synBIOnews No.1

Welcome to the first newsletter edition of the MSCA-ITN project synBIOcarb! We are delighted to provide you with news from our training network activities and to update you on project highlights in the exciting field of synthetic glycobiology! We are happy to keep you posted and we hope that you enjoy reading.

Yours sincerely, synBIOcarb Team

synBIOcarb AT A GLANCE

synBIOcarb is a European Training Network in the frame of the Marie-Skłodowska-Curie program (H2020-MSCA-ITN). It brings together a diverse team of chemists, structural biologists, biophysicists, cell biologists and protein engineers from across Europe who are pioneering the development of Synthetic Glycobiology. In addition, four SMEs that are leading industrial innovation in glycoscience and protein engineering are completing the consortium. This team provides 15 early stage researchers (ESRs) with advanced scientific training in enabling technologies that underpin the development and exploitation of glycoscience for diagnostics and targeted drug delivery. synBIOcarb intends to progress the state of the art in Synthetic Glycobiology. The centerpiece of synthetic glycobiology is the redesign, synthesis as well as exploitation of the cell glycocalyx (which is the outer layer of the cell membrane) for diverse analytical, diagnostic and targeted therapeutic applications. The glycocalyx is made of gly - coproteins (eg lectins) and glycolipids . In this context , ESRs have to understand and engineer protein -carbohydrate interactions , functionalize complex surfaces with novel glycocalyx and lectin components and develop tools for analytical, diagnostic or cell targeting purposes.

Further information on https://synbiocarb.science/

JUVISSAN MEDALITH AGUEDO ARIZA

Host institution: Slovak Academy of Sciences

ESR Project Title:
ESR12: Nanotechnology-driven construction of bioanalytical devices applicable in glycomics

My contribution to synBIOcarb:
In this project, my role is to develop biosensors employing nanomaterials and glycobiomarkers for early diagnostic and earlier detection of colorectal cancer, this is interesting for us because these bioanalytical devices offer exceptional advantages in selectivity and sensitivity over other diagnostics platforms that are currently, on the market.
My work has been presented in some international conferences and currently, we are working on generating robust data for our future publications. In our synBIOcarb meetings, I can show the progress of my project to comply with timelines established by the consortium.

My personal experiences:
Thanks to MSCA-ITN, I have been successfully integrated into a very experienced team. Even I am developing independence in my research I always receive some inputs on how I can improve my experiments.

My opinion about the MSCA-ITN program:
Being an MSCA-ITN fellow has given me the opportunity to work as an early-stage researcher in Slovakia and learn from synBiocarb experts, pioneering the development of Synthetic Glycobiology from various prestigious universities and companies in Europe. The program has allowed me to focus in my career development by attending scientific conferences, improving my communication skills for example by talking about glycans and its role in cancer with the Slovak public during the researchers night and also during one conference I had the opportunity to talk with a Nobel Prize winner.

My benefits from synBIOcarb:
The collaboration with our network provides me with the support I need to complete my Ph.D., it allows me to use the facilities of our partners and what is more important is that we can receive feedback from experts to have an increasingly innovative project.
The training and research disciplines we receive will improve my academic competences and industry-relevant transferable skills which are so crucial for the labor market.

FEDERICA VENA

Host institution: GLYcoDIAG

ESR Project Title:
ESR14: Development of lectin kit for quality control in production of recombinant glycoproteins

My contribution to synBIOcarb & measures to meet the objectives:
My contribution is on the application level. The aim is to use the specificity of lectins towards carbohydrates to develop a lectin kit for recognition of unwanted glycans epitopes on biotherapeuticals. The measure is in terms of deliverables and milestones, each one of us has to reach specific goals according to a previously set timetable.

