Project no. 017749

Universal Vaccine

Novel antigen-adjuvant vehicle as an effective influenza vaccine

Instrument: Co-operative Research Projects

Thematic Priority 1, Life Sciences, genomics and biotechnology for health

Publishable Final Activity Report

Period covered: from 01/06/2006 to 31/05/2007 Date of preparation: 30/06/2007

Start date of project: 01/06/2005 Duration: 31/05/2007

Project coordinator name: Dr. Anna Ramne
Project coordinator organisation name: Biovitrum AB

Revision [draft 1]

1 Project execution

1.1 Project name

Universal Vaccine

1.2 General project objectives

The overall objective of the project is to integrate the combined scientific excellence and technologies of the SME proposers and RTD performers for developing a powerful, safe and easily administered mucosal vaccine for humans providing life-long protection against influenza.

1.3 Involved contractors

- Biovitrum AB, Sweden
- Pepscan Systems BV, The Netherlands
- Proxima Concepts Ltd, England
- Eurogentec SA, Belgium
- Flanders Interuniversity Institute for Biotechnology VZW (VIB), Belgium
- Göteborg University (UGOT), Sweden

1.4 Project co-ordinator contact details

Project Co-ordinator:
Dr. Anna Ramne
Biovitrum AB
Arvid Wallgrens Backe 20
SE-413 46 Göteborg
Sweden
Phone: +46-31-749 11 00
Website: www.universalvaccine.org

1.5 State of the art

Current influenza vaccines have several draw backs. First, they are manufactured annually and based on the influenza viral strains that the WHO recommend approx 9 months prior to the next influenza season. Consequently, there is always a risk that the annual influenza vaccine is off target and does not provide a satisfactory protection against infection by the circulating influenza strains. Further, the annual vaccines are produced by a laborious method involving use of embryonated chicken eggs. This method is both time consuming and costly, making vaccine supplies limited and does not allow for rapid changes in manufacturing should novel influenza strains arise. Individuals that are allergic to egg products are also excluded from the possibility of utilizing these

vaccines. The majority of the annual influenza vaccines are administered via injection which encompasses major patient discomfort both by the invasive administration and the necessity for patients to have to visit their physician for the flu shot.
The goal of this project is to develop a novel influenza vaccine that addresses all these issues in that the final vaccine will have the following benefits over current influenza vaccines:

- Powerful and provide broad protection against a wider variety of influenza strains
- Easy to administer via the intranasal route, which arm the patient with both a mucosal response at the line of enemy attack and also a systemic protection
- Produced by a none-egg based method

1.6 Work performed

1.6.1 Objectives of the first and second reporting periods

In this project, the initial steps for generating novel influenza vaccine candidates were to optimize the various components that would potentially be part of the vaccines. The second period has been focused on evaluating the vaccine candidates and examining key elements important for the vaccine efficacy.

1.6.2 The vaccine antigen

The novel influenza vaccines are based on the extracellular domain of the minor influenza protein M2 protein further referred to as M2e. The sequence of this domain has proved to be stable and is not subject to the seasonal variation characteristic of the major influenza proteins hemagglutinin (HA) and neuraminidase (NA). This concept is the main foundation for the Universal Vaccine project and by using the M2e as antigen it may be possible to generate a specific immune response targeted to the M2e domain of every different influenza strain, regardless of the seasonal variation in e.g. HA and/or NA.
The antigen can be incorporated into a vaccine in multiple different ways. Pepscan has utilized its competence and proprietary technology to optimise the M2e antigen in the vaccine. They have performed detailed mapping analysis of the M2e peptide and shown which amino acids are essential for antibody binding. Further, several hundred M2e peptide analogues have been designed which are conformationally restricted using their scaffold chemistry. Pepscan has also created libraries of peptide variants and screened these for reactivity toward both polyclonal and monoclonal M2e antibodies. Multimeric structures composed of M2e bound to a variety of scaffolds e.g. mutter scaffolds have been generated. New variants of stabilized multimeric copies of M2e have been made by disulphide linking single and branched M2e peptides. Additional, multimeric structures composed of M2e bound to helical scaffolds have been generated to create a tetrameric structure of M2e that would mimic the native extracellular domain of the M2 protein and may potentially enhance the reactivity of the antigen.
An alternative method for presenting the antigen is to chemically couple it to another component of the vaccine. The CTA1-DD adjuvant was tested by this approach and CTA1-DD conjugates of single M2e peptide and several types of branched dimeric peptides have successfully been coupled to the cysteine residue located at the C-terminus of the CTA1 domain of CTA1-DD and tested *in vitro* and *in vivo.*

