
**Colonization resistance: training & research towards microbiome derived solutions to foodborne disease
Marie Skłodowska-Curie Actions (MSCA), Innovative Training Networks (ITN)**

Job offer: COL_RES PhD position

Host university: Université Clermont Auvergne, Clermont-Ferrand, France

Host laboratory : MEDIS (Microbiologie, Environnement Digestif et Santé), Clermont-Ferrand, France

PhD awarding institution: Université Clermont Auvergne, Clermont-Ferrand, France

Total duration: 36 months

Starting date: September, 1st 2021

GENERAL DESCRIPTION OF COL_RES PROJECT

The COL_RES Innovative Training Network (ITN) comprises a world-leading network of investigators that will examine the mechanisms by which the gut microbiota protects against serious foodborne pathogens (*Salmonella*, *E. coli*, *Listeria*, *Citrobacter rodentium* and *Campylobacter*) and lead to the identification of next generation probiotics that can potentially protect against multiple infectious agents. The project will utilize a system biology-based approach by exploiting existing research models at world-leading laboratories combined with phageomics, metabolomics and bioinformatics to generate multi-omics data that will uncover both pathogen-specific and shared mechanisms by which the gut microbiota protects against foodborne pathogens. This EU project gathers six european partners with worldwide recognition in the fields of gut microbiology and enteric diseases: University College Cork / Ireland, Imperial College London / United Kingdom, Charité Universitätsmedizin Berlin / Germany, Eidgenössische Technische Hochschule Zürich / Switzerland, FUNDACIO EURECAT / Spain and **MEDIS** from Université Clermont Auvergne / France. In this project, eight early stage researchers (ESRs) will be recruited. Every ESR will work on an independent research project with an allied training program tailored to the career goals of the candidate. Each ESR will each undertake two periods of secondment to other academic or industry institutes.

JOB DESCRIPTION OF PHD POSITION AT MEDIS – UNIVERSITE CLERMONT AUVERGNE

The PhD candidate will investigate the role of the human intestinal microbiota in resistance to enterohaemorrhagic *Escherichia coli* (EHEC) following gut microbiota perturbations with either antibiotherapy or Western diet. The work will identify specific commensal taxa influenced by antibiotics and/or diet, which affect EHEC pathogenesis using ARCOL (Artificial COLon) *in vitro* fermentation system reproducing the human colon. This ARCOL model integrates the main abiotic (pH, residence time, anaerobiosis, nutrient availability) and biotic (luminal gut microbiota and mucus-associated microbiota) parameters of the human colonic environment. The consequences of EHEC infection on the intestinal microbiota will be finely characterized by high-throughput sequencing and metabolomics approaches. The research conducted in this collaborative project is expected to identify key commensal species required for colonization resistance against EHEC and to test the application of next-generation probiotics to protect against EHEC infection. The PhD candidate will undertake a primary secondment at University College Cork / Ireland and a second one at Pentaluba INC / Spain.

- **Required knowledge's**

- Biology: biochemistry, molecular biology, digestive physiology
- Advanced skills in microbiology (aerobic and anaerobic) and work with class BSL2 and BSL3 pathogens
- Knowledge of continuous fermentation systems
- Knowledge of bioinformatics and statistics will be particularly appreciated
- Solid written and oral communication skills in English
- Skills in French would be highly appreciated

- **Research skills:**

- Carrying out *in vitro* fermentation experiments
- Culture of aerobic and anaerobic microorganisms
- Molecular biology techniques (nucleic acid extraction, qPCR, RTqPCR)
- Analytical techniques (determination of gases and microbial metabolites by liquid and gas chromatography)
- Data analysis (bioinformatics, bio-statistics)
- Participation in common tasks in the laboratory
- Writing of scientific articles and literature reviews
- Communications in national and international meetings

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- **Behavioral skills:**

- Ability to work in a team
- Autonomy
- Rigor
- Ability to adapt to interdisciplinary work (microbiology, *in vitro* fermentation, molecular biology, bioinformatics, bio-statistics)

INCOME

- Gross salary of 2,690 €/month for 36 months

The exact (net) salary will be confirmed upon appointment and is dependent on local tax, social and health insurance regulations.

- All applicants will also be compensated with a mobility allowance of 430 €/month, and, for researchers who have a family, a family allowance of 358 €/month. All amounts are subjected to deductions and taxes

(Family is defined as persons linked to the researcher by (i) marriage, or (ii) a relationship with equivalent status to a marriage recognised by the national legislation of the country of the beneficiary or of the nationality of the researcher, or (iii) dependent children who are actually being maintained by the researcher; family status is determined at recruitment and does not evolve).

SPECIFIC REQUIREMENTS

- Applicant must have a Master's degree (or any equivalent diploma) in the relevant area (biology, microbiology, digestive physiology, molecular microbiology).

- Applicant must not yet been awarded a PhD degree and must be in the first 4 years (full-time equivalent) of their research careers prior to the recruitment.

-Applicant should not have resided in France for more than 12 months in the 3 years immediately prior to the recruitment date and not have carried out their main activity (work, studies, etc.) in that country.

- Applicant must have solid written and oral communication skills in English as communication and teaching language throughout COL_RES is English. Candidates who are not fluent in English are requested to provide proof of English proficiency (in speaking and writing) (e.g. typically IELTS min. 7, TOEFL internet-based min. 90 or similar level as proven by other tests).

TO APPLY FOR THE POSITION

The applicant must provide:

- (i) A one-page letter of motivation outlining why he/she should be considered for this position.
- (ii) a detailed CV – Europass format obligatory. This should include details such as education, work experience, skills, dissertations, research interests, career objectives, names and contact details of two referees (at last one academic) who are willing to be contacted about your potential suitability for the position, and/or list of publications if any;
- (iii) a transcript of his/her master studies' grades (including the overall grade) if available;
- (iv) proof of English language proficiency e.g. English language certificates for non-native speakers.
- (v) at least one letter of recommendation, preferably by the Master's thesis supervisor.

Application should be sent by e-mail to Dr Stéphanie Blanquet-Diot
stephanie.blanquet@uca.fr