



EUROPEAN SCIENCE FOUNDATION

Network Outreach Workshop

REPORT and ATTENDANCE LIST

Date and Time: *Thursday 21st March 2013*

Place: *NHow Hotel, Berlin Germany*

Attending *Steering Committee, Interest Group Chairs, Invited Industrial and Academic Participants*

Chairperson *Professor Sabine Flitsch*

Purpose

This workshop formed the start of an intensive outreach programme of the Network in its final period. Up to now we have concentrated on building trans-European Network of Glycoscientists and at the last Meeting in Madrid it was accepted that we can now truly claim to be the voice for Glycoscience throughout Europe as well as forming strong contacts with organisations in other countries. We have also successfully completed a very successful programme of supporting meeting in most member countries and have very actively participated in training activities and summer schools.

Now we need to contact other groups to promote the idea of glycoscience and its applications to them. One such group which was the main focus of this meeting are those in the business centre. This workshop was an formal information gathering and dissemination exercise which is the first of those planned. Other workshops will involve the general public and other scientific disciplines and the decision makers and policy formers in Government and the Funding agencies will also be covered at a later stage.

The workshop was well attended with representative ranging from multi-national companies such as IBM to very small local start-up companies.. The workshop was arranged around a series of broad challenges important to society. These are ;

1. Improved health care

- Improved safety of drugs particularly from biotechnology where non-human sugars can cause serious allergic responses
- More effective vaccines recognizing microbial carbohydrates
- Improved antimicrobial drugs – sugars are frequently used by bacteria and viruses to infect human cells
- Better understanding of stem cells to be used in tissue replacement therapy – the interaction of stem cells with intracellular matrix is highly dependent on sugars
- More specific bio-imaging where sugar recognition can target very focussed cells types
- Better diagnostic markers as diseases are frequently associated with changes in the sugar structures in body fluids and on cells

2. Better and more nutritious food supplies

- Incorporation of human milk oligosaccharides into formula milk
- The promotion of healthy bacteria in the gut frequently invokes various carbohydrates and these can be formulated in pre and pro-biotic
- Food safety – allergies such as those to peanuts are caused by responses against sugars in food and better understanding of these could limit such problems

3. Renewable biofuels

- A large proportion of available biomass is in the form of carbohydrates – as we learn more about how these can be manipulated better biofuels may be produced
- There are several carbohydrate sources of energy which have not yet been exploited due to lack of knowledge about their behaviour- indeed the whole process of photosynthesis is to generate carbohydrate compounds as an energy store

4. New renewable feedstocks for the chemical industry based on carbohydrates

- Carbohydrates are generally very useful compounds for conversion into building blocks their biodiversity and availability make them very attractive candidates
- A whole range of new process for conversion of carbohydrates is possible through many examples of microbial enzymes which exist and could be used on an industrial scale

5. New and improved bio-materials

- Many natural materials are carbohydrate based and they have a wide range of properties – advances in carbohydrate chemistry would now enable synthetic production of those with desirable properties.
- The bioavailability of materials is often enhanced by incorporating carbohydrates or molecules which recognise carbohydrates such materials can be made from readily available renewable sources

To provide focus the following objectives were agreed

- *To spread knowledge of glycoscience and its applications to all potential partners within the next five years*
- *To provide a comprehensive re-education programme with facilities to provide both theoretical and practical training in glycoscience*
- *To enhance the availability on resources available on the Internet for glycoscience by providing dedicated websites and databases*
- *To engage with regulatory bodies to give advice on best practice for the use of carbohydrates*

The workshop considered the following benefits for companies of interaction with the Euroglyconet ;

- Being a partner gives you access to all other partners across Europe- extensive network of recognised glycoscience experts



- Introduce new technologies and products



- Hold training courses and seminars



- Access to academic research (subject to negotiation of IPR)

- You can suggest new lines of research or applications for your products



- High profile networks, good visibility well respected – leading glycoscience applications



- Our Transdomain Network enables your company to find new markets

The meeting concluded with several of those present expressing interest in joining in a network for glycoscience. This had been considered at the Steering committee meeting and it had been decided that this could be best implemented by setting up a trans domain COST application. This is now being applied for under the name of EUROGLYCONET.

The case for this is presented below ;

Carbohydrates comprise the largest amount of biomass on earth and exploiting this biomass for novel applications in materials, energy and health will be important for developing sustainable biotechnology products and renewable fuels for the future – moving away from dependence on hydrocarbons to sustainable carbohydrates. Glycoscience is a broad term used for all research and technology involving carbohydrates, ranging from cell biology and medicine to carbohydrate-based materials and the conversion of carbohydrates to energy.

Glycoscience provides tremendous opportunities: a full understanding of the human glycome will help open the doors to personalised medicine; efficient and precise tools for manipulating and characterising polysaccharides will generate an entirely new generation of renewable biomaterials; bio-inspired processes will help us to use carbohydrate-based fuels and convert them to energy with much greater efficiency, close to the 70% observed in cells.

A major limitation to realizing these opportunities in the past has been the lack of tools, not least because carbohydrates – unlike amino acids – are fundamentally rather similar to each other. Indeed, the requirements of Glycoscience have pushed a number of technologies to their limit and have stimulated the development of novel fundamental methods in synthesis, analysis and bioinformatics in the past 20 years that are now considered ripe for adaptation. Some of the most advanced platform technologies have been developed for applications in health, but are equally important for the current research agenda of biomaterials and bioenergy.

Alongside technology development, the education of the wider user community including industries and the public in the capabilities of these new tools, opportunities for the future and training in their use will be essential to lower barriers for entry into this field leading to successful adaptation of Glycoscience.

This is a timely proposal from a network of acknowledged European experts to provide a unique framework for innovation based on the application of Glycoscience.

Attendees

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