1.6.3 The vaccine adjuvant

Vaccine adjuvants are essential for vaccines that are based on recombinant or peptide antigens to help mount a sufficient immune response to the incorporated antigen to provide host protection against viral infection. Non-living adjuvants are often formulations of lipid or gel (alum) to create a depot effect of the vaccine following injection. However, adjuvants derived from bacterial components achieve their adjuvanticity by non-specific cellular interactions causing an inflammatory response which elicits increased levels of cytokines. Therefore, there is a fine balance between degree of inflammation versus adjuvant effect and great precautions need to be taken such that adverse side effects are not generated by vaccines containing this type of adjuvant. CTA1-DD on the other hand does not cause an inflammatory response but acquires the adjuvant effect via the enzymatic activity that is targeted to specific immune responsive cells. CTA1-DD is a superior mucosal adjuvant in that it is non-toxic, non-inflammatory and effective for mucosal administration.

Since the major objective of this project is to develop novel influenza vaccines for human use, it is essential that the clinical development of the various vaccine components is forwarded. For the CTA1-DD adjuvant this means that the production and purification process must be optimised and scaled up for large scale GLP/GMP manufacturing. Biovitrum has worked on the key steps to achieve this. First, CTA1-DD was cloned into a vector mediating high level expression in a system which is approved for large scale and commercial production of recombinant proteins in *E. coli*. Further, the N-terminal sequence was modified to attain improved transcriptional and translational efficiency and the AmpR gene in the vector was replaced by KanR for regulatory reasons.

Continued optimisation of the pilot scale production and purification process development of CTA1-DD was performed, in close collaboration with Eurogentec (WP5). The various steps of fermentation and purification were analyzed in detail and adjusted in pilot scale so as to be as amenable as possible for large scale production to facilitate a smooth transfer of the process to Eurogentec. Successful large scale fermentation was achieved at Eurogentec. However, due to unforeseeable technical difficulties the process could not be fully transferred to EGT within the timeframe of this project.

Previous studies have shown that the CTA1-DD protein can be employed to carry the antigen by inserting one or several copies of a peptide antigen between the CTA1 and DD domains. This was carried out for the M2e peptide and both CTA1-M2e-DD and CTA1-3xM2e-DD have been constructed, produced and purified successfully. Further, sufficient quantities of CTA1-DD have been produced and distributed to the consortium for *in vitro* and *in vivo* studies.

1.6.4 Vaccine formulation

Formulating the vaccine is imperative for the adequate delivery of the all components to mount a correct immune response. Proxima's proprietary vaccine delivery system (Vaxcine) is based on use of oils as carriers of the antigen and adjuvant to the cells of the immune system responsible for processing and presentation of antigenic materials. By adding oils to already immunogenic materials, the immune response can be further enhanced, thereby increasing the efficacy of the vaccine.

Proxima has worked on formulating the different components of the vaccine and these have been tested both *in vitro* and *in vivo*. A variety of oils have been used to create reverse micelles and by designing the M2e antigen peptide with lipid tails conjugated ordinary micelles have also be formulated.

