



EUROPEAN COMMISSION
RESEARCH DG HUMAN RESOURCES
AND MOBILITY

RTN Periodic Activity Report

Project No.: 5645

Project Acronym: GlycoGold

Project Full Name: GlycoGold: Exploration of the nature and potential of Glyco-nano-particles.

Marie Curie Actions

RTN Periodic Activity Report

Period covered: from 01/04/2005 to 31/03/2006

Date of preparation: 13/11/2006

Period number: 1st

Start date of project: 01/04/2005

Date of submission (SESAM):
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Project coordinator name:
Prof. Johannis P. Kamerling

Duration: 48

Project coordinator organisation name:
Universiteit Utrecht

Version: 1

Marie Curie Actions

RTN Periodic Activity Report

GENERAL INFORMATION

Project No.:	5645
Project acronym:	GlycoGold
Project full name:	GlycoGold: Exploration of the nature and potential of Glyco-nano-particles.
Period number:	1st
Period covered - start date:	01/04/2005
Period covered - end date:	31/03/2006
Project start date:	01/04/2005
Project duration [months]:	48
Project coordinator name:	Prof. Johannis P. Kamerling
Project coordinator organisation name:	Universiteit Utrecht
Date of submission:	13/11/2006

SUMMARY OF THE RECRUITMENT DURING THE REPORTING PERIOD

Contractor: Universiteit Utrecht

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				
C. Svensson	ESR (<4 years)	SE-Sweden	No	Male	01/10/2005	15/11/2005	1.5

Contractor: Consejo Superior de Investigaciones Cientificas

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				
Andrea Ragusa	ER (4-10 years)	IT-Italy	Yes	Male	01/10/2005	30/09/2006	6
Marco Marradi	ER (4-10 years)	IT-Italy	No	Male	01/01/2006	01/01/2007	3

Contractor: Centre National de la Recherche Scientifique

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				
Jimmy Rosen	ER (4-10 years)	SE-Sweden	No	Male	01/11/2005	30/04/2007	5

Contractor: University College London

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				
Africa G. Barrientos	ER (4-10 years)	ES-Spain	Yes	Female	01/03/2006	01/03/2007	1

Contractor: Stockholms universitet

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				
Jan Vesely	ER (4-10 years)	CZ-Czech Republic	No	Male	01/09/2005	31/03/2006	7
Ferenc Sajtos	ER (4-10 years)	HU-Hungary	No	Male	01/09/2005	31/03/2006	7

Contractor: Institute of Chemistry, Slovak Academy of Sciences

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				
Lucie	ESR (<4 years)	CZ-Czech	No	Female	01/10/2005	30/09/2007	6

Contractor: Institute of Chemistry, Slovak Academy of Sciences

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				
Sihelnikova		Republic					

Contractor: University of Zagreb, Faculty of Pharmacy and Biochemistry

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				

Contractor: Valtion Teknillinen Tutkimuskeskus (VTT)

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				
Michael Lienemann	ESR (<4 years)	DE-Germany	No	Male	01/10/2006	31/12/2007	3

Contractor: Universitair Medisch Centrum Utrecht

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				

Contractor: Unilever Nederland BV

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				

Contractor: Infrae V.O.F.

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				

Contractor: Midatech Ltd

Name of the Researcher (as stated at time of selection)	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months covered by this recruitment during this reporting period
		Country	LFR				

SUMMARY OF THE EMPLOYMENT FORECAST FOR THE NEXT REPORTING PERIOD

Contractor: Universiteit Utrecht

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				
Roberto Adamo	ER (4-10 years)	IT-Italy	Yes	Male	01/06/2006	30/06/2008	10

Contractor: Consejo Superior de Investigaciones Cientificas

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

Contractor: Centre National de la Recherche Scientifique

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

Contractor: University College London

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

Contractor: Stockholms universitet

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

Contractor: Institute of Chemistry, Slovak Academy of Sciences

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

Contractor: University of Zagreb, Faculty of Pharmacy and Biochemistry

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

Contractor: Valtion Teknillinen Tutkimuskeskus (VTT)

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

Contractor: Universitair Medisch Centrum Utrecht

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				
Dodi Safari	ESR (<4 years)	ID-Indonesia	No	Male	19/06/2006	18/06/2009	9

Contractor: Unilever Nederland BV

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

Contractor: Infrac V.O.F.

