**TITLE: ENGINEERED CASCADE COMPONENTS AND CASCADE COMPLEXES**


## Abstract

The present disclosure provides engineered Class 1 Type I CRISPR-Cas (Cascade) systems that comprise multi-protein effector complexes, nucleoprotein complexes comprising Type I CRISPR-Cas subunit proteins and nucleic acid guides, polynucleotides encoding Type I CRISPR-Cas subunit proteins, and guide polynucleotides. Also, disclosed are methods for making and using the engineered Class 1 Type I CRISPR-Cas systems of the present invention.


[FIGURE 1A]