

# Super Abzymes

## ~ Essential Structure and Applications ~

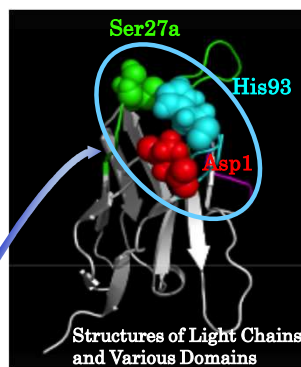
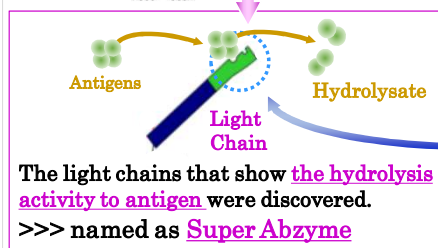
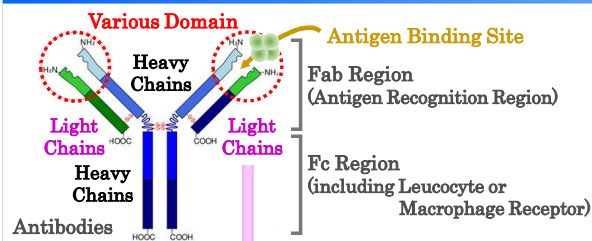
### KEY INVENTION

The essential structure of "Super Abzymes" which consist of the light chains of antibodies and show a hydrolysis activity to antigens has been identified, and the production method of the "Super Abzymes" has been developed.

What's Super Abzymes? ~ in comparison with Antibodies and Abzymes

- **Antibodies :** What specifically to bind antigens and defang them in the immune system
- **Abzymes :** What specifically to bind antigens then defang them by hydrolysis
- **Super Abzymes :** Abzymes which consist of the light chains of antibodies and show a higher hydrolysis activity than that by general abzymes

### SUMMARY of INVENTION

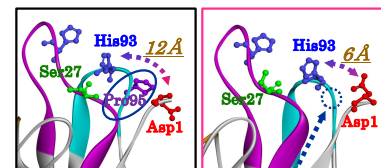


#### Hydrolysis Center

"Catalytic Triad Residues - Asp1, Ser27 and His93" are very important to be in an appropriate relative position each other to show the hydrolysis activity.

Pro95 in the most of natural light chains makes the relative position of "Catalytic Triad Residues" inappropriate.

→ No Activity!

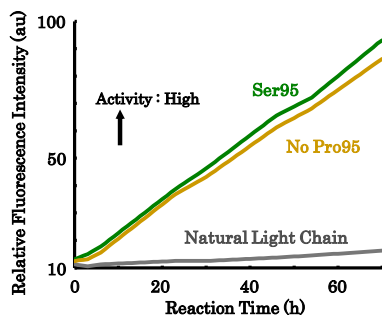


Crone of Light Chain with Pro95      Crone of Light Chain without Pro95

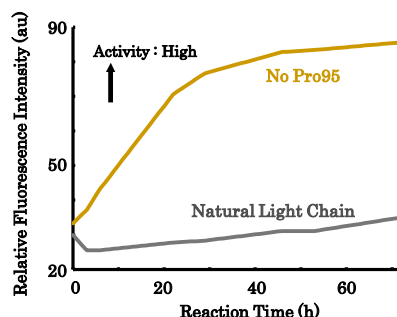
Super Abzymes showing a high hydrolysis activity are producible by the artificial deletion of Pro95 or replacement of Pro95 with other amino acids.

### EFFECT of INVENTION

#### Hydrolysis Activity for A8 Peptides



#### Hydrolysis Activity for PD-1 Peptides



#### Others

The technologies would be applicable to various fields (usages) such as...

- To the abzymes for chemokine receptor CCR5 (HIV Receptors), which means to be usable as **Anti-HIV Agents**.
- To the abzymes for human TNF- $\alpha$ , which means to be usable for the **Diseases of Abnormal Cytokine Production**.
- To the abzymes for the cancer cells (lung cancer cells), which means to be usable as **Anti-Tumor Agents**.

### APPLICATION expected

- Application for medicines such as anti-HIV agents or anti-tumor agents
- Application for the measures against new infectious diseases such as COVID-19
- Application for the new prevention method against influenza
- Application for the rapid virus detection method by biosensors

**Representative Inventor :** Emi Hifumi (Professor, Oita University), Taizo Uda (Professor, Oita University)

**Licensable Patent [Title of Invention - Registration No. (JP)/International Publication No. (WO)]**

- Novel Production Methods for Abzymes and Novel Abzymes - JP4334931
- Human Abzymes and Production Methods - JP4829609
- Abzymes for N-Terminal Region of Chemokine Receptor CCR5 - JP4777785
- Abzymes for Human TNF- $\alpha$  and Application - JP4861019
- Abzymes for Human IgE and Application - JP5058490
- Anti-Cancer Agents - WO2013133253
- Production Methods for Anti-Virus Agents, Abzymes, Primer Sets, Polynucleotides and Polypeptides - WO2011102517
- Human Antibody  $\kappa$ -Type Light Chain Complex-containing Composition and Production Method - WO2015025786
- Innovation Production Technologies for Abzymes - WO2021015237

**Contact :** IP Management & Licensing Group, Department of Intellectual Property Management, JST

TEL) +81-3-5214-8486

email) [license@jst.go.jp](mailto:license@jst.go.jp)

URL) [www.jst.go.jp/chizai/](http://www.jst.go.jp/chizai/)