1.6.5 *In vivo* protection studies

At VIB different vaccine candidates have been evaluated for efficacy and protection in an influenza challenge mouse model. Briefly, animals are vaccinated 2-3 times either by the intranasal or oral route, depending on the formulation of the vaccine candidate and then challenged with mouse adapted influenza virus. The animals are monitored for mortality (survival) and morbidity (temperature and weight), and the serum antibody titres are analyzed at different time points during the immunization/boost/challenge regimen. Virus lung titres are also determined.
Strikingly, both CTA1-M2e-DD and CTA1-3xM2e-DD provide good protection against a lethal influenza challenge in the mouse model. Indeed M2e-specific antibody titres are also elevated in these animals and lung virus titres are largely reduced compared to control animals. This is a main achievement for the whole project.
Vaxcine formulations containing M2e adjuvanted with LT were also tested via both the nasal and oral route but none of these formulations displayed increased efficacy compared to the control animals. During the second reporting period additional efficacy studies of CTA1-3xM2e-DD intranasal vaccine have been performed, this time with the normalized M2e amounts and it could be concluded that an M2e-VLP vaccine (1818) adjuvanted with CTA1-DD induces stronger M2e-specific IgG responses than the CTA-3xM2e-DD conjugates. M2e peptidomimetics conjugated to CTA1-DD and monomeric versus dimeric M2e were also compared and while the branched M2e-CTA1-DD conjugate appears to be more immunogenic than its monomeric counterpart, neither conjugate is superior to M2e-VLP + CTA1-DD. Further the results suggest that there is no advantage in using dimeric over monomeric unconjugated M2e peptides as antigens.
Follow up studies to analyze particular Fc-gamma receptors involved and essential to provide protection by anti-M2e IgG antibodies were completed. We conclude that both CD16 and CD64 are implicated in anti-M2e antibody protection and propose that both ADCC e.g. by NK cells and phagocytosis of opsonized cells e.g. by monocytes are at least part of the *in vivo* effecter mechanism. An ADCC type of mechanism is corroborated by the consistency of a correlation between IgG2a/b anti-M2e serum titers whereas anti-M2e IgG antibodies may be involved primarily in phagocytosis of infected cells.

1.6.6 *In vivo* mechanism of action studies

The work performed at UGOT has focused on examining the *in vivo* mechanism of action of the vaccine candidates. One goal has been to explore in detail the mucosal immunogenicity of the vaccine constructs in mice, with special focus on the ability to prime specific T cell responses at systemic and mucosal sites. Epitope mapping of the M2e domain has also been performed and efforts have focused on investigating the newly identified T cell epitope incorporated in M2e with regard to immunogenicity and which may have significant impact on the efficacy of this universal anti-influenza A virus vaccine.

It was shown in the first reporting period that intranasal administration of the CTA1-M2e-DD and CTA1-3xM2e-DD vaccine candidates are effective stimulants of both M2e-specific CD4+ T cell responses and serum anti-M2e antibodies. Further, constructs including three copies of M2e appear more effective than single copy M2e constructs.
Following the midterm review UGOT has focused the efforts on investigating the newly identified T cell epitope incorporated in M2e with regard to immunogenicity; i.e MHC class II restriction, exact amino acid (aa) position. This hitherto unknown MHC class II restricted T cell epitope in the M2e peptide may have significant impact on the efficacy of this universal anti-influenza A virus vaccine.

1.7 End results

The work conducted up to date supports the hypothesis that a universal influenza vaccine can be developed based on the rationale of this joint research and development collaboration. We have developed several vaccine candidates which provide protection in a mouse challenge model and demonstrate adequate and relevant immunologic responses and so far, no results have been obtained which indicate any major obstacle in the onwards development work. By refining the composition of the various vaccine parts, an optimal candidate vaccine product protected by novel IPR is likely to be developed within the framework of this programme. Concomitantly, important knowledge regarding immune mechanisms involved in host protection against viral infection will be generated. This may in addition have a general impact on future vaccine design.

