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Collective Functionality through Bacterial Individuality

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According to the conventional view, the properties of an organism are a product of nature and nurture - of its genes and the environment it lives in. Recent experiments with unicellular organisms have challenged this view: several molecular mechanisms generate phenotypic variation independently of environmental signals, leading to variation in clonal groups. My presentation will focus on the causes and consequences of this microbial individuality. Using examples from bacterial genetic model systems, I will first discuss different molecular and cellular mechanisms that give rise to bacterial individuality. Then, I will discuss the consequences of individuality, and focus on how phenotypic variation in clonal populations of bacteria can promote interactions between individuals, lead to the division of labor, and allow clonal groups of bacteria to cope with environmental uncertainty. Variation between individuals thus provides clonal groups with collective functionality.