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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  $\beta$  sheet structures. Generally these structures form fibrils of rippled antiparallel cross- $\beta$  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 $\beta$ 42 that is conjugated to a deamidation agent. The deamidation agent then can act on K16, E22, or D23 of wild type A $\beta$ 42 and reduce the neurotoxicity of A $\beta$ 42.

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### INVENTORS

► Raskatov, Jevgenij

### OTHER INFORMATION

#### KEYWORDS

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

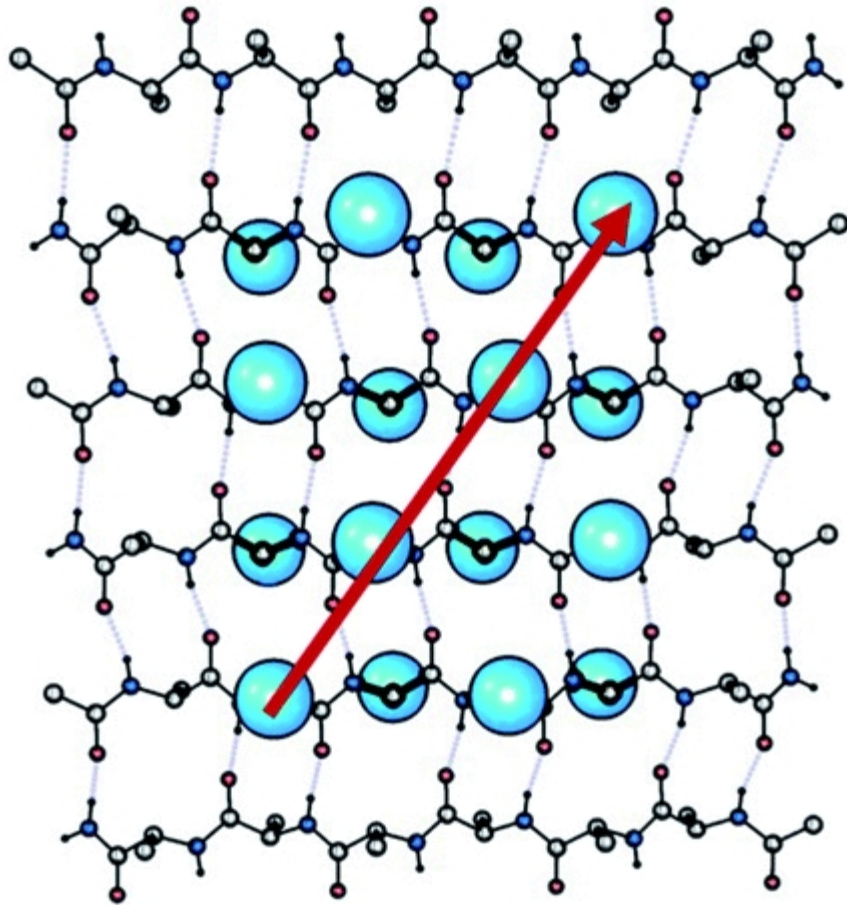
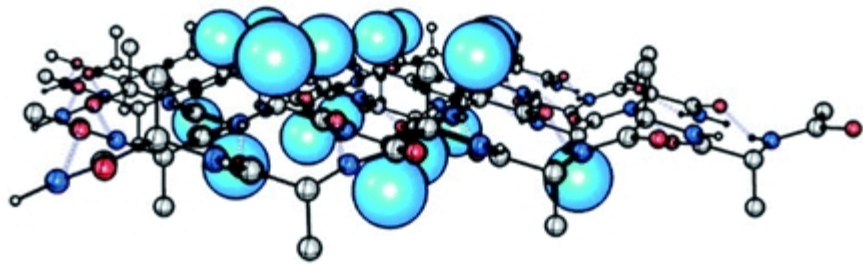
#### CATEGORIZED AS

- **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

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