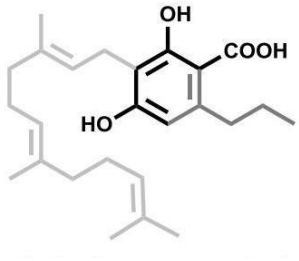
What is claimed is:

1. A method for producing a cannabinoid precursor, the method comprising

(a) contacting 2,4-dihydroxy-6-pentylbenzoic acid and geranyl pyrophosphate with an NphB orthologue to obtain 5-geranyl olivetolic acid, 4-O-geranyl olivetolic acid, or 2-O-geranyl olivetolic acid;

(b) contacting 2,4-dihydroxy-6-propylbenzoic acid and geranyl pyrophosphate with the NphB orthologue to obtain cannabigerovarinic acid; or

(c) contacting 2,4-dihydroxy-6-pentylbenzoic acid and farnesyl pyrophosphate with the NphB orthologue to obtain a compound having a structure of



;

wherein the NphB orthologue has the amino acid sequence of any one of SEQ ID NOs: 1-8.

2. The method of claim 1, wherein the substrate is olivetolic acid, the pyrophosphate is geranyl pyrophosphate, and the cannabinoid precursor has a mass to charge ratio of 359.22 and a retention time of longer than 6.1 minutes, as determined by LC/MS analysis.

3. The method of claim 2, wherein the NphB orthologue is from *Streptomyces roseochromogenus subsp. oscitans*, *Streptomyces rubidus*, *Streptomyces cinnamonensis*, *Aspergillus calidoustus*, *Aspergillus terreus*, *Clostridium clariflavum*, *Nocardia brasiliensis*, or uncultured bacterium esnapd16.1.

4. The method of claim 3, wherein the NphB orthologue is a recombinant enzyme

produced in *Yarrowia lipolytica*.

5. The method of claim 1, wherein the NphB orthologue is from *Streptomyces roseochromogenus subsp. oscitans*, *Streptomyces rubidus*, *Streptomyces cinnamonensis*, *Aspergillus calidoustus*, *Aspergillus terreus*, *Clostridium clariflavum*, *Nocardia brasiliensis*, or uncultured bacterium esnapd16.1.

6. The method of claim 5, wherein the NphB orthologue is a recombinant enzyme produced in *Yarrowia lipolytica*.

7. A recombinant cell of *Yarrowia lipolytica*, comprising in its genome a nucleic acid encoding an NphB orthologue, wherein the NphB orthologue is from *Streptomyces roseochromogenus subsp. oscitans*, *Streptomyces rubidus*, *Aspergillus calidoustus*, *Clostridium clariflavum*, *Nocardia brasiliensis*, or uncultured bacterium esnapd16.1, and the NphB orthologue is expressed in the recombinant cell, and wherein the NphB orthologue has the amino acid sequence of any one of SEQ ID NOs: 1, 3-5, and 7-8.