

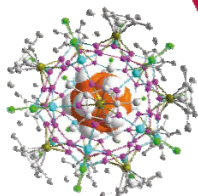
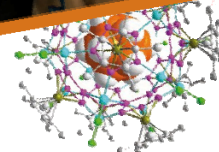
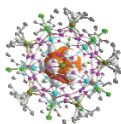
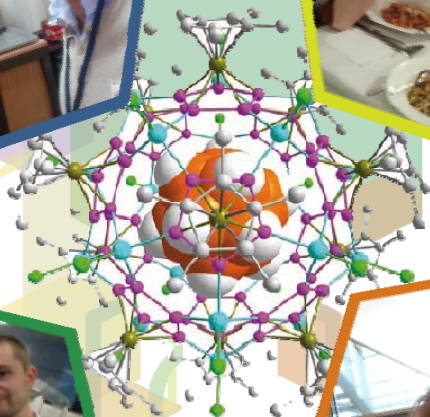
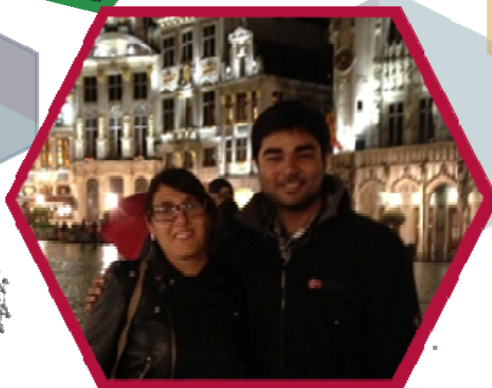


NANODRUG

Research project funded by the European Commission - Marie Curie Actions ITN FP7 PEOPLE 2011-2015

newsletter

Issue 8—March 2014



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The NANODRUG Researchers in secondments





The NANODRUG teams from QMUL, Sanofi and Innsbruck University met to discuss results and see how these could fit with the computation models developed by Yin Wang.

Dr. Steinmetz (SANOFI) organized a meeting with Prof. Liedl from the University of Innsbruck and Prof. Resmini from QMUL, with the participation of Dr. Zarbakhsh (QMUL) while Gabriele Saito (ESR QMUL) and Yin Wang (ESR UIBK) were doing their secondment in Sanofi R&D at Structure Design & Informatics department in Paris.

As the scientific background of the participants was different, ranging from polymer chemistry and nanogels interactions with lipid layers for the chemist group from QMUL and computational chemistry for the other members of the other two institutions, the goal of the meeting was to discuss some aspect of the individual research, have a better understanding of common scientific issues seen from different points of view and build the basis for a possible collaboration between NANODRUG members and Dr. Zarbakhsh.

Dr Ali Zarbakhsh delivered an excellent presentation about the use of different tools, in particular neutron reflectivity, in the study of interac-

tion between nanogels and lipid monolayers. The interesting results shown described the behaviour of cross-linked NPs in the penetration of complex lipid systems. Prof. Resmini introduced the work on thermoresponsive nanogels carried out in her group and the computational chemists explained their point of view on the simulation of interactions between nanoparticles and lipid matrix constituting the skin. Yin in particular presented his achievements in coarse-grain molecular dynamics simulations. Interestingly they showed how results provided by experimental systems and simulation models matched, so interesting ideas and were discussed.

Thanks to Prof. Resmini, Dr. Steinmetz and Prof. Liedl an interesting multidisciplinary meeting took place and both Yin and Gabriele got good knowledge related to other scientific fields.

Gabriele and Yin



My secondment at Sanofi R&D at Structure Design & Informatics department

Gabriele

Hey hey people!!

Going back of few months, at the time of the previous newsletter, I left you with an 'au revoir'! As I was preparing the luggage to go to Paris for my first secondment, I promised you an update and some pictures.. and here we are. Like all of you during a period abroad, I worked hard at Sanofi R&D in the Structure Design & Informatics department, supervised by Dr. Steinmetz and Yin, but I also had time to enjoy the 'ville lumiere', experiencing its secret places and loving crepes and vin brûlé (off course)!

I realized that working in a company is a bit different compared to what I expected: not just because I didn't use chemicals and solvents, but because they definitely got a better coffee than the university ones! Thank to Yin and Dr. Steinmetz explanations and instructions, (without them I would not have been able to perform those kind of computational tests), I carried out studies on my fluorescent probes and some preliminary molecular dynamics simulations on the self-assembly of my future polymer. It was kind of weird to see and analyse how it could behave in forming aggregates before having synthesized it. Though we weren't able to get pictures inside

Sanofi (company's policy) we documented one of the most significant moment... the coffee time!

