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(54) Title: BACTERIA ENGINEERED TO TREAT DISORDERS INVOLVING THE CATABOLISM OF A BRANCHED CHAIN AMINO ACID

(57) Abstract: The present disclosure provides recombinant bacterial cells that have been engineered with genetic circuitry which allow the recombinant bacterial cells to sense a patient's internal environment and respond by turning an engineered metabolic pathway on or off. When turned on, the recombinant bacterial cells complete all of the steps in a metabolic pathway to achieve a therapeutic effect in a host subject. These recombinant bacterial cells are designed to drive therapeutic effects throughout the body of a host from a point of origin of the microbiome. Specifically, the present disclosure provides recombinant bacterial cells comprising a heterologous gene encoding a branched chain amino acid catabolism enzyme. The disclosure further provides pharmaceutical compositions comprising the recombinant bacteria, and methods for treating disorders involving the catabolism of branched chain amino acids using the pharmaceutical compositions disclosed herein.

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