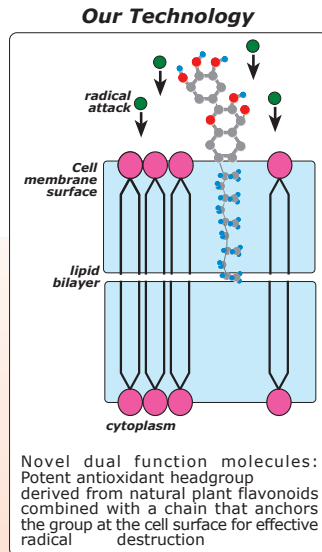
## The Science

### Free Radicals

- damage cells and biomolecules
- produced in high amounts in certain medical conditions such as stroke and Alzheimer's disease
- contribute to disease progression

### We have

- designed and synthesised potent, cell-targeted and antioxidants
- demonstrated strong membrane protection in a model of free radical damage
- produced a new class of bioactive compound with therapeutic potential



## 2. Developing a business plan

### The business strategy

#### Secure our intellectual property

- lead drug candidates and active variants patented
- ensures income from drug companies using our compounds

#### Determine our value by market assessment

- clinicians and industry express interest in antioxidant drugs
- USA / EU annual market estimate for effective therapeutics
- ischaemic stroke - £420M Alzheimer's disease - £708M

#### Secure funding for development costs

- research-to-industry technology transfer grants
- venture capital

#### Incorporate **OxyProTec**



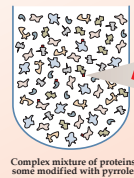
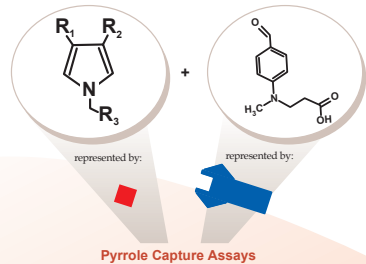
**OxyProTec** is a joint venture by the Rowett Research Institute and the University of Glasgow. We acknowledge support from Scottish Enterprise Proof of Concept fund.



# Novel tests to determine the risk of developing disease

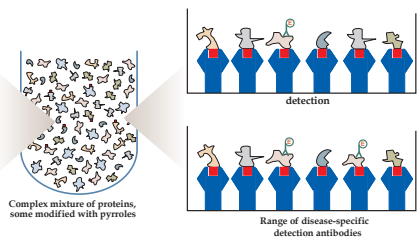
## Pyrronostics

- High concentrations of fats and sugars in the blood cause damage to proteins.
- The damage can result in the formation of PYRROLES in the proteins.
- PYRROLES are not present in newly-formed proteins and are therefore indicators of damage.

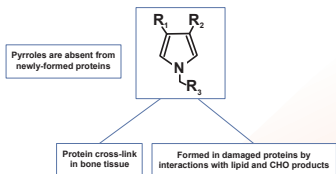


### 3. Creating the company

- Pyrronostics have devised a way of targeting PYRROLES to show the extent of damage and to identify the damaged proteins.
- By creating different detection reagents, markers can be produced to monitor heart disease, diabetes and several other long-term illnesses.



#### Pyrrrole Capture Assays



Pyrroles are ideal markers for bone resorption and protein damage

**Pyrronostics Ltd is a newly-formed Spin-out company from the Rowett Research Institute. It is a joint venture between Rowett Research Services Ltd and a Newcastle-based company, Immunodiagnosics Ltd.**



# Pioneering Heart-Healthy Foods



## CardioFlow®

CardioFlow® is an extract from tomatoes, shown to have biological activity which may benefit the cardiovascular system.

The laboratory extract has now been developed into a commercial ingredient, which has been added to a fruit juice to form a functional drink. Its effectiveness in humans has been shown in several volunteer trials.

CardioFlow® is the lead product of Provexis Limited. On its launch in 2004, CardioFlow® will underpin a new range of functional drinks targeted at the "heart healthy" food market.



Clear yellow extract

CardioFlow®  
Concentrated syrup

Functional drink



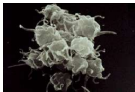
## 4. Product to market

Smooth platelets

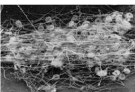


Stress

Sticky platelets



Aggregated platelets



Platelet thrombus causing blockage in blood vessel



### The biological effects of CardioFlow®

CardioFlow®'s potential benefits are due to its effects on human platelets. Many people, especially as they grow older, have platelets which are in a permanently activated or 'sticky' state. This means that their platelets are more likely to clump together and form aggregates in blood vessels. Under such circumstances, platelets can be implicated in the development of heart disease.

From results of human trials to date, CardioFlow® could help reduce the activation of platelets.

Regular consumption of a functional drink containing CardioFlow® would therefore be expected to make a significant contribution to reducing the risk of heart attack, stroke and deep vein thrombosis (DVT).



Provexis Limited was founded in 1999 as a joint venture between Rowett Research Services Limited and ANGLE Technology. Provexis develops natural bioactives for application in the functional food and medical food markets.