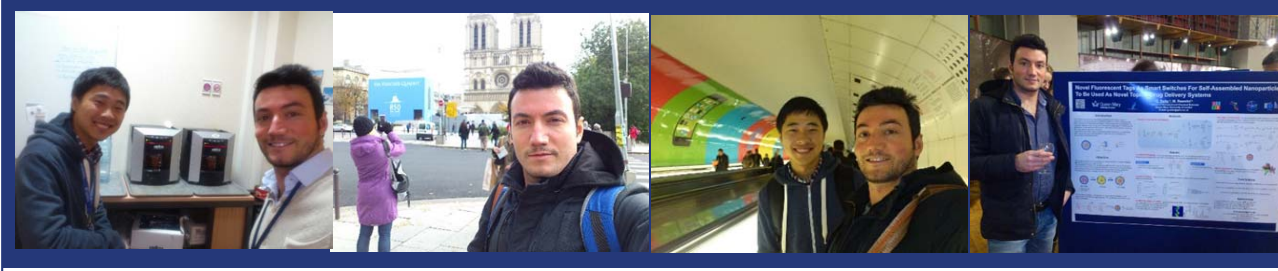
Beside the work, I enjoyed the company of Yin and of two friends of mine, so we had good time visiting the city. I had long walks in the city centre, I discovered street art everywhere and mostly we enjoyed the cakes Dr Steinmetz offered us in her place, talking about life experiences meanwhile drinking some good tea.

Despite the short period of time I spent working there, it was a precious experience! So, I'm looking forward to the next secondment.

I am now back at QMUL with a very busy schedule: McBain Medal Award Lecture Conference in Cambridge with Giorgio, QMUL Poster Session and I am working hard for my 2nd year exam. At the same time my girlfriend joined me in London for 6 months during her PhD and Asli and Sara spent a few weeks in our labs. And the next few months will be as busy...

I really look forward to see you all soon for the workshop in Brussels and maybe some of you at QMUL, why not?

Big hugs NANODRUG family!!



Kerala, India



Namaskar my dear friends! Hope you had a joyful December break and amazing New Year celebrations. I would like to share with you many interesting things that happened in the last couple of months: Supervised a master student, had a wonderful trip to India and got a travel-research grant for my secondment at TransDerm, USA.



Charles, Prof. Véronique Prétat, Kiran

When Prof. Prétat asked me to supervise Charles -Henry Her, a master student coming from University of Bath, I thought that I might not be able to supervise a student since I am still learning many new things each day. But, with the strong and continuous support from Prof. Prétat, I drafted a work plan with goals, timeline, procedures and anticipated results. The proposed work was totally dealt with my experiment tissue samples and so, much more care has to be taken during the tissue analysis. Now the performance time! In the beginning we started slowly to push the work onto the track and sooner, our work got momentum and went perfectly well with only some minor repetitions. Thanks to Charles who worked with me even at odd hours to complete the experiments and gave me a very good company. From this task, I learnt how to supervise, teach, encourage and motivate the student, write the experimental plan, manage time and resources. Charles's testimony after the internship: *"Kiran, you have been a great supervisor and your work ethic was inspirational. I hope that I can take forward what you have taught me in the rest of my studies and future work career."*

Houseboats, Kerala, India



After 14 months of work in Belgium, I went to India for the December break. I bought 15 kilograms of Belgium Chocolates for my family and friends. The trip started with a flight cancellation and continued with a delay of 12 hours. However, as always, luck is mine! My ticket got promoted to Business class! My parents were not aware of my visit and it was a huge surprise for them. They were very happy and we celebrated New Year and Sankranti (Indian festival) together. I visited my childhood school and fortunately met some of my teachers after 12 years. They easily recognized me and introduced very proudly to their current students. One of the happiest moments ever! With my parents and sister's family we went for a tour to Kerala and spent 7 days enjoying the green forests and nature's beauty. A whole day in the House boat was the most memorable

part of my tour. We enjoyed the tea plantations, local food and bought the traditional clothes of Kerala.

