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**Persistent Off-the-Shelf meACE2-CAR-IL-15 NK Cells Derived from CD34(+) Cord Blood Stem Cells to Prevent and Treat COVID-19**

**Grant Award Details**

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Persistent Off-the-Shelf meACE2-CAR-IL-15 NK Cells Derived from CD34(+) Cord Blood Stem Cells to Prevent and Treat COVID-19

**Grant Type:** Discovery Research Projects

**Grant Number:** DISC2COVID19-11947

**Project Objective:** Develop engineered NK cells expressing a mutated extracellular domain of ACE2 and IL-15 for the specific killing of SARS-CoV-2-infected cells with long-term persistence in vivo.

**Investigator:**

<b>Name:</b>	Jianhua Yu
<b>Institution:</b>	City of Hope, Beckman Research Institute
<b>Type:</b>	PI

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**Disease Focus:** COVID-19, Infectious Disease

**Human Stem Cell Use:** Adult Stem Cell

**Award Value:** \$150,000

**Status:** Active

**Grant Application Details**

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**Application Title:** Persistent Off-the-Shelf meACE2-CAR-IL-15 NK Cells Derived from CD34(+) Cord Blood Stem Cells to Prevent and Treat COVID-19

**Public Abstract:****Research Objective**

To develop and characterize meACE2-CAR-IL15 NK cells expressing a mutated ACE2 and IL-15, allowing specific killing of SARS-CoV-2-infected cells and long in vivo persistence of the engineered cells.

**Impact**

To provide a timely, novel, and effective cell therapy for COVID-19, which has no FDA-approved vaccines and only remdesivir has received an emergency-use approval.

**Major Proposed Activities**

- To further optimize expansion of umbilical cord blood (UCB) hematopoietic stem cells (HSCs) and engineer the expanded with the meACE2-CAR-IL15 retrovirus.
- To differentiate UCB HSCs transduced with meACE2-CAR-IL15 into NK cells, followed by cell expansion.
- Proof of concept: In vitro evaluation of meACE2-CAR-IL15 NK cells.
- Proof of concept: In vivo evaluation of meACE2-CAR-IL15 NK cells.
- Manuscript submission for publication & preparation for an INTERACT meeting with the FDA.
- N/A

**Statement of Benefit to California:**

SARS has presented as a major public health threat in the past. A new SARS, COVID-19, started in December 2019 has rapidly disseminated to worldwide including California with mortality as high as 20% in the elderly and other more vulnerable populations. At present, worldwide COVID-19 patients have over 3.6 million with over 250,000 deaths. Currently, there are no approved COVID-19 vaccines and only remdesivir has received an FDA-approval for the treatment of COVID-19.

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