2 Annex 1 – Final plan for using and disseminating the knowledge

2.1 Section 1 – Exploitable knowledge and its Use

The SME Partners are using their respective regular channels and methods for exploitation and commercialisation of results to initiate contacts with potential industrial partners and customers in the pharmaceutical industry.

The project coordinator (PCO) is appointed to act on behalf of the co-owners and will be responsible for negotiations with potential industrial partners who have expressed an interest in licensing the jointly owned Knowledge.

The PCO is also be responsible for negotiations regarding the terms for access right to any Pre-Existing Know-How which is to be presented to a potential industrial partner. The co-ownership agreement shall in detail define the rights and obligations of the PCO, or any other Party appointed to act as coordinator on behalf of the co-owners as the case may be, in the course of negotiations and when entering into agreements with industrial partners.

This plan will act as a complement to the Consortium Agreement, which regulates IP

issues in detail, i.e. the filing of patents and licensing issues. This promotes efficient and conflict-free interaction between the partners, while protecting the IP created in the project.

Table 1. Overview table of exploitable knowledge.

Exploitable Knowledge (description)	**Exploitable product(s) or measure(s)**	**Sector(s)** of application	Timetable for commercial use	Patents or other IPR protection	**Owner** & Other Partner(s) involved
CTA1-(M2e)x-DD provides protection against influenza	CTA1-(M2e)x-DD	1. Public Health 2. Medical	2010-2020	Based on pre-existing patents	**BVT (owner)** **VIB (owner)**
M2e contains MHC class II-restricted T-cell epitope		1. Public Health 2. Medical	2010-20300	Based on pre-existing patents	**BVT (owner)** **VIB (owner)**

2.1.1 What the exploitable result is

$CTA1-(M2e)_x-DD$ represents two novel fusion proteins harbouring one or multiple copies of the M2e peptide incorporated between the CTA1 and DD domains.
A hitherto unknown MHC class II restricted T cell epitope has been identified in the M2e peptide, which complements the potent B cell epitope present, and this combination may have significant beneficial effects on the efficacy of a universal anti-influenza A virus vaccine.
Within the framework of this programme partner 1 (BVT) and 6 (UGOT) have conceived, constructed, produced and characterized the novel proteins. Partner 2 (Pepscan) have synthesized M2e- peptide sequences. Partner 5 (VIB) has demonstrated *in vivo* that intranasal administration of these fusion proteins provides protection against a lethal challenge with a mouse adapted influenza strain.

2.1.2 Partners involved

Partner 1 – Biovitrum
Partner 2 - Pepscan
Partner 5 – VIB
Partner 6 – UGOT

2.1.3 How the results may be exploited

These novel fusion proteins represent putative influenza vaccine candidates, comprising both the relevant influenza specific peptide and the functional mucosal adjuvant within the same molecule. With the knowledge of the beneficial effects of having a potent B cell epitope complemented with a T helper- and CTL-epitope and their role in protective immunity against influenza A virus it may be possible to develop even more potent

mucosal influenza vaccines. As such they could be exploited as vaccine products either directly within the context of a potential spin out from the consortium or as a component in a sub-licensing deal with a major vaccine company.

2.2 Section 2 – Dissemination of knowledge

The partners forming this consortium all agree to continue to promote dissemination of the results that have been acquired within the project. This work holds high priority in the consortium. The partners will, however, always consider the patentability and potential commercial exploitation of results prior to any publication. Dissemination will be achieved by means of publishing research results in international peer-review journals (e.g. *European Journal of Immunology*, *Vaccine*, *Nature* and *Journal of Virology*) using original material from the project, speaking at international scientific conferences, and filing patents. The consortium will also have an official presentation through the intra-project website where the results of the project can be presented to the public.

Information and results are disseminated between all partners (bi-annually) and the EU at regular intervals (annually). The plans for dissemination of information to groups external to this project are discussed formally at project meetings to avoid any scientific disagreement amongst partners. A first version of the dissemination plan was published by month 12 of the project (deliverable number D11), and this is the final version made available at the end of the project (month 24, deliverable number 34). Results obtained will be published in international peer-reviewed journals, contingent on the agreement of all partners involved.