Before leaving for India, I submitted my application for a travel-research grant at the international office, UCL. The application is having 7 sections, of which 3 sections are dealing with personal and academic details of the applicant. The other four sections: science background, proposed research, why USA and TranDerm, impact and future prospects. I recalled all the training during our Biarritz summer school about the proposal writing. Thanks to Prof. Resmini and Prof. Haupt for giving us such a comprehensive and detailed lecture on proposal writing. I spent about two weeks to prepare the first draft and another 2 weeks to finalise the proposal. Recently I received an email that my research proposal was granted funding. I am very glad for this opportunity to work at TransDerm. My earnest thanks to Prof. Pr at and Dr. Gaelle for helping me in proposal writing and Dr. Roger Kasper for the recommendation letter.

I wish all only the best and see you all very soon at UCL! Until then take care and have fun!

Kiran



Our lab Christmas meal



This is the first newsletter that I write since I joined the NANODRUG project as a post-doc at Sanofi (Toulouse) last September '13. So I will be brief summarizing these (already) six months. And this new period of my life could not have a better start.

In the first week of my new job I had to attend the Nanodrug meeting in a wonderful place beside sea, such as Biarritz. In that meeting, I had the chance to meet all the fellows and PIs with who I will have to collaborate in the future. I was really impressed by the high scientific level of all the groups integrating the network and I felt lucky for sharing the same goals of these very good scientists and for having the opportunity of collaborating with them. I had the feeling that the next two years would certainly represent the great opportunity that I was looking for in my career.

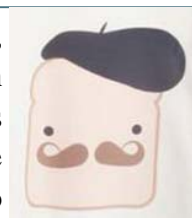
It took me some time to settle down in Toulouse since I had some delays in my search for apartment, but that did not stopped from discovering and enjoying the city since the very first day. As Michela told you in a previous newsletter, Toulouse, “la ville en rose”, is a very dynamic, lively and sunny city. The riverwalk beside “La Garonne” (the river) is a wonderful place to go in a sunny day and synthesize some vitamin D after one week working in the darkness of the microscope room. The Canal du Midi, which goes through the city, is a fantastic cycling/hiking/jogging area (if you follow it you can arrive to the Mediterranean Sea!). The three Universities and Engineering Schools provide bunches of

students having fun in the nightlife of Toulouse. The industrial activity in the city is also very important, especially due to the presence of Airbus. In addition, you can find several cinemas, theatres, concert halls, etc. So the cultural offer is abundant and high quality. Yes, I am trying to convince you to come to Toulouse for one of your secondments!

On the other hand, working in a big pharma company, such as Sanofi, was a huge change since I had always worked in Academia. However, there are some things that are not that different, such as bureaucracy procedures (long and annoying). I could see that research goals are really focused on the final application, people’s working time is one the most valuable as-



sets and standardization of procedures is a must. The facilities are also spectacular, brand new labs and multiple equipments handled by expert technicians, which in my opinion are more important than the equipment itself. For example, my previous experience in microscopy was very basic and in our group in Sanofi, I have the great opportunity to learn from the best experts: my PI, Jorge, and Philippe, who



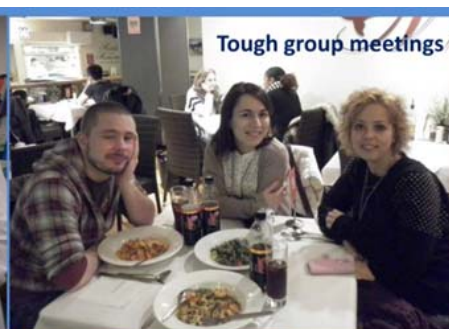
knows these imaging techniques off pat. The other group members, have been also very helpful and available for all my questions and for helping me to learn a little bit every day. They are fantastic professionals and thus, it is easy to get adapted to the new lab and new situation. Now I am in the process of learning French. I have enrolled a course for foreigners and I think I am doing good progress!

At the moment of writing this newsletter, I am in a room at the France House of the Mile End Campus of the Queen Mary University of London. I have come for my first second-

ment at Dr. Kessel's lab at the Blizzard Institute. I feel like a child with a new toy, because I am learning things that I had never done before: 3D cultures, tissue processing, immunohistochemistry and imaging, etc. Of course, I have to thank Ben for being my teacher for these 3 weeks, because he perfectly organized an exhaustive plan of work for me, so that I could see and perform most of the techniques he uses, and in this short time, he showed me the great work he is carrying out. I am looking forward to his visit to Sanofi in March, but before him, Jacqueline will also spend a few weeks with us.

See you all in Brussels!