My personal experiences:
I'm based in the north of France, in the city of Orléans. I'm carrying out my project at the company GLYcoDIAG and here everyday I have the chance to learn something new in a very stimulating environment. I really appreciate doing research in a company because it's a good opportunity to put studies into practice. Here I am surrounded by knowledgeable people on both the scientific and the marketing level. I did my first secondment last January, in the south of France, in Grenoble at the Cermav (Centre de Recherces sur les Macromolécules Végétales). This has been a great experience on the professional and human level. I experienced another way to work and answer scientific questions. I learned new techniques. I met a group of nice people, open-minded and willing to help. I took advantage from their expertise and from their approach to everyday lab problems. I strengthened my collaboration with my SynBiocarb colleagues as well as I acquired new connections in the scientific world. I came back to Orléans with new ideas and a renewed energy.
We are encouraged a lot to think about our career development. This is really useful now to keep track of progresses and setbacks and it will be important in the moment of taking a direction after PhD.

My opinion about the MSCA-ITN program:
It's a cutting-edge program completely in line with the time we are living in. It promotes not only high level research but also mobility, inclusion, gender equality, collaborations that is what we need most in nowadays society.

My benefits from synBIOcarb:
I am acquiring excellent scientific knowledge and many other soft skills like communication, scientific outreach, project and time management. I have the chance to meet and learn from great researchers in the field of synthetic glycobiology. I am also building new important friendships.

DAJANA KOLANOVIC

Host institution: acib GmbH

ESR Project Title:
ESR10: Lectin attachment on surfaces by bioconjugation at non canonical amino acids

The project:
It is known that the controlled and oriented immobilization of lectins for glycan diagnostics and analysis is still a challenge. Therefore, we will explore whether reactive ncAAs can be used to immobilize lectins in a directed manner on a solid support. In order to achieve this, the project involves the site-selective functionalisation of lectins with non-canonical amino acids (ncAAs).

The synBIOcarb training program
brings European research groups together into a transnational network. This program allows us, the early stage researchers, to gain hands-on experience in various techniques. Lectures from experts help us update our knowledge base in the advancing synthetic glycobiology research like biosensors or targeted drug delivery.
A good allocation of funding from MSCA towards workshops, trainings and conferences allow us to communicate science at ease. Participating in conferences abroad we can connect to other scientists from the same research area who share our research interests. These activities can initiate possible future collaborations.

My host institution
is the Austrian Centre of Industrial Biotechnology, acib GmbH, located in the city of Graz, Austria. Acib as an organization provides an interdisciplinary environment for research in close cooperation with scientific and company partners. I work in the Synthetic Biology group of acib under the supervision of Dr. Birgit Wiltschi. I also have an affiliation to Graz University of Technology for my PhD studies.

Secondments
are a great opportunity to work with experts from various areas of research. This helps us to learn useful techniques and implement them in our own projects. On the other hand, secondments create an excellent stage to exchange cultural and working habits.
I think trainings, workshops and secondments which are part of the activities in the consortium will provide valuable experience in the field of glycoscience. The exposure to international research and work in different environments in the teams of the consortium will make us more flexible and compatible for future positions.

DYLAN JABEGUERO

Host institution: CERMAV-CNRS

ESR Project Title:
ESR7: Application of glycosyl transferases to functionalise protocells

My contribution to synBIOcarb and measures to meet the objectives:
The goal of the project is the surface modification of artificial cells or tissues using enzymes called glycosyltransferases (GTs), key enzymes that catalyze the transfer of glycans such as those found in the glycoproteins and lipids. I will produce and functionally characterize select GTs with activity related to glycans of interest by the synBIOcarb projects, which opens opportunity for collaborations. The project will expand our toolbox for building a complex glycans-landscape with applications in tissue engineering, drug delivery and diagnostics.

My personal experiences:
Since starting the project last year I continue to be trained in key competencies by my supervisor and the supportive scientists at CERMAV. The bi-annual synBIOcarb meetings is also a great source of training both scientific and cross-disciplinary. Personally, the highlight of the last meeting combined entrepreneurial, creativity and research skills in an exercise where we were posed with a hypothetical scientific problem and presented a solution in proposal format to a company. I am also looking forward to experiencing work in industry during my secondment at Elicityl. Finally, through Alliance Française and CNRS I am also learning French language.

My opinion about the MSCA-ITN program:
A great opportunity to expand my network with many universities as well as industries across Europe. No financial stress from funding for lab equipment and trainings. I feel confidence in my expanded career prospects.

My benefits from synBIOcarb:
Opportunities for detailed discussions with inputs from experts in the field have allowed me refine my project. There are also potential collaborations with other ESRs during the consortium meetings.

