

The urban regeneration of the university using a microbiome approach

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Abstract:

It has long been established that there is a close relationship between environmental quality and human health. In recent decades, considerable changes in many urban areas transformed cities into extremely industrialized and urbanized areas, resulting in consequences for human health. In particular, the modern lifestyle has reduced the biodiversity of the urban microbiota. This loss in microbial species is one of the main causes of the so-called Diseases of Civilization, that arise due to the mismatch between our ready-to-react immune system, and the little exposure to microorganisms we have in our daily lives. Having a microbiome-oriented perspective redefines health as a property that emerges from a complex network of relationships between micro- and macro- organisms. These themes are of primary importance and lead us to reflect on how to regenerate our urban environment most efficiently while protecting that vault of microorganisms that is beneficial to humans.

The MUSA project addresses the urban regeneration of the metropolitan area of Milan by intervening at various levels, including the microbiome one, becoming a model at the European level. In the MUSA context, the presented project has as its primary objective the analysis of microbial communities associated with the University of Milano-Bicocca and the Politecnico di Milano and their students to assess the salubrity of these environments and to estimate the potential exchange of microorganisms between students and the environment they spend the majority of their time in. For this purpose, a total of more than 1500, skin, gut, and environmental microbiome samples were collected in two different seasons (spring and autumn).

We will characterize the microbial communities through sequencing techniques and bioinformatics approaches. This will make it possible to assess the improvement in the quality and safety of the environment to take preventive or corrective measures in the future, such as the creation of health-related and microbiome-related jobs, the development of technologies for the detection of pathogens to monitor biological risks in students and universities and prevent possible pathologies and infections.