Intra and Interspecies Control of Bacterial Growth Through Quorum Sensing Molecules

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A variety of species of bacteria colonize the human body, many of which reside in the gut microbiome. Quorum sensors are naturally emitted by these bacteria and allow them to communicate and exhibit multicellular behaviors, despite individually being unicellular. This study measured the impact of quorum sensors found in bacteria-free supernatants collected from Escherichia coli in the death and log phases on the growth of new cultures of E. coli and Enterobacter aerogenes. Exposure to E. coli death phase clarified supernatant inhibited E. coli growth by 21.41-81.24% and E. aerogenes growth by 19.43-58.62%. Contrarily, E. coli log phase clarified supernatant induced E. coli growth by 15.08-52.61% and E. aerogenes growth by 29.93%-107.52%. A combination of these supernatants can potentially be used to fine-tune population sizes of bacteria in the gut microbiome, the disruption of which is linked to several digestive issues and chronic health conditions, such as Clostridium difficile infections and colorectal cancer. Future experiments could characterize the macromolecules that make up the quorum sensors present in each clarified supernatant, explore their degradation pathways, and how they interact with each other.

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