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microbial cell factory

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When one thinks of a factory, one thinks of a huge manufacturing plant with assembly lines, producing a product of interest. Now imagine if a factory is only about one micron which is the size of a bacterium. Microbes are able to produce many valuable products such as enzymes, therapeutic molecules, plant products, bioactive molecules, biopolymers etc. Some microbes produce these products naturally, while others are engineered to produce them. Microbes are efficient factories because what they lack in size, they make up in numbers. Microbes are easy to genetically manipulate, easy to grow, and easy to control, making them perfect cell factories.

The production process of a microbial cell factory involves isolating or engineering a microbial strain which can produce the product of interest efficiently, then multiplying this cell factory by the millions through a process called fermentation and lastly, separating the product of interest from the cells and growth medium. Microbes can be engineered to either produce the product of interest in the cell or to secrete them out of the cell, which would allow easier purification.

Some noteworthy products produced in microbes thus far are insulin for the treatment of diabetes (produced in *Saccharomyces cerevisiae* (yeasts) or *Escherichia coli*), antibiotics such as penicillin, (produced by *Penicillium* fungi) and industrial enzymes such as lipase, amylase, cellulase etc. With recent advances in biotechnology, especially in the fields of genetic and metabolic engineering, it seems that there is no stopping these tiny microbial cell factories from accomplishing enormous tasks.