Any other comments:
Grenoble is an incredible high tech city. The fantastic atmosphere and its close proximity to the Alpes mean there is easy access to enjoy mountain activities during breaks.

SPYRIDON GATOS

Institution: University of Copenhagen

ESR Project Title:
ESR9: Glyco-Modulation of Membranes to elucidate host-parasite interactions

Glycosylation is a significant post- translational modification on proteins modulating various functions in living organisms. The latter include pathogen recognition, cell signaling cell development to mention a few. In addition, cancer cells display a unique repertoire of various glycans that are common only in cancer cells. Investigating these cancer related glycan structures can be vital for the development of new cancer drugs. My research activity involves glycan modifications on cell membranes to study their role in tumor cells. The next step is the development of antibodies against these targets and perform targeted delivery experiments. To achieve these, collaborations between the training will take place. Thus, I am looking forward to visit other labs and do a part for my project. It would be a great opportunity to see other working environments and how people behave and work in other countries with different cultures. Being part of a European training program could not be anything less but advantageous for our future career. It broadens our horizons and give us possibilities both the academic or industrial setting. Moreover, we have the opportunity to meet researchers that share the same passion for science like me. Finally, apart from potential collaborations that will take place, the funny moments that we have in the meetings are worth mentioning.

synBIOcarb HIGHLIGHTS

THE FIRST 18 MONTHS OF synBIOcarb HAVE BEEN DEDICATED TO RECRUITING AND TEAMING UP.

ESRs got familiar with their individual projects and initiated their first steps for career development. A first highlight was the review about the “Structure and the engineering of tandem repeat lectins” from the University of Grenoble (CNRS). The authors, including ESR6 Simona Novota, gave an overview about the most promising scaffold for engineering novel lectins, namely β-propellers and β-trefoils. They have a strong appetite for the specific sugar-containing molecules on cell membranes (glycoconjugates) and therefore they represent excellent tools as biomarkers. Their function can even be improved by changing single amino acids or incorporating synthetic molecules and through the latest innovative engineering techniques there is now a realistic way of developing new artificial lectins that will have numerous applications in health science and biotechnology.

synBIOcarb ON NETWORKING TOUR

INTERNATIONAL MEETING ON SYNTHETIC GLYCOBIOLOGY, 8TH - 9TH OCT 2018, BUCKINGHAMSHIRE UK

At the beginning of the project, the synBIOcarb team organized a Royal Society funded conference on synthetic glycobiology, to coincide with the synBIOcarb kick-off meeting.

ITN COORDINATOR INFORMATION DAY, 23RD NOV 2018, BRUSSELS, BELGIUM

The synBIOcarb coordinator gained useful knowledge about project implementation during the ITN Coordinator Information Day, offered by the European Commission.

synBIOcarb 1ST TRAINING EVENT (TE1), 24TH - 27TH JUN 2019, LEEDS, UK

The first opportunity for ESRs to get to know each other in Leeds was a great success. The program offered a presentation training, a workshop about ethics and research management as well as a science communication training.

EUROPEAN RESEARCHERS NIGHT (NIGHT), 27TH SEP 2019, BRATISLAVA, SLOVAKIA

Two synBIOcarb ESRs took the opportunity to explain basics of the world of sugars and their role in cancer to children and their families.

synBIOcarb 2ND TRAINING EVENT (TE2)/MID TERM CHECK, 9TH - 12TH DEC 2019, GRAZ, AUSTRIA

The second training event was accompanied by a Mid-term Check of the EC project officer. The ESRs presented their projects and were trained in developing designs to target sick cells and deliver a drug to heal or kill them.

synBIOcarb EVENT CALENDAR

Meet the synBIOcarb team at upcoming events dealing with synthetic glycobiology. Stay tuned!

15TH BRATISLAVA SYMPOSIUM ON SACCHARIDES
8TH - 12TH JUNE 2020, SMOLENICE CASTLE, SLOVAKIA

SYNBIOCARB 3RD TRAINING EVENT (TE3)
15TH - 18TH 2020, GRENOBLE, FRANCE

SYNBIONEWS EDITORIAL TEAM

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