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

Contractor: Midatech Ltd

Name of the Researcher	Type	Origin		Gender	Start date of recruitment	End date of recruitment	No. of full-time equivalent months in the next reporting period
		Country	LFR				

PROJECT ACHIEVEMENTS DURING THE REPORTING PERIOD

Research Achievements

Research Achievements

The aim is to explore the potential of gold Glyco-Nano-Particles (GNPs) as a probe for deepening the understanding of biomolecular interactions and as an instrument to solve biomedical problems. This project is centred on functionalised GNPs that typically have a metallic core of gold covered with multiple spacers carbohydrate ligands. These particles can be tailor made to study and optimise the functioning of the active compound, to include special tags for diagnostic purposes, and to achieve targeted delivery. The GlycoGold consortium, however, cannot perform an exhaustive exploration of GNP applications. Choices have been made to have a realistic focus in the research. Three classes of explorations will be pursued: vaccines, interaction inhibitors and delivery vehicles.

In order to arrive at the goal a series of objectives have been defined. In this section

- O1. To construct well characterized GNPs and their interacting partners.
 - O2. To explore and apply advanced biophysical characterization methods for GNPs.
 - O3. To explore and apply in-vitro/ex-vivo/in-vivo biomolecular interaction assays.
 - O4. To deepen the understanding of carbohydrate-protein and carbohydrate-carbohydrate biomolecular interactions.
 - O5. To optimise and innovate the design and construction of GNPs
 - O6. To explore potential biomolecular applications of GNPs
 - O7. To integrate the results and to draw conclusions on scope and limitations for the use of GNPs.
- Although the objectives cover only a limited part of the potential spectrum of applications and insights, their realization would constitute an important breakthrough. This should ultimately result in both economic and health benefits for the community.

The work comprises various task that are grouped in to work packages. One could report on the progress work package by work package. For reporting purposes, however, it much more informative to present the activities and the results on the basis of the individual explorations. With each report on an exploration reference will be made to which objective it contributes. The exception to this rule can only be found for WP1 (networking and to some extent to WP8 (Integration of results). WP1 will be presented as a work packages activity. For WP8 it is too soon in the project to report.

Communication, Training and Mobility - WP1 deals with all aspects of training, mobility and transfer of knowledge. The task scheduled for the first year were focused on establishing a web-based communication system and work towards a framework for on-line courses.

A website (<http://www.glycogold.org>) has been set up in this reporting period, based on the commonly available open-source tools (Linux, Apache (www.apache.org), Zope (www.zope.org) and Silva (www.infrea.com)). Silva is a content management system in development by one of the SME partners of the network (P11). For day to day communication e-mail is being used and for network wide messages an e-mail list has been established to which all people involved are registered.

With respect to the on-line learning, we initially aimed for one integrated system. However, during the project meetings in Oxford (autumn 2005) it was decided that it would be better to go for the simultaneous implementation of two systems. In order to accommodate a means for providing background information on Glyco-Nano-Particles a WIKI system will be made available. All people in the network will be able to collaboratively build a public knowledge base on our field of interest. This WIKI system will be the basis for public dissemination to both new staff in the networks as well as to the general public. In addition to the WIKI system a course system will be implemented. The original plan was to develop and integrate such a system in the Silva Content Management System. However, it was decided that this would be a major project in itself that would go beyond the scope of this RTN. Therefore we started a selection process for a publicly available solution, that will ideally interface to the Silva CMS. This will be reported in the second reporting period.

Exploration projects - Presentation of the various projects of the first year.

Mannose oligosaccharide functionalised GNPs as inhibitors of DC-SIGN/gp120 binding.

Lewis b functionalised GNP as inhibitors of Helicobacter pylori
GNP's as non-viral transfection agents
Magnetic GNPs for cellular binding
GNP's as multivalent systems to explore and apply advanced (bio)physical methods
Ligand place-exchange reaction on GNPs
Radioactive siRNAgluconanoparticles for Intervening in RNA processes. A Study of Stability against Place-Exchange Reactions.
Sponge proteoglycan models for carbohydrate-carbohydrate interaction studies.
GNPs as inhibitors of Cryptococcus neoformans
GNP's as proto-vaccin against Streptococcus Pneumoniae
GNP Models development and study

Details are provided in the attached report on the research progress.

Training and ToK

GlycoGold Transfer of Knowledge

The aims with respect to training and transfer of knowledge are the following. We aim to convey our trainees all the skills they will need in their future careers. In fact, scientists can nowadays only operate in interdisciplinary research teams. It is expected from them that they have acquired social and non-scientific intellectual skills in addition to professional know-how. GlycoGold has an integrated training and mobility programme to guide young researchers in obtaining these skills, and to provide for the necessary training instruments. The training activities bring together elements from nanosciences, immunology, chemistry and structural biology. ERs and ESRs participate in the same training programme. However, the training focus for ER and ESR are different. The ESR training is geared towards acquiring basic research skills and has a relatively high coaching intensity. With growing research experience, an increased capacity to have a broadening range of responsibilities should be accomplished. For ER are more advanced in their career and are moving towards leading scientific positions. They should have the opportunity to learn the basics of research management and work toward formulating research proposals. Execution of these aspects is expected later in the project, where e.g. specific FP7 calls can be used as training materials.