A Public Dissemination Committee (PDC) was established in the initial phase of the project. The PDC is composed of one representative from each member of the consortium and consists of the same members of the Steering Committee (SC). This secures an efficient monitoring of dissemination activities and acknowledgment of information that can be disseminated to the general public. The PDC collaborates with healthcare professionals, public health organisations (e.g. WHO, UNICEF), patient associations, journalists, investors and vaccine companies to pursue the task of imparting non-confidential scientific information via multiple channels. The consortium gains access to the professional services of InVivo Communications to compile the information to be disseminated in a comprehendible and popular form amenable to reach out to the public and financial community. Press releases have been issued upon attainment of major milestones and/or key scientific observations. The intra-project web-site is updated continuously with information on the progress of the project and also to disclose non-confidential information to the general audience. Below is an overview table describing in brief performed and planned activities for disseminating knowledge.

Table 2. Overview of performed and planned activities for disseminating knowledge.

Planned /actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
050601	Project web-site	General public	World	Internet	BVT
050908	Presentation Scientific meeting "New approaches to vaccine development - From the bench to the field"	Research	World	100 - 200 delegates	VIB
051031	Press release project start	General public	Europe	Unknown	BVT/All
0511xx	Press articles (Biotech Sweden, Kemivärlden, Ny Teknik etc.)	General public & trade specialist	Sweden	500 000	BVT
051117	TV interview (News)	General public	Sweden	2 million	BVT
051201	Project presentation	General public	World	Internet	BVT
050911	Presentation Scientific meeting ESWI	Research	World	100 - 200 delegates	VIB
051003	World Vaccine Congress, France	Research/Industry	World	250-300 delegates	BVT
051207	Presentation Scientific meeting WHO	Research	World	200 - 300 delegates	VIB
060131	Scientific publication	Research	World	Subscriber Internet	VIB/UGOT/ BVT
060207	Media briefing/ EC Press conference	General public & Higher education	Europe	Unknown	VIB/BVT
060207	Film/Video	General public & Higher education	Europe	Unknown	VIB
060320	World Vaccine Congress, USA	Research/Industry	World	300-400 delegates	BVT
060427	Joint Vaccine Meeting	Research	Europe	50 delegates	VIB
060912	Presentation Scientific meeting MVADS	Research	World	100 - 200 delegates	VIB
060927	Presentation Scientific meeting "Novel Vaccination Strategies"	Research	World	200-300 delegates	VIB
061005	Pandemic influenza meeting, France	Research	World	50-100 delegates	VIB
061102	Mini symposium	Research	Europe	30-40 delegates	VIB
070412	Presentation Scientific meeting Semmering Conference 2007	Research	World	100-150 delegates	VIB
061005	Presentation Scientific meeting EMIG	Research	World	100 - 200 delegates	UGOT
061124	Vaccines in Netherlands	Research/Industry	Europe	50-100 delegates	VIB

Planned /actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
070315	Publication EC Parliament Magazine	EU public	Europe	Not known	VIB/BVT
070531	Filing for IP	Industry	World	Not relevant	BVT/Pepscan/Proxima/VIB
070xxx	Publication	Research	World	Subscriber Internet	VIB/UGOT/BVT
070617	Presentation Scientific meeting options for Control of Influenza, Canada	Research	World	400-500 delegates	VIB

2.2.1 Project website

A website specific for the Universal Vaccine project was set up with the http address: www.universalvaccine.org. This site has two parts, one external domain with general information on the project such as a project summary, project presentation, a list of the consortium participants with links to their home pages, publications, press releases and public statements. The internal website can only be accessed by members of the consortium and is used as a document repository and for internal communication. All data results are deposited there as well as internal reports, power point presentations and minutes from SC meetings and teleconferences and other documentation. Further, the PDFs of the EC contract, DoW and its annexes and consortium can be retrieved from this site.

