COLOTAN

13 open PhD positions in the EU Horizon 2020 Marie Skłodowska-Curie Project:

Boosting advanced doctoral training in innovative colon targeting drugs

Applicants are invited for 13 PhD positions ("Early Stage Researchers", ESRs) to be funded by the Marie-Sklodowska-Curie Innovative Training Network "COLOTAN – Boosting advanced doctoral training in innovative colon targeting drugs" within the Horizon 2020 Programme of the European Commission.

COLOTAN is a network for "Boosting advanced doctoral training in innovative colon targeting drugs". Its overarching goal is to provide high-level training to 13 early stage researchers in drug delivery, drug disposition and gastrointestinal (GI) (patho)physiology to improve targeting of drugs to the colon and to provide them with the transferable and scientific skills necessary for a successful career. This international training program, combining 10 countries, focuses on innovative technological and scientific developments across a range of interdisciplinary fields such as (physical, analytical and organic) chemistry, drug delivery, drug disposition, cell biology, gastroenterology, microbiology and modelling and simulation. The aim of this project will be achieved by a unique combination of intersectoral research training facilitated by 10 beneficiaries (7 academic and 3 non-academic) and 6 partner organisations. The COLOTAN consortium consists of leading research groups from universities and from innovative pharmaceutical companies.

Each of the 13 ESRs will be working towards a PhD degree, supported by a carefully chosen supervisory team that maximizes both scientific excellence as well as interdisciplinary and intersectoral collaboration. The 13 COLOTAN ESRs will not only receive state-of-the-art science/technology training but will also benefit from a unique soft-skills training programme. The interdisciplinary and inter-domain training will make COLOTAN ESRs highly employable in various industries academia, or public government bodies.

Key dates

- August 21, 2020: Launch of 15 ESR Positions recruitment
- December 01, 2020: Deadline for on-line application
- December 15, 2020: Circulation list "preselected candidates"
- January 2021: COLOTAN Recruitment Event
- January 2021: Circulation list "recruited COLOTAN ESRs"
- March 01, 2021: Targeted starting date for ESR contracts

Recruitment

COLOTAN wishes to reflect the diversity of society and thus welcomes applications from all qualified candidates regardless of personal background. Recruitment targets ESR backgrounds in:

1. – Organic synthetic Chemistry
2. – Biomedical Sciences
3. – Molecular biology
4. – Pharmaceutical sciences
5. – Biochemistry
6. – Microbiology
7. – Cell biology

In total 13 ESRs will be recruited that will work at the 10 beneficiaries across Europe.
We expect that applicants hold a university degree that qualifies them for doctoral studies at their recruiting organization. Solid written and oral communication skills in English are prerequisites of any successful application (typically IELTS min. 7, TOEFL internet-based min. 90 or similar level as proven by other tests). Every applicant can apply for up to three ESR positions (first, second, third choice)

Career Stage

Early Stage Researcher (ESR) or 0-4 yrs (Post Graduate)

Benefits and salary

The successful candidates will receive an attractive salary in accordance with the MSCA regulations for ESRs. The fellowship will consist of a competitive salary. The exact (net) salary will be confirmed upon appointment and is dependent on local tax regulations and on the country correction factor (to allow for the difference in cost of living in the different EU Member States). The salary includes a living allowance, a mobility allowance and a family allowance (if married or in a relationship with equivalent status). The guaranteed PhD funding covered by the training network is for 36 months (i.e. EC funding, additional funding is possible, depending on the local Supervisor, and in accordance with the regular PhD time in the country of origin). In addition to their individual scientific projects, all fellows will benefit from further continuing education, which includes internships and secondments, a variety of training modules as well as transferable skills courses and active participation in workshops and conferences.

On-line Recruitment Procedure

All applications proceed through the on-line recruitment portal on the https://colotan-etn.eu/ website. Candidates apply electronically for one to maximum three positions and indicate their preference. Candidates provide all requested information including a detailed CV – Europass format obligatory – and motivation letter. During the registration, applicants will need to prove that they are eligible (cf. ESR definition, mobility criteria, and English language proficiency). The deadline for the on-line registration is 01 December 2020.

