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Design Of Functional Protein Materials Based on Beta-Rippled Sheet Architectures

Tech ID: 33446 / UC Case 2021-986-0

BACKGROUND

The rippled sheet was proposed by Pauling and Corey as a structural class in 1953. Following approximately a half century of only minimal activity in the field, the experimental foundation began to emerge, with some of the key papers published over the course of the last decade. Researchers at UC Santa Cruz have explored the structure of and have discovered ways to form new beta rippled sheets.

TECHNOLOGY DESCRIPTION

Jevgenij Raskatov's lab at UC Santa Cruz has determined the structures for a wide variety of rippled β sheet structures. Generally these structures form fibrils of rippled antiparallel cross- β dimers. One general structure is an $(L,L,L)-(FX_1F)_k$ dimerized with $(D,D,D)-(FX_2F)_k$ where F is phenylalanine, X_1 and X_2 , can be any amino acid, and k is an integer greater than or equal to 1. Examples of X_1 and X_2 include phenylalanine, tyrosine, and tryptophan.

Other structures include $(L,L,L,L,L,L)-(MVGGVV)_k$ dimerized with $(D,D,D,D,D,D)-(mvggvv)_k$; $(L,L,L,L,L,L)-(KLVFFAE)_k$ dimerized with $(D,D,D,D,D,D)-(klvffae)_k$; and $(L,L,L,L,L,L)-(AILSS)_k$ dimerized with $(D,D,D,D,D,D)-(ailss)_k$; where k is an integer greater than or equal to 1.

Therapeutic compositions include a D-peptide with the sequence KLVFFAE that can bind to the Alzheimer's disease associated peptide A β 42 that is conjugated to a deamidation agent. The deamidation agent then can act on K16, E22, or D23 of wild type A β 42 and reduce the neurotoxicity of A β 42.

CONTACT

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INVENTORS

► Raskatov, Jevgenij

OTHER INFORMATION

KEYWORDS

beta rippled sheet, secondary structure, peptide, D-peptide

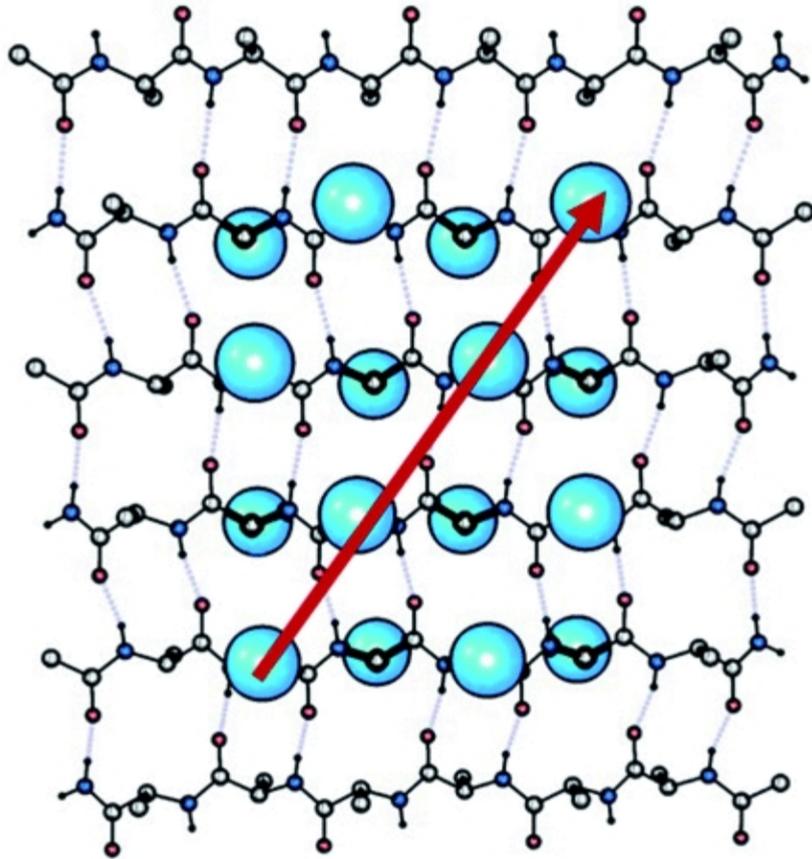
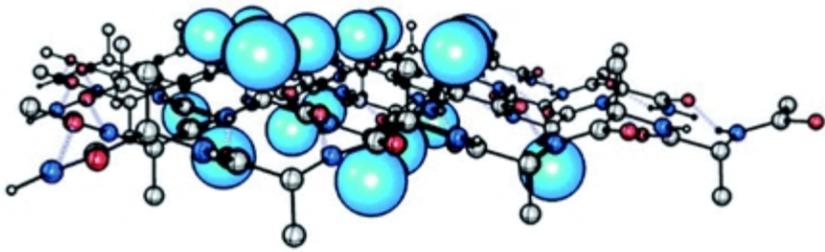
CATEGORIZED AS

- **Materials & Chemicals**
 - Polymers
- **Medical**
 - Delivery Systems
 - Disease: Central Nervous System
- **Nanotechnology**
 - NanoBio

RELATED CASES

2021-986-0, 2023-906-0, 2023-930-0

Rippled antiparallel



APPLICATIONS

Potential applications include:

- ▶ Nanomaterials
- ▶ Fluorescent signaling
- ▶ Therapeutic peptides
- ▶ Drug targeting

ADVANTAGES

These are fully unexplored structures that are implicated in potentially disrupting fibril formation in diseases like diabetes and Alzheimer's Disease.

INTELLECTUAL PROPERTY INFORMATION

| Country | Type | Number | Dated | Case |
|------------------------|-----------------------|---------|------------|----------|
| European Patent Office | Published Application | 4355758 | 04/24/2024 | 2021-986 |

Additional Patents Pending

RELATED MATERIALS

- ▶ [A crystal-structural study of Pauling–Corey rippled sheets](#) - 01/21/2022
- ▶ [Understanding and controlling amyloid aggregation with chirality](#) - 10/01/2021

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Rippled Beta-Sheets From Mixed Chirality Linear And Cyclic Peptides
- Rippled Beta-Sheets and Related Materials and Methods
- Separation of Methionine Sulfoxide Diastereomers.

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