An overview of training programme and the activities in the first reporting period:

Direct research training

In our vision, the best way to learn research is to do research. Thus the actual work in the lab and the interactions with the colleagues in the lab is the most important element of the research training activities. Indeed the trainee is part of the local research team and the trainee joins in on all the activities, including the seminars and graduate training programme.

Science Courses and Workshops

The trainee take part in a selection of dedicated science tutorial events (seminar, workshops, courses) that are offered by the partners:

Advanced course: Physical chemistry

Course: Statistical thermodynamics

Language courses: Spanish / Swedish / French / Finish / Dutch

Course: Chemical bond theory

Lecture programme: Material sciences and Nanotechnology

Carbohydrate Chemistry (incl synthesis, purification, and characterisation of nanoparticles)

Atomic Force Microscopy (AFM)

Transmission Electron Microscopy (TEM),

Lab training in GNP skills

Microscale synthetic approaches for manipulating nanometric films of gold.

External Hands-on course on NMR (measurement of relaxation behaviour)

External training stay: basic concepts, techniques and instrumentations related to magnetic materials.

External tutorial stay: basic concepts of Surface Enhanced Resonance Raman Spectroscopy (SERRS)

External course: synthesis of chromium-gold based Self Assembled Monolayers by an e-beam evaporator to create the flat gold surfaces supported on micas.

Training in presenting the results of a research project

The GlycoGold network provides also network wide training. We have scheduled a large number of project meetings (once every 6 months), where the young scientists are the one presenting and discussing the progress and difficulties in research. The trainee are trained in presenting their research results, in the context of GlycoGold, in publications and at scientific meetings. In the latter case both the presentation of posters and lectures are being trained. It is the trainee - not the group leader - who presents the research progress at the GlycoGold scientific meetings twice a year.

Multidisciplinary summer schools

In addition to networking meetings, GlycoGold will organise network training events. In the first reporting period we did not yet have such a tutorial event. However, in June 2006, at the third project meeting in San Sebastian a scientific tutorial session is organised.

As a part of the training, most GlycoGold trainees will attend the Summer Course in Glycosciences at the University of Wageningen, The Netherlands. Formally, this summer course is not a GlycoGold activity. However, the GlycoGold PI's organise this event biannually and lecture at it.

Career development opportunities / complementary skills

The trainees are coached in preparing further career moves and are given full collaboration in broadening their perspectives above and beyond the science. The pursued activities thus far are language courses, full access to Internet. It should be noted in this respect that the frequent network meeting at which the trainees meet each other are also essential aspects for building personal international networks, that will be beneficial for their future careers.

On-line learning

One of the work packages (WP1) has some elements that deal with the transfer of knowledge. A public web site has been set up. A WIKI system is in place that can now be filled with information. The young researchers in particular will have a change to put forward their specific knowledge and insights in the scientific area of GlycoGold. In this way they can convey their knowledge to their fellows and to the general public.

The WIKI will be an essential element in the on-line learning and will later be complemented by a module that monitors and registers the students performance. (Second report)

Mobility is an inherent characteristic of Marie Curie RTNs. In GlycoGold mobility is ensured by task and responsibilities that are shared among multiple partners. Secondments have not yet been taken place. Shorter visits to labs occurred frequently. The exchange of material occurs intensively. (Glycan) ligands, GNP preparation skills and analysis skills are scattered over the network.

Management

Management aspects of the first reporting period.

As the consortium is not large we established a relatively flat management structure. The daily management is the responsibility of the Executive Board that consists of the coordinator (Prof. Vliegthart), a science manager (Prof. Penades) and a projectmanager (Dr. Leeflang). The project manager plays a central role in the communication with the network, between the board and the partners and with the EC. The board has met twice in person during the first year and once in a teleconference. E-mail is often sufficient to be able to inform each other and resolve issues.

Planning and Control

At the network meetings scientific progress and problems are being discussed in the presence of staff and trainees. In an open discussion these topics are judged and solutions proposed. Following the science meeting, the Steering Committee (i.e. the PI's) meet in parallel to the Young Researchers Council. Both meetings discuss their relevant business. The Steering committee meeting has focused mainly on administrative and contractual issues and to work planning in relation to scheduled deliverables. The Steering Committee meetings is used to crosscheck progress with the original objectives. The ethical committee of Partner UMC Utrecht identified a problem. that resulted in a change of testing procedure for the exploration of GNP's in the vaccine area.

