TITLE

Identification of diagnostic tools from urine microbiota through -omics platforms

DESCRIPTION

Emerging evidences show that the microorganisms inhabiting the urinary tract, which has long been assumed sterile in healthy individuals, might have a role in maintaining urinary health. Studies of the urinary microbiota have identified remarkable differences between healthy populations and those with urologic diseases. In particular, shifts in the microbial community generally precede the development of tumors.

The project will involve the molecular profiling of biological fluids derived from patients/animals affected by several type of urogenital cancers. Samples will be processed through metagenomic sequencing and bacterial culture protocols in order to assess the variability of the microbiome and the presence of obligate and facultative pathogens within each sample. The candidate will identify, by metagenomic analyses (DNA-seq, transcriptomic), specific metabolic features that constitute the urinary microbiome of patients/animals affected by urogenital cancers. Validation will be done using NMR-/LC-MS-based metabolomics in order to identify potential biomarkers of the diseased status. The biological relevance of the most pathogenic species in tumor progression will be evaluated in-vitro, using available cell lines and bacterial colonization. Mathematical models based on biological data will be developed to correlate urinary microbiota changes with basic mechanisms of carcinogenesis leading to the development of new diagnostic tools.

This interdisciplinary PhD project will be carried out in a collaborative effort with Italian hospitals and universities. The proposed project is expected to characterize microbial communities and to correlate changes in the microbiome with tumor progression. The candidate will join a multidisciplinary research network in an innovative, well-equipped and scientifically stimulating environment with a variety of training opportunities.

We are seeking a creative, self-motivated student with an interest in developing a multidisciplinary approach based on microbiology (microbial isolation), molecular biology (DNA-sequencing), and spectrometry (LC-MS and NMR metabolome profiling).

SELECTION CRITERIA

Eligibility Criteria

- Academic degree: Applicants shall have a master degree **in Microbiology**, **Biotechnology** or **Biology** or related fields, corresponding to the second level of studies.

- Mobility rule: There will be no nationality restrictions. Applicants can be from any Country. However, according to the mobility rule, at the time of the application deadline researchers should not have resided or carried out their main activity (work, studies, etc.) in Italy for more than 12 months in the 3 years immediately prior to the reference date. Compulsory national service and/or short stays such as holidays will not be taken into account.

- Research experience: Applicants shall, at the time of the application deadline, be in the first four years (full-time equivalent research experience) of their research careers and not yet awarded a doctoral degree.

Full-Time Equivalent (FTE) Research Experience will be determined from the date when a researcher obtained the degree which would formally entitle her/him to embark on a doctorate, either in the country in which the degree was obtained or in Italy, irrespective of whether or not a doctorate is or was ever envisaged.

Evaluation Criteria

Step 1 -Evaluation of documentation provided by the candidate: a) Academic record and training b) Research activities c) CV/motivation letter; d) Level of English; e) Reference letters.

Step 2 - Interview: a) Scientific knowledge in the field of interest; b) Research experience in the field of interest c), Motivation; d) English proficiency.

Supervisor
Dr. Alessia Ligresti