The COLOTAN Recruitment Committee selects between 20 and maximum of 30 candidates for the Recruitment Event which will take place in Leuven (Belgium) (January 2021) unless COVID19 imposes an online event. The selected candidates provide a 20-minute presentation and are interviewed by the Recruitment Committee. Candidates will be given a domain-relevant peer-reviewed paper (prior to the recruitment event) by their prioritised Supervisor and will be asked questions about this paper during the interview to check if the candidate has the right background/profile for the ESR position. Prior to the recruitment event, skype interviews between the Supervisors and the candidates are recommended,

along with on-line personality tests. In order to facilitate their travel, selected candidates (from outside Belgium) receive a reimbursement up to 500 euros (paid by the prioritised Supervisor). In order to avoid delays in reimbursements, candidates are asked to keep all invoices and tickets (cf. train, plane, hotel…). The final decision on who to recruit is communicated within one week after the Recruitment Event (January 2021). The selected ESRs are to start their research as quickly as possible (target: 1 March 2021).

Applicants need to fully respect three eligibility criteria (to demonstrated in the Europass cv):
Early-stage researchers (ESR) are those who are, at the time of recruitment by the host, in the first four years (full-time equivalent) of their research careers. This is measured from the date when they obtained the degree which formally entitles them to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the research training is provided and should not have been awarded a doctoral degree.

Conditions of international mobility of researchers:

Researchers are required to undertake trans-national mobility (i.e. move from one country to another) when taking up the appointment. At the time of selection by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than 12 months in the 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account.
English language: Network fellows (ESRs) must demonstrate that their ability to understand and express themselves in both written and spoken English is sufficiently high for them to derive the full benefit from the network training.

The 13 available PhD positions to cooperate in a European Network and follow a dedicated training program

ESR1: Chemically modified polysaccharide (CMP) coatings for site-specific drug delivery to the colon

Host: KU LEUVEN (Leuven University), Belgium

PhD awarding institution: KU LEUVEN (Leuven University), Belgium

Main Supervisor: Guy Van den Mooter (KUL)

Co-supervisors/mentors: Christer Tannergren (AZ), Wim De Haen (KUL)

Secondment partners: AZ (supervisor: C. Tannergren)

Expected Results: 1. Knowledge about the degradation kinetics of CMP. 2. In vitro release test for colon specific drug delivery systems. 3. Understanding of the process parameters, in vitro release kinetics and in vivo PK of the developed colon specific drug delivery system. 4. A novel polysaccharide-based colon-specific drug delivery system.

Objectives:

To develop a universally applicable colon drug delivery system based on chemically modified polysaccharides (CMP) as coating material. The coatings will be enzymatically degradable by colonic microbiota, but not by human digestive enzymes and thus will enable drug release specifically in the colon.

ESR2: The influence of altered gut microbiota on the metabolism of and drug release from bacterially-triggered film coated colonic drug delivery for patients with IBD: in vitro and in vivo evaluation

Host: University College Cork, Ireland

PhD awarding institution: University College Cork, Ireland

Main Supervisor: Caitriona O'Driscoll (UCC)

Co-supervisors/mentors: René Holm (JAN), Brendan Griffin (UCC)

Secondment partners: JAN (supervisor: R. Holm)

Expected Results:1. An in vivo pig model with altered gut microbiota. 2. Data on the ability of altered gut microbiota to metabolise film coating materials. 3. A biorelevant dissolution method capable of predicting the in vivo response

Objectives:

To determine if an altered gut microbiota as seen in the colon of patients with inflammatory bowel disease (IBD) will influence the metabolism of oligosaccharide film coatings. The ultimate aim is to develop an in vitro dissolution model to predict these changes which can then be used to screen polymers and identify the optimum formulations which selectively release drugs in the large intestine of patients with IBD.

ESR3: Evaluate the usefulness of innovative orally administered modified release dosage forms for removing potentially harmful agent(s) from the lower intestine

Host: National And Kapodistrian University Of Athens, Greece

PhD awarding institution: National And Kapodistrian University Of Athens, Greece

Main Supervisor: Christos Reppas (NKUA)

Co-supervisors/mentors: Maria Vertzoni (NKUA), Jody Voorspoels (EUR)

Secondment partners: Eurofins (supervisor: Jody Voorspoels) and ELPEN Pharma (Supervisor: A. Papalois)

Expected Results: 1. A material that is safe to be administered to humans and adsorbs an EU approved antibiotic for human use, based on in vitro data collected under simulated colonic conditions. 2. Prototype MR dose units which contain the adsorbing material 3. Proof of concept using the Landrace pig model