At the end of the day the Young Researchers Committee joins the Steering Committee. In the joint

meeting issues brought up by the young researchers are being discussed and if needed action is being planned.

Financial management

The finances are the responsibility of each partner individually. The coordinator and its project manager provide the partner with background information on the Marie Curie rules. Furthermore the coordinator collects the partners financial reports and prepares them for submission to Brussels. The coordinator has transferred proportional shares of the EC advance payment to all partners shortly after reception of these funds.

The EB centrally administers the budgets for training and career development. One third of these funds are transferred directly to the partners for covering local training expenses using the system outlined above. The organisation of network wide training events are funded from this budget on the basis of actual costs. Furthermore, the development and operation of the on-line learning facilities will be paid from the training budget. The SC will oversee a fair distribution.

Part of the general budget is allocated to the development, installation and maintenance of the web site. Infrac, one of the SME partners, will be involved in these tasks on a sub-contracting basis.

Networking and communications

Vacancies have been announced on web sites and at conferences. All advertisements mentioned explicitly the Marie Curie Research Training Network programme. One month after the commencement date of the contract, the network came together for the start up meeting in Paris in May 2005. At that time no trainees had been attracted to the network. However, some junior staff was present through that contributed from day-1 to the project goals. During the start up meeting we made sure that we shared the same expectations for the project and collaboration arrangement were made to jointly startup various tasks. Six months later at the meeting in Oxford, the first scientific progress was reported and evaluated.

The dissemination of the results primarily occurs through peer-reviewed publications and presentations at scientific conferences. As publications always lag behind the execution of the research, publications on GlycoGold should be expected in the second year. The web site is a further and continuous platform for presenting the goals and outline of the project and our research interests. In all dissemination activities the European Community is acknowledged with mention of the Marie Curie programme and the contract number.

Networking meetings:

11 May 2005; Paris, France; 20 participants

Science and Governance meeting: Programme and participants are attached to the report.

November 2005; Oxford, UK

Science and Governance meeting: Programme and participants are attached to the report.

Planned meetings:

11-12 June 2006; San Sebastian, Spain;

Two day network meeting (one day Science and Governance) and (one day) workshop on nano-science

24 November; Grenoble, France

Science and Governance meeting

Dissemination examples

The project and its research has been presented at multiple occasions. Below in a (by far non-exhaustive) list:

Nanobiotechnology III, (7-8 June 2005, Nice, France)

Invited lecture: Glyconanobiotechnology: A new methodology to create biofunctional nanoparticles with application in biotechnology and biomedicine

6th International Workshop on Interfaces by design (26-30 June 2005, Santiago de Compostela, Spain)

Invited lecture: Glyconanotechnology: A new methodology to create biofunctional nanoparticles with application in biotechnology and nanomaterial sciences.

XVIII International Symposium on Glycoconjugates (4-9 September 2005, Florence, Italy)

Invited Lecture, Glyconanotechnology applied for understanding carbohydrate-carbohydrate interactions.

Surfaces, Interfaces, and Membranes - International Symposium (18-19 May 2006, Seville, Spain)

Invited lecture: Glyconanotechnology: The merger of glycoscience, material science and bioscience.

Eurocarb 13 (21-26 August 2005, Bratislava, Slovakia)

Oral and poster presentations

Trends in Nanotechnology (29 August-02 September 2005, Oviedo, Spain)

Oral and poster presentations

Microbicides 2006 Conference (23-26 April 2006, Cap Town, South Africa)

Poster: Gold manno-nanoparticles: potential microbicides that block HIV-1 gp120 binding to DC-SIGN.

Poster: Evaluation of gold manno-nanoparticles in a model for DC-SIGN binding and dissemination of HIV-1.

DEVIATIONS/MODIFICATIONS TO THE ORIGINAL WORK PROGRAMME

Please indicate if the project

b) has/will required some minor deviations/modifications to the original plan

If you answered b) or c) please include a detailed description of the modifications in the report (one page)

*The Croatian partner was not entitled to a true FP6 budget. The network valued their contribution very much. That is why it was decided to provide them a limited budget to participate in the network activities. The Croatian partner would need to find other funds to contribute to the work in the network., In the first year it was decided that the coordinator would manage the Croatian Travel budget. This means a formal budget rearrangement: where The budget for the Croatia partner fully goes to Utrecht University. Utrecht University, however, will reimburse the travel expenses of the Croatian partner for the participation in the network meetings.

*Approval of career plans by the a central person in the network does not seem to be desirable.

Arrangement for the future career of the fellows is a matter of the fellow him/her self together with the local supervisors

ADDITIONAL INFORMATION

Please indicate any additional information, which may be considered useful to assess the work done during the reporting period.

Attachments	report-science-1.pdf
Name	
Date	
Signature	