NIH NATIONAL CANCER INSTITUTE

Catalytically Hyperactive Variant of Human APOBEC3G Protein

Summary (1024-character limit)
The National Cancer Institute (NCI) seeks co-development and licensing interest to further develop and optimize APOBEC3G protein variants.

NIH Reference Number
E-150-2018

Product Type
- Therapeutics

Keywords
- APOBEC3G, ssDNA, AIDS, Gene Editing, CTD2, Genetically disordered diseases, Matsuo

Collaboration Opportunity
This invention is available for licensing and co-development.

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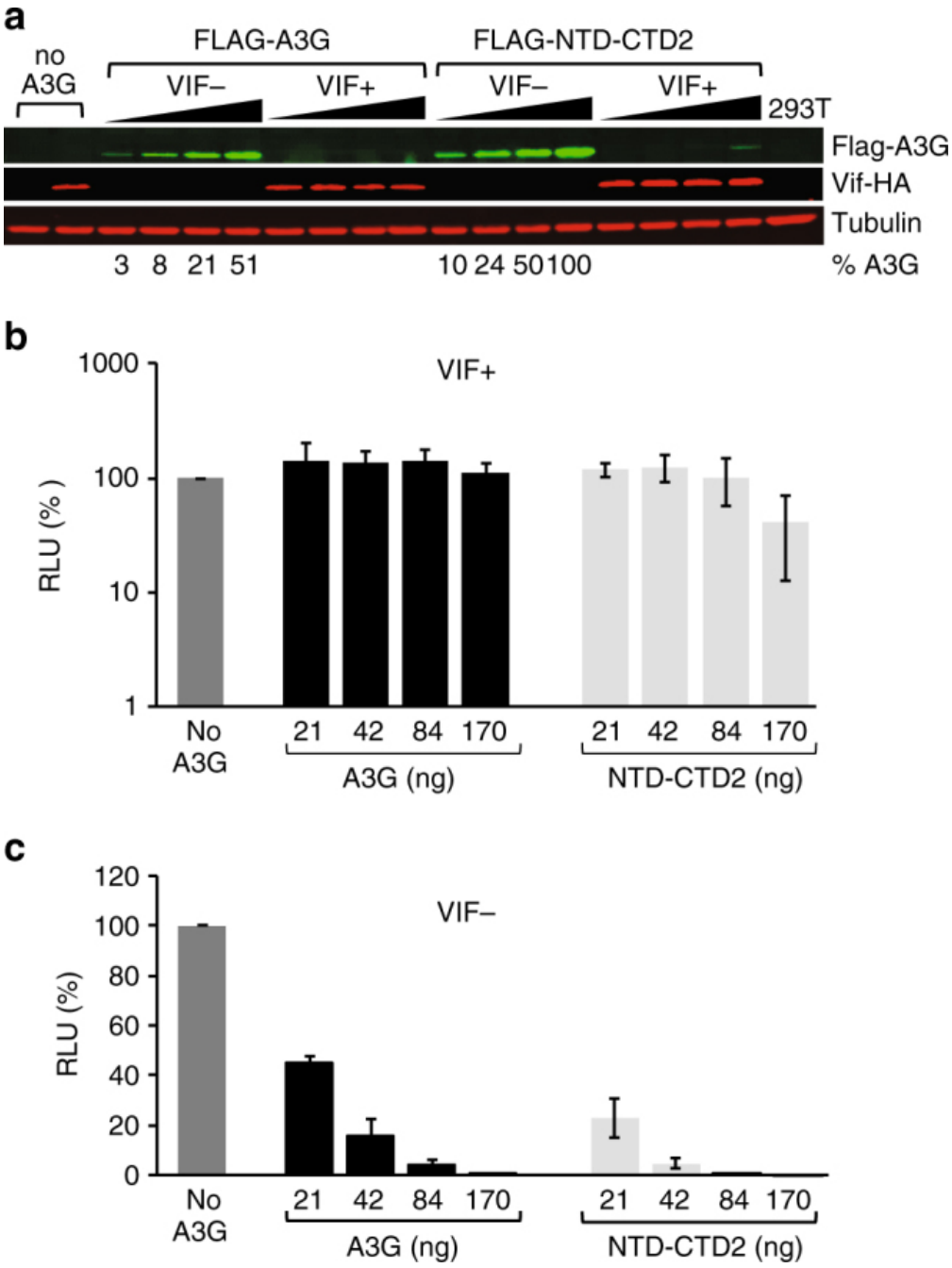
Description of Technology

Researchers at the National Cancer Institute (NCI) have developed a highly active variant of the catalytic domain APOBEC3G with higher ssDNA affinity. This variant may be used to develop therapeutics for AIDS, and may also be used as a tool of gene editing techniques. This hyperactive variant of the human APOBEC3G protein (hereby called CTD2) can be used as a tool to edit human genes in combination with the CRISPR/Cas9 system. CTD2 is selective to a specific target DNA sequence, soluble, and catalytically hyperactive, which makes CTD2 the ideal molecule to use in the aforementioned gene editing, using the CRISPR/Cas9 system.

Figure: Antiviral restriction activity of FLAG-NTD-CTD2



Potential Commercial Applications

- Therapeutic for HIV
- Gene Editing

Competitive Advantages

- The variant of the catalytic domain of APOBEC3G has high affinity to ssDNA substrates as apparent dissociation constant, Kd, is 55 μM
- The variant of the catalytic domain of APOBEC3G can catalyze deamination of cytosines in single stranded DNA 20 times faster than the wild type catalytic domain of APOBEC3G
- The variant of the catalytic domain of APOBEC3G is 4 times more soluble than the wild type catalytic domain of APOBEC3G

Inventor(s)

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Publications

Maiti A, et al. Crystal structure of the catalytic domain of HIV-1 restriction factor APOBEC3G in complex with ssDNA. [PMID 29941968]

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number 62/673,591 , Filed 18 May 2018

Therapeutic Area

- Infectious Diseases