



# Novel peptide-carrier conjugates for use in treatment of Alzheimer Disease

---

## Problem

**Alzheimer's disease** (AD) is the most common cause (60-80% of all cases)<sup>1</sup> of age-related dementia worldwide. The number of AD cases is rapidly growing, as of 2013, there were 44.4 million people with dementia globally, which number is expected to reach 75.6 million in 2030<sup>2</sup>. Despite the decades of research on AD, **no effective therapy** has been proposed so far. The **A $\beta$  oligomers**, formed during the aggregation process called amyloidogenesis are strong **neurotoxins** and their presence correlates with progression of pathological changes in patients with AD. Thus the potential therapies are considered to **inhibit the formation of toxic A $\beta$  oligomers** and / or **neutralize already formed A $\beta$  oligomers**.

## Solution

We have identified short synthetic peptides exhibiting **high specificity for A $\beta$**  and effectively **inhibiting neurotoxicity of A $\beta$  oligomers** in the culture of neurons<sup>3</sup>. Furthermore, we have synthesized conjugates of these peptides with a carrier allowing **transport through the blood-brain barrier** and increasing their **biostability**. These novel peptide-carrier conjugates do not exhibit general toxicity and immunogenicity. The additional advantages of developed conjugates are relatively **low cost** of their synthesis and their composition of **pharmaceutically admissible components**. As these conjugates inhibit formation of neurotoxic A $\beta$  oligomers as well as neutralize already formed oligomers we presume that they can be useful both **in the prevention and treatment of AD**.

Our invention has been **submitted for patent protection** as PL417159 (2016) and PCT/IB2017/052733 (2017).

## Our needs

### 1. Support in product development:

We are looking for industrial partner support to raise private funds and public grants for **preclinical testing *in vivo***. (We are currently performing first proof-of-concept