2.2.2 Press release project start

When the project start date had been officially approved by the EC, a joint press release was put together by the consortium and dispatched on October 31st of 2005. It was released in both English and Swedish and distributed to all European news agencies as well as to Swedish trade press e.g. within biotech, health and medicine and also our local press and news agencies. The press release was acknowledged in a number of papers and magazines in Sweden e.g. Ny teknik and Kemivärlden Biotech. It also made it to the local TV news channel and the Västnytt team visited both UGOT and former Arexis sites for an in depth footage and interview of the scientists working with the project. In the main Swedish Biotech journal, Biotech Sweden, the story made the front page of the following number and a large article about the project was published, meaning that awareness of the project was well spread among all Swedish companies involved in pharmaceutical and biotech research and development.

2.2.3 Project presentation

A project presentation was compiled and presented on the public domain of the Universal Vaccine website. The outline of the presentation follows the recommendations of the EC.

2.2.4 Presentation at scientific meetings

The Universal Vaccine project has been presented at multiple scientific venues, conferences and events. Professor Walter Fiers VIB (WP6) was invited to hold a Keynote presentation at a meeting on "New approaches to vaccine development - From the bench to the field" in September 8th -10th 2005 in Berlin, Germany. He also attended and held a Keynote presentation on our research at the "Novel Vaccination Strategies" conference on 25th-27th September 2006 in Berlin, Germany which was organized by Prof. Stefan H. E. Kaufmann of the Department of Immunology and Director of The Max-Planck-Institute for Infection Biology. Recently Professor Fiers attended a Semmering Conference 2007 titled "Challenges for vaccine development: Medical Needs and Social Implications" 12th–15th April 2007 in Baden, Austria organized by Prof. Dr. Alexander Von Gabain from Intercell where he also held a Keynote presentation. Further the abstract "M2e-based Universal Influenza A Vaccine" authored by Fiers, W., De Filette, M., Descamps, F., Birkett, A., Lycke, N., Ramne, A., Min Jou, W., & Saelens, X. was presented in conjunction with this conference.

The European Scientific Working group on Influenza (ESWI) organised The Second European Influenza Conference in Malta 11th -14th September 2005. Dr. Xavier Saelens from VIB (WP6) attended this meeting and held an oral presentation. An abstract published in the conference abstract book under the title: Universal Influenza A Vaccine: Optimisation of M2-Based Constructs with authors Xavier Saelens, Marina De Filette, Wouter Martens, Willy Min Jou, Ashley Birkett, and Walter Fiers.
Dr. Saelens also participated at the meeting on "Influenza vaccines that induce broad spectrum and long lasting immune responses" organized by the WHO in Geneva 6-7th December 2005. There he held a presentation entitled " Protection against influenza A virus infection by M2e-based protein vaccination: universality, mechanism of protection and mucosal delivery" authors Xavier Saelens, Ashley Birkett, Marina De Filette, Willy Min Jou, Anna Ramne, Nils Lycke, Björn Löwenadler, and Walter Fiers.
Xavier Saelens (WP6) attended the meeting on "Modern Vaccines Adjuvants and Delivery Systems", MVADS 2006 organized by The Royal Society of Medicine, in London, UK 12th-14th September 2006. The abstract "M2e-based vaccination: intranasal administration and heterosubtypic protection against influenza virus infection in mouse" authored by Xavier Saelens, Marina De Filette, Wouter Martens, Anouk Smet, Ashley Birkett, Anna Ramne, Nils Lycke, Björn Löwenadler, Willy Min Jou & Walter Fiers was presented at this meeting. Dr. Saelens was also invited to hold oral presentations describing the work being performed in our Universal vaccine programme at the "19èmes Rencontres européennes sur la grippe et sa prevention" October 5th-6th Paris, France, 2006, "Mini symposium on immunity to influenza infection" at The Eijkman Graduate School of the University Utrecht and the Netherlands Vaccine Institute (NVI), Utrecht, The Netherlands, November 2nd, 2006 and the conference "Vaccins in Nederland", van Research tot Gebruik, Dutch Vaccines Group, Zeist, The Netherlands on November 24th, 2006.