Sara

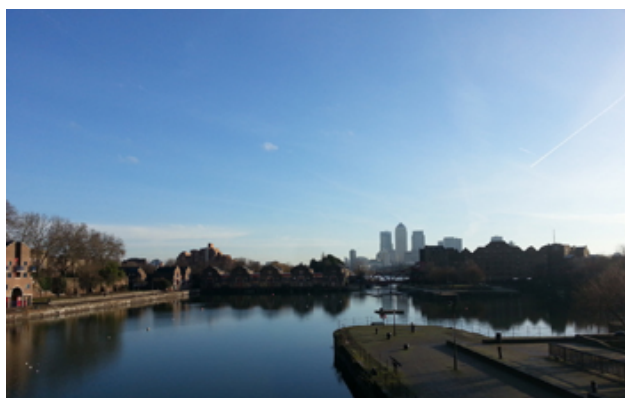




Just after the Christmas Holidays, I flew to London for my second secondment at Queen Mary University of London to work with Prof Resmini research group

I was very excited and just before flying to London, I couldn't sleep all night. I was excited because I had planned for a long time my experiments with my supervisor Prof Schneider and Prof Resmini. I was excited about this big, multicultural amazing city, especially after my long stay in a lovely and small city in Germany. I was excited because I would get back together with my friends from the Nanodrug project for 4 weeks. On the 8th of January, I finally arrived in London Heathrow airport. After the London tube and a couple of changes, I met my first flat-mate in London. The flat was very nice and cosy with very nice view on the canal.

Look at this view and surprisingly bright sky:

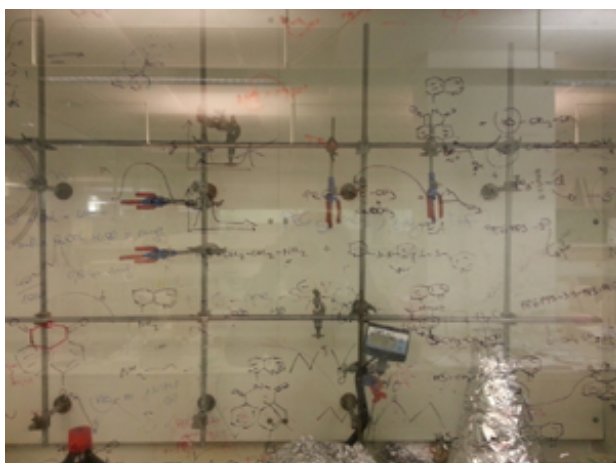


On my first day, I arrived at Prof Resmini's office 30 minutes before our appointment that we had scheduled. After I had been welcomed by Prof Resmini I was directed to lovely Sylvie and Dr. Sofia Papadimitriou. Sylvie and Sofia helped me so much during my adaptation period, scientifically Sophia and Sylvie about everything else.

After the safety training, I started my experiments in the lab and despite the short period of time I was able to achieve quite a lot of work.



My work place can tell you how much I worked.



Messy ...it is just messy ☺

At the end of my second week I gave a presentation which summarized my research so far and experiments that I performed at QMUL. This meeting was very successful and useful for me.

After my presentation I received valuable comments from Prof Resmini and all group members. It was a “brain storming” which led me to new experiments and results. During my stay in London every week I attended Prof Resmini’s group meetings and I was informed about other group members’ study. In these meetings besides science, Prof Resmini instructed us general presentation techniques and shared her experience.

It was a very hectic time. I said good bye and good luck to Diana Velluto for her new job and Giorgio for his secondment in France. I tried to visit all sightseeing, museums and eat as much as I could in London. I participated at the Chinese horse new year celebration in China town. Okay... I have to confess that I couldn’t stay too long because the place was too crowded for me after Germany and my small town here. I liked to be in London and during my last week I even checked flight tickets to come back to London and I think I forced my flatmates to invite me again... just a little bit.



Fortunately Sara and I carried out our secondments at same time in London. She was in the Blizzard Institute at Queen Mary University of London with Benjamin and Prof Kellsell. We met and planned some very informative experiments for my research and it is always nice to see friends. Besides scientific meetings, we went out for lunch and coffee and shared our experiences about London.

But of course life was not always happy and shiny. Most days it was raining very heavily. A big tube strike stopped the life for two days. We



had to walk, walk, and walk...

I really enjoyed my time in London. All group members were very kind and friendly to me. I didn’t feel as a guest or visitor. I felt like a member of group. I would like to thank all but specifically Giorgio and Gabrielle. They had to share every chemical and equipment with me and answer my all questions. Thank you guys... without your help I couldn’t finish my experiments on time.

