Tandem bispecific antibody protects fully and induces prolonged viremia control against SHIV$_{SF162P3}$ infection

Mengyue NIU
AIDS Institute, The University of Hong Kong

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Broadly Neutralizing Antibody (bNAb) s

- Neutralize multiple HIV-1 viral strains
- Target conserved epitopes on HIV Env
- Neutralization
- Fc-mediated effector function
- Induce immune response

Natural resistant viruses exist
BiIA-SG displays significantly enhanced potency and breadth against HIV-1

A

Normal Antibody + knob-in-hole (BiIA-DG) < Single Gene-encoded Bispecific Immunoadhesin (BiIA-SG)

B

** ** *** **

100 90 72.5 95 87.5

IC50 (nM)

Guido Ferrari. J Clin Invest. 2018
Tandem bispecific neutralizing antibody eliminates HIV-1 infection in humanized mice

Xilin Wu, Jia Guo, Mengyue Niu, and Zhiwei Chen*

BiIA-SG can potently neutralize SHIV$_{SF162P3}$

High dose intravenous SHIV$_{SF162P3}$ infection is highly pathogenic for Chinese rhesus macaques

Unpublished data
Prior injection of BiIA-SG confers fully protection against high dose SHIV challenge

A

- BiIA-SG, i.m.
- SHIVSF162P3

Day -1 0

Group A (n=3)

B

Plasma Viral RNA

Plasma viral RNA (log_{10} copies/ml)

Days post infection

C

Proviral Load

Log_{10} copies/10^6 PBMCs

Days post infection

D

BiIA-SG Level

Concentration (µg/mL)

Days post infection

E

CD4+ T Cell %

CD4+ T cells (%)

Days post infection

F

anti-HIVSF162 gp120

Endpoint dilution (Log10)

Days post infection

Unpublished data

www.iasociety.org
Single early treatment of BiIA-SG converts lethal SHIV infection into sustained control

A

\[ \text{Plasma viral RNA (log} \_{10} \text{copies/ml)} \]

B

\[ \text{Day 10-84 Geometric mean} \]

C

\[ \text{Peak Date} \]

D

\[ \text{BiIA-SG Level} \]

E

\[ \text{Proviral Load} \]

F

\[ \text{Survival %} \]

Unpublished data

www.iasociety.org
Single early treatment of BiLA-SG induces stronger humoral and cellular response

**A** anti-HIV$_{SF162}$ gp120

**B** Serum ID$_{50}$ (SHIV$_{SF162P3}$)

**C** T cell response (env+gag+nef)

**D** Plasma viral RNA

Day 119, anti-rhCD8β, i.v., 50mg/kg

Unpublished data
Summary

- A single injection BiIA-SG is sufficient to confer the full protection against high dose SHIV_{SF162P3} infection
- Early single dose of BiIA-SG treatment
  - Prevents rapid disease progression and **deaths**
  - Converts lethal infection into sustained control ($8/13 \to 6/11$)
  - Induce stronger humoral and cellular response
  - CD8$^+$ T cell play a role in controlling viremia
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Thanks for your attention!
## Disclosure

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