

RNA Aptamer with Anti-Aggregative Effects against Amyloidosis

We are looking to out-license the technology for its commercialization.

RNA aptamer that binds strongly to the N-terminal region of α -synuclein (α Syn), thereby exhibiting high inhibitory effects on amyloid aggregation

◆Background

Alpha-synuclein (α -Syn) aggregates are associated with neurodegenerative diseases such as Parkinson's disease, Lewy body dementia, and multiple system atrophy. Although the N-terminal region of α Syn plays an important role in α Syn aggregation, most agents that detects α Syn target the C-terminal region, which is susceptible to degradation, making their practical use challenging. Furthermore, although some antibodies recognize the N-terminal region of α Syn, their large molecular size can hamper drug delivery. Thus, there have been no effective drugs against amyloid diseases.

◆Description

RNA aptamers are a type of single-stranded oligonucleotides that bind strongly to specific molecules. A researcher at Kyoto University identified a novel RNA aptamer that binds to α Syn using 1-95 amino acids located in the N-terminal and the central region of α Syn. The identified sequence of the aptamer binding located in the N-terminal region of α Syn (Fig. 1) and exhibited high inhibitory effects on α Syn aggregation (Fig. 2).

➤ **Strong binding to the N-terminal region of α Syn**

The C-terminal region of α Syn degraded during the aggregation process, but the N-terminal region remains unprocessed in amyloid fibrils.

➤ **Inhibition of amyloid protein aggregation**

The novel aptamer is capable of binding to tau in addition to α Syn thus can be potentially used as a prophylactic or therapeutic agent diverse amyloid diseases.

➤ **Aptamer sequence of 21 nucleotides in length**

Combined with other methods, delivery to the brain is also possible.

➤ **Inexpensive and synthesizable**

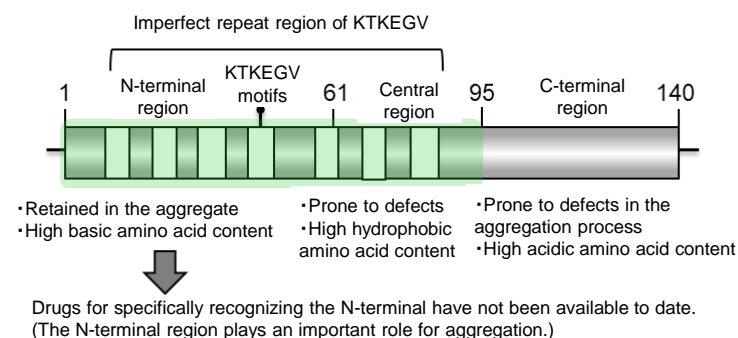


Fig. 1 Overview of the Invention

The binding region (1-95) to the aptamer of this invention is highlighted in green.

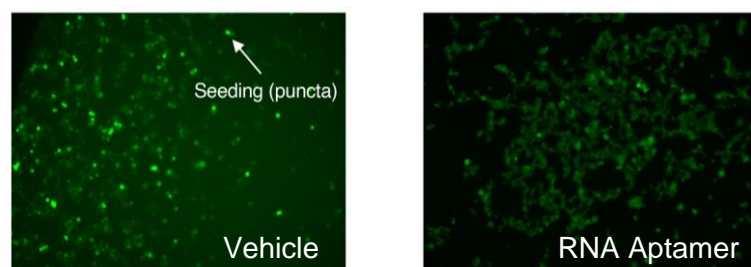


Fig. 2 Inhibition of α Syn aggregation by the novel RNA aptamer (HEK293 cells)

An α Syn seeding assay was performed using the FRET method. The novel RNA aptamer inhibited the α Syn aggregation, resulting in no FRET (excitation of YFP) signals and decreased aggregation seeds (puncta) shown in green.

◆Development Status

Amyloid aggregation was inhibited in vitro. The binding region to α Syn was identified to be 21-nucleotide sequence.

◆Applications

- Therapeutic drugs
- Diagnostic drugs

◆Offer

- Patent License
- Option for Patent License

◆Presentations/Papers

- 64th Annual Meeting of the Japanese Society of Neurology (June 1, 2023)
- 64th Annual Meeting of the Japanese Society for Neurochemistry (July 6, 2023)
- Jikken Igaku (Experimental Medicine) Vol.41 No.12

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