Last week I was very sad to leave that soon. But group members found a way cheer me up again so we went to Japanese restaurant together (thanks Dolca and Gabrielle). The food was great and I couldn’t count how many sushi I ate. You can easily find different type of cuisine from all over the world in London which I appreciated so much. I believe I have problem about food or it is not a problem just appetite. Am I eating too much???

After one month and a very long trip, I was at home in Germany with very lovely memories of London. I came together with my sweethearts (my cats, Patik and Lou Lou) who I had to leave behind for my secondment in London. They were not happy when they saw me and it had not been easy to make it up to them but at the end of a week they were just adorable again.

Asli

...*Bonjour, Guten Morgen UCL!!!*



Dear NanoDrug family,

I hope you all are doing **Great!!!**

Anyway, we have the chance to meet each other again in just a few weeks so I can ask you how things are going very very soon.

I am so so happy and I can't wait to hug you all in Brussels, I miss you a lot...

...It has been a long time since we were all together in Biarritz and I did so many things since last September that it seems much more than only six months ago. Yes, you understood correctly...Today, I cannot mask my **nostalgic mood MODE-ON!!!!**...And I know I would be able to write and write and...**WRITE & SHARE** my **FEELING**, my **EMOTION** and my **EXPERIENCES** without stopping at all!

LET'S START...

This time, I would like to tell you about the **secondment** I had in **UCL**, in Brussels, immediately after the **MID-TERM** Meeting. It was my first time in Belgium and it was **CRAZY!!!** I came back from Biarritz, happy and satisfied but really tired and without any rest I had to prepare the samples to bring in Belgium with me (a lot of nanoparticles synthesis), book the flights and find an accomodation, everything in a short week. (**Where there is a will there is a way**). To get an accomodation was not so easy. In fact, all the Hotels that Kiran suggested me were completely full, I only knew to have a room booked just the night before my departure (...**I breathed a sigh of relief!**).

Once I arrived in Brussels, I thought it was worth it.



In September, the academic year was restarting, freshers enrolling in the faculty, old students taking exams or starting new classes after summer holidays. I enjoyed a lot the academic atmosphere of the university campus, it reminded me of **my academic LIFE**. It was like a tragedy to

The Belgian famous chocolates, ice cream waffles and chocolate covered strawberries: **A Gourmand's Paradise!!!**

I arrived in Brussels and **Kiran** was waiting for me at the airport and he wanted to be sure I get to the right Hotel, so he came with me and left me there. He was really a gentleman and so friendly. He took care of everything, he checked for the bus to get to the hotel, the metro to get to the University from my hotel, he gave me a "**precious**" metro/city map, he showed and went around the city with me after our lab working hours. We also had time to go out and spend nice time together. I believe it is impossible to make friends in a new city in just a week so you can feel a bit alone or confused for the fast change, Kiran was\is my **friend** there and he was able to make my

week of secondment **SUPER COOL!!!** I enjoyed a lot with him and with all the members of UCL group. I got a lovely welcome from **Prof. Veronique**, she was so glad to host me in her lab and to know Kiran and me collaborating and working together. In fact, besides the free time, our days were full of experiments from 9am to 18pm for the entire week with a strict schedule. Mice were waiting for us every morning. It was important to take part in animal experiments for the first time in my life, to take care of mice and even test my nanoparticles. In vivo testing makes you think you are closer to the final achievement, it is a **good feeling!** You get a lot of **enthusiasm** back, especially if the results are **GREAT!!!**



“Travel is the only thing you buy that makes you richer”

The only annoying aspect was the weather, I crashed my face with 10 degrees less than Biarritz and Coimbra at least. I wanted to die! It was like to be catapulted into an other time/ LIFE/world, without even the slightest warning...**Michy, Welcome in AUTUMN!**

And imagine my clothes and shoes for that week...Because I was not expecting this cold temperature and pouring rain, or better I didn't have the time to check and worried about the weather before my departure, I didn't put any winter clothes in my luggage (only some cotton sweaters and a leather jacket). And I arrived there so proud to wear my new ballets flat... without socks of course!!!

I have to say I failed in the wardrobe that time, it was not appropriate, not at all, and I got sick then L

I want to conclude saying it was an other important experience, a short one, but rich for my professional knowledge and for my personal growth.