Professor Nils Lycke and Dr. Dubravka Grdic Eliasson from UGOT (WP7) attended the European Mucosal Immunology Group (EMIG) meeting in Prague, 5th-7th October 2006 and the abstract titled "CTA1-M2e-DD: novel antigen-adjuvant vehicle as an effective

influenza vaccine" authored by Dubravka Grdic Eliasson, Karin Schön, Anna Ramne, Björn Löwenadler and Nils Lycke was presented there.

Dr. Anna Ramne attended the World Vaccine Congress in Lyon, France 3rd – 6th October 2005 and a follow-up meeting World Vaccine Congress in Washington 20th – 23rd March 2006. These venues are largely visited by representatives from the vaccine industry and are excellent occasions to meet with the business development representatives in the vaccine industry to discuss and explore potential commercialization, partnering and collaboraration opportunities.

2.2.5 Publications

VIB (WP6) has been responsible for authoring the article "The universal influenza vaccine M2e-Hbc administered intranasally in combination with the adjuvant CTA1-DD provides complete protection" by De Filette, M., A. Ramne, A. Birkett, N. Lycke, B. Löwenadler, W. Min Jou, and W. Fiers which was published in Vaccine (2006) Jan 30;24(5):544-51. (Epub 2005 Aug 31).

Further, VIB put together a follow up publication "Improved construct design and intranasal delivery of an M2e-based humans influenza A vaccine" by De Filette M, Fiers W, Martens W, Birkett A, Ramne A, Lowenadler B, Lycke N, Jou WM, Saelens X. was published in Vaccine 2006 Nov 10;24(44-46):6597-601. (Epub 2006 Jun 12).

UGOT (WP7) has been responsible for authoring the manuscript "Adjuvant targeted CTA1-M2e-DD; a novel concept for mucosal delivery of a universal influenza A vaccine" by Dubravka Grdic Eliasson, Karim El Bakkouri, Karin Schön, Anna Ramne, Els Festjens, Björn Löwenadler, Walter Fiers, Xavier Saelens and Nils Lycke which has been submitted to Journal of Immunology.

2.2.6 Other public presentations and public statements

On February 7th 2006 the EC organized a range of media relations activities for an event focused on EU-funded Research on Pandemic and Avian Influenza. VIB (WP6) hosted a Technical Media Briefing which was attended by a large group of European journalists in which a presentation of the Universal Vaccine project was made and also included a tour of the VIB facilities. Biovitrum (WP1) contributed by drafting project fiches and a short written summary about the project and provided visual material to aid the visual aspect of the fiches.
Following this event, our project co-odinator was contacted by representatives of the Swedish press and an in depth interview with him and also Nils Lycke of UGOT (WP7) was published in one of the leading Swedish evening newspapers Aftonbladet. The next

day the leading Swedish morning paper, Dagens Nyheter, also published an article on the same subject.
An executive summary of the Universal Vaccine Programme was printed in two separate issues of The European Commission Parliament Magazine, which is a unique publication working at the heart of the EU. With an active advisory board of MEPs, the magazine opens a window into the workings of the European Parliament – and other EU institutions. Regular contributors include EU Presidents and Commissioners, ambassadors, leaders of the parliament's political groups, senior members of parliamentary committees and rapporteurs on key EU legislation.
Our dissemination message with 600 words plus logos and 2 figures was printed first in the special FP7 Research Supplement published in March 2007 in which there were a vast number of co-funded projects & Research organizations from all over Europe participating. Further it was published in the 50th Anniversary of the EU issue which covered Milestones, Policy and Enlargement of the EU and former Research Commissioner Philippe Busquin wrote on how research programmes have developed.

2.3 Section 3 – Publishable results

At this point of the programme there are no publishable results.