Leibniz Associations Conference on Sustainable Development Goals
Workshop on the SDG3 'Health' *Global Change – Global Health*
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The workshop *Global Change – Global Health* focused on microbial influences on human health. The presentations covered the alarmingly increasing challenge to public health by infectious agents resistant to antimicrobial drugs, with a focus on tuberculosis as one of the prime bacterial infections worldwide with contributions by T. Eckmanns, (Robert-Koch-Institute, Berlin) and U. Schaible (Forschungszentrum Borstel). To further widen our view on global microbial health effects, we included the global microbiome as well as the essential importance of agriculture for Global Health concepts with presentations by G. Berg (Institute of Environmental Biotechnology, Graz) and B. Amon (Leibniz Institute for Agricultural Engineering and Bioeconomy).
These challenges require multidisciplinary collaborations between health, environmental and agricultural disciplines. Consequentially, the Leibniz Research Alliance INFECTIONS'21 will focus on global conditions for the evolution of antimicrobial resistance in the context of local microbiomes, of agriculture and animal husbandry, and environmental transmission facilitators as well as on counteracting strategies such as antibiotic stewardship beyond the clinical field. The LRA's interdisciplinary approach requires inclusion of expertise in health economics and urban development.
From our workshop, we identified the following **key research topics and future challenges**

1. Globally, underprivileged populations are predominantly affected by infectious diseases including those by pathogens resistant to anti-microbial drugs, with tuberculosis as a prime example. Therefore, global health strategies need to include fighting poverty and social injustice with high priority.
2. To eliminate one of the most important infectious diseases, tuberculosis, the triad of i) individualized antibiotic combined with host-directed therapies guided by fast resistance tests and biomarkers, ii) molecular surveillance and iii) innovative vaccines, requires additional interdisciplinary approaches to annihilate risk factors such as poverty, malnutrition, smoking and comorbidities.
3. Beyond the microbes settling in and on the human body, the global microbiome from animals, plants, and the environment can also influence human health but are yet underappreciated and mostly uncovered therefore requiring more research activities.
4. Arising pathogens carrying anti-microbial resistances from animal husbandry is just one global health threat associated with industrial farming. Others include agricultural nitrogen and greenhouse gas emissions, which affect human health, air, soil and water quality, climate and biodiversity including microbiomes. Agriculture is currently at the cusp of immense new opportunities in digital, technological and data science progress. A multidisciplinary research concept for agricultural systems for future global health concepts was presented that integrates progress in efficiencies at process level and optimisation at the system level.