Look at the Moon...
with LOVE
Michela



German Portuguese Student Seminar on “Matrix engineering meets stem cell therapy”

Funded within the DAAD Program “Dialogue with institutions of Higher Education in Southern Europe”

Last December I got the chance to help in the Organization of a German-Portuguese Student Workshop, which took place in our Institution. The proposal was written by Dr. Lino Ferreira and Dr. Tilo Pompe and funded inside the DAAD Program “Dialogue with Institutions of Higher Education in Southern Europe”. Tilo Pompe is Professor and Group Leader of the Biophysical Chemistry group at the University of Leipzig. The purpose of this workshop was not only to create a dialogue and collaboration between both research groups and to give 16 Master students an idea about research and the importance of European Networks, but also to initiate the discussion for a project proposal in Horizon 2020.



2: Andreia Bernardo (Cambridge Stem Cell Institute, UK), Andras Dinnyes (BioTalentum Ltd, Hungary), Michela Comune and Josephine Blersch (CNBC)

NANODRUG



Being a Marie Curie ITN Fellow

During the two day workshop, we were listening to talks from PhD Students and Post Docs of both research groups and also from two invited speakers. Andreia Bernardo from the Cambridge Stem Cell Institute, UK and Andras Dinnyes from BioTalentum Ltd, Gödöllő, Hungary. Andreia Bernardo was focusing on pluripotency of mammalian cells and the differentiation of human embryonic stem cells. Andras Dinnyes, who is CEO and Founder of BioTalentum, an SME on agricultural and medical biotechnology, gave us one lecture about differentiation of 2D and 3D structures from human pluripotent stem cells. In his other lecture about funding opportunities in Horizon 2020, he explained to us not only to changes in the Framework, but also to his experiences as coordinator and co-coordinator of several ITNs. Last but not least, Michela and I were giving as Ambassadors an inspiring presentation about the experiences from our Network and the opportunities, functions and possibilities of being a Marie Curie Fellow.

At the end of the second day we were visiting together the University and the city in Coimbra. Visiting this old parts of the city did not only show Portuguese culture to the German visitors but also gave time and room for discussion about all the lectures we were listening to.

It was a great pleasure for me to help Lino organizing this workshop, to make new contacts and to show so many people of my country the place where I am living and the opportunity I receive as a Marie Curie Fellow.

Josephine Bleresch, CNBC





Forthcoming Events

NETWORK

2nd NANODRUG Workshop

13-14 March 2014

UCL, Brussels, Belgium

3rd NANODRUG Summer Training School

29th June—2nd July 2014

Portugal

3rd NANODRUG International Scientific Meeting

3rd—4th July 2014

Portugal

CONFERENCES

4th Zing Bionanomaterials Conference

6 – 9 Apr 2014

Málaga, Spain.

E-MRS 2014 Spring Meeting

26-30 May 2014

Congress Center - Lille, France

PhD position October 2014

Lipid nanoparticles as delivery system for antigens

Abstract: Nanomedicine, which represents health applications of nanotechnologies, is a growing field. The benefits of nanomedicine are mainly expected for a better diagnosis and / or therapy of cancers, with clinical products already on the market. However, applications of nanoparticles to fight against infectious diseases are less explored and new therapies are still highly anticipated in this field. To date, there is a major health issue in order to find alternative treatments to antibiotics, taking into account the emergence of resistant strains of pathogens. The purpose of this thesis is to design new nanoparticles as adjuvant delivery systems to enhance the overall efficacy and safety of novel vaccine formulations. In particular, such nanoparticles bearing antigens would enable the induction of mixed immune responses (humoral and cellular) which are required to fight efficiently against pathogens such as HIV, for which there is currently no vaccine. The work proposed here deals with the engineering of lipid nanoparticles in order to modulate induced immune responses, mainly through the targeted delivery of antigens to antigen-presenting cells. Furthermore, immunogenicity studies will be performed in relevant animal models.

Keywords: *nanomedicine, lipid nanoparticles, antigen delivery, immune responses, dendritic cells, immunization, adjuvant delivery system*

The candidate should have obtained a master degree in Chemistry and/ or Biochemistry. Backgrounds in nanoparticle formulation, cell culture experiments and in immunology will be particularly appreciated. Moreover, ability to collaborate in a highly multidisciplinary environment is absolutely required (biologists, chemists, industrial and clinicians).

Please send your application (cover letter, CV...) before **May 15th** by email to: Fabrice Navarro, fabrice.navarro@cea.fr

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