Objectives: To propose and evaluate (proof of concept) of novel oral antibiotic delivery methodology which allows for removing the unabsorbed antibiotic from the lower intestine

ESR4: Delivery of peptides, proteins, antibodies and nucleic acids to the colon

Host: EUROFINS CMDO, Belgium

PhD awarding institution: KU LEUVEN (Leuven University), Belgium

Main supervisor: Jody Voorspoels (EUR)

Co-supervisors/mentors: Lien Saerens (EUR), Guy Van den Mooter (KUL), Christos Reppas (NKUA)

Secondment partners: NKUA (supervisor: C. Reppas)

Expected Results: 1. Knowledge about the stabilization effect of excipients. 2. Analytical tools for the characterization of biologics in solid state and during dissolution. 3. Miniaturized manufacturing system. 4. A novel colon-specific drug delivery system for biologics. 5. Upscaling of the developed drug delivery system.

Objectives: To develop a formulation platform for the colon targeted delivery of biologics (peptides, antibodies, proteins, nucleic acids).

ESR5: Transporter/enzyme assessment in colonic tissue from healthy volunteers and colorectal cancer patients

Host: KU LEUVEN (Leuven University), Belgium

PhD awarding institution: KU LEUVEN (Leuven University), Belgium

Main supervisor: Patrick Augustijns (KUL)

Co-supervisors/mentors: Tim Vanuytsel (KUL), Bertil Abrahamsson (AZ)

Secondment partners: AZ (supervisor: C. Tannergren)

Expected Results: 1. Reference data on transporter and enzyme expression in healthy and cancerous colonic tissue. 2. Improved understanding of colonic drug absorption in relation to transporters and enzymes. 3. Insight into the influence of colorectal cancer on colonic drug absorption in relation to transporter/enzyme expression.

Objectives: To assess the impact of transporters and enzymes on drug disposition in the colonic mucosa from healthy volunteers and colorectal cancer patients

ESR6: Influence of intra and extracellular free drug concentrations in the human colon on local and systemic drug exposure

Host: Uppsala University, Sweden

PhD awarding institution: Uppsala University, Sweden

Main supervisor: Per Artursson (UU)

Co-supervisors/mentors: Bertil Abrahamsson (AZ), Christer Tannergren (AZ)

Secondment partners: AZ (supervisor: B. Abrahamsson)

Expected Results: 1. Information on drug distribution in the colonic epithelial barrier. 2. Information on drug distribution to the colonic microbiome. 3. Understanding how extra and intracellular free drug concentrations in colonic cells and bacteria influence local exposure and systemic drug delivery

Objectives: To understand the relationship between free drug concentrations, local drug exposure and systemic drug delivery in the colon

ESR7: : Importance of diffusion, dissolution and release mechanisms for dosage forms delivering drugs to the colonic environment

Host: Uppsala University, Sweden

PhD awarding institution: Uppsala University, Sweden

Main supervisor: Christel Bergström (UU)

Co-supervisors/mentors: Filippos Kesisoglou (MSD), Per Larsen (UU)

Secondment partners: MSD (supervisor: F. Kesisoglou)

Expected Results: 1. Improved understanding of crucial processes involved in the presentation of the drug to the intestinal mucosa: drug release, particle/drug diffusion and interactions with e.g. mucus. 2. A theoretical guide to what drug delivery system to use to increase the amount dissolved in the colonic environment. 3. In silico models facilitating the prediction of in vivo performance

Objectives: To identify the role of dissolution, diffusion and release in the colonic environment for drug absorption from the colon.

ESR8: Metabolomics investigation of the colonic intraluminal environment.

Host: Uppsala University, Sweden

PhD awarding institution: Uppsala University, Sweden

Main supervisor: Daniel Globisch (UU)

Co-supervisors/mentors: Ralf Strasser (DBS), Ingela Lanekoff (UU)

Secondment partners: DBS (supervisor: R. Strasser)

Expected Results: 1. Identification of altered metabolites and metabolic pathways linked to age, gender, and drug treatment. 2. Deeper insights into the colonic metabolic network

Objectives: Identification of altered metabolites, metabolic pathways and features linked to age, gender and drug treatment.

ESR9: Investigating the effect of age, sex, prebiotics, and drug treatment on colonic microbiota and drug absorption

Host: University College London, UK

PhD awarding institution: University College London, UK

Main supervisor: Mine Orlu (UCL)

Co-supervisors/mentors: Mine Orlu (UCL), Mark McAllister (PFI)

Secondment partners: PFI (supervisor: M. McAllister)

Expected Results: 1. Identifying the differences of colonic microbiota environments with respect to age and sex. 2. Defining the threshold (age ranges) at which colonic microbiota is altered i.e. the transition from paediatric, adult to geriatric microbiota environments. 3. Determining the key factors in designing colonic drug delivery systems considering the altered gut microbiota during maturation. 4. Understanding how colonic bacteria are affected by age, sex, prebiotics and drug treatment

Objectives: To understand how the colonic microbiome is affected by age, sex, prebiotics and drug treatment and the effects this has on drug absorption.

ESR10: Mechanistic in silico modelling of colonic drug absorption

Host: Astrazeneca AB, Sweden

PhD awarding institution: KU LEUVEN (Leuven University), Belgium

Main supervisor: Christer Tannergren (AZ)

Co-supervisors/mentors: Bertil Abrahamsson (AZ), Patrick Augustijns (KUL)

Secondment partners: KUL (supervisor: P. Augustijns)

Expected Results: 1. A novel, validated in silico model for improved prediction of colonic drug absorption. 2. Increased insight in importance of different physiological factors on drug absorption from the colon providing input to novel designs for improved drug delivery in the colon. 3. Increased understanding and guidance on the usefulness of more physiologically relevant input parameters in comparison to standard input parameters.

Objectives: To develop a new mechanistic in silico model for colonic drug absorption.

ESR11: : Evaluating the suitability of novel colon-specific in vitro models to investigate drug disposition, metabolism and safety in medium to high-throughput setting

Host: Janssen Pharmaceutica NV, Belgium

PhD awarding institution: KU LEUVEN (Leuven University), Belgium

Main supervisor: Stephanie Kourula (JAN)

Co-supervisors/mentors: Jan Snoeys (JAN), Patrick Augustijns (KUL)

Secondment partners: UP (supervisor: S. Bertoni)

Expected Results: 1. Comparative data set of 2 – 3 novel colon-specific in vitro models addressing drug disposition, metabolism and toxicity. 2. Identifying strength and weaknesses of each model 3. Identifying the best suitable model(s) for in-house us at Janssen.

Objectives: To identify the best suitable colon specific in vitro model to accurately measure drug disposition, metabolism and assess the safety profile of compounds in the colon with specific focus on reproducibility and scalability for pharmaceutical use

ESR12: Optimisation of in vitro and in silico tools to facilitate development of colonic delivery systems

Host: University Of Copenhagen, Denmark

PhD awarding institution: University Of Copenhagen, Denmark

Main supervisor: Anette Müllertz (UCPH)

Co-supervisors/mentors: Thomas Rades (UCPH), K Stamatopoulos (SIM)

Secondment partners: SIM (supervisor: K Stamatopoulos)

Expected Results: 1. An in vitro model, suitable for evaluation of drug product behaviour: drug dissolution, diffusion through mucus and absorption across the epithelium, with emphasis on the ileum and the colon. 2. Improved PBPK models for evaluating drug dissolution, diffusion and absorption in the lower parts (ileum and colon) of the GI tract.

Objectives: To develop predictive in vitro models for screening of drug and drug product behaviour in the lower part of the GI tract and to use the data to further improve physiologically-based pharmaco-kinetic (PBPK) in silico modelling

ESR13: Enteroids and cytokines: an *in vitro* model of drug absorption in the inflamed gut

Host: Universita Degli Studi Di Parma, Italy

PhD awarding institution: Universita Degli Studi Di Parma, Italy

Main supervisor: Simona Bertoni (UP)

Co-supervisors/mentors: Elisabetta Barocelli (UP), Emre Isin (UCB)

Secondment partners: UCB (supervisor: E.M. Isin)

Expected Results: 1. Colonoid model mimicking colonic biopsies from healthy volunteers. 2. Colonoid model mimicking colonic biopsies from IBD patients. 3. Data on the absorption and therapeutic effect of dosage forms containing therapeutic anti-inflammatory agents

Objectives: To develop an in vitro simplified and reproducible model of human colonic epithelium to study colon-targeting dosage forms

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