Publisher Correction: Detection of antibiotics synthetized in microfluidic picolitre-droplets by various actinobacteria.

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Abstract

The natural bacterial diversity is regarded as a treasure trove for natural products. However, accessing complex cell mixtures derived from environmental samples in standardized high-throughput screenings is challenging. Here, we present a droplet-based microfluidic platform for ultrahigh-throughput screenings able to directly harness the diversity of entire microbial communities. This platform combines extensive cultivation protocols in aqueous droplets starting from single cells or spores with modular detection methods for produced antimicrobial compounds. After long-term incubation for bacterial cell propagation and metabolite production, we implemented a setup for mass spectrometric analysis relying on direct electrospray ionization and injection of single droplets. Even in the presence of dense biomass we show robust detection of streptomycin on the single droplet level. Furthermore, we developed an ultrahigh-throughput

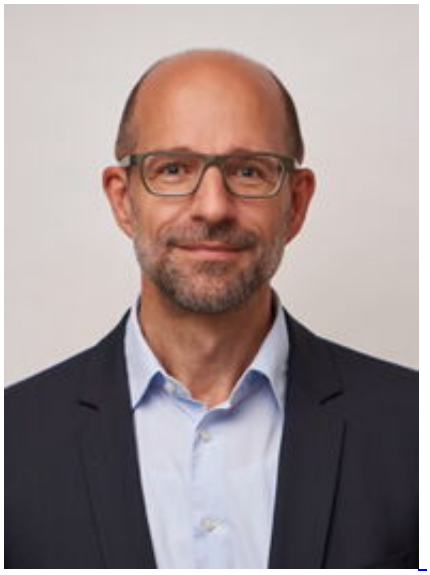
screening based on a functional whole-cell assay by picoinjecting reporter cells into droplets. Depending on the survival of reporter cells, droplets were selected for the isolation of producing bacteria, which we demonstrated for a microbial soil community. The established ultrahigh-throughput screening for producers of antibiotics in miniaturized bioreactors in which diverse cell mixtures can be screened on the single cell level is a promising approach to find novel antimicrobial scaffolds.

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