NEW BIO-BASED SUPPLY CHAINS FOR PLANT-BASED MEDICINES

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Plants are a rich source of unique molecules, including 25% of natural-product-derived drugs. However, the discovery, synthesis, and overall material supply chains for sourcing plant-based medicines remain ad hoc, biased, and tedious. While microbial biosynthesis presents compelling alternatives to traditional approaches based on extraction from natural plant hosts, many challenges exist in the reconstruction of plant specialized metabolic pathways in microbial hosts. We have developed approaches to address the challenges that arise in the reconstruction of complex plant biosynthetic pathways in microbial hosts. We have utilized these strategies to develop yeast production platforms for an important class of plant alkaloids, which include the medicinal opioids and noscapinoids. The intersection of synthetic biology, genomics, and informatics will lead to transformative advances in how we make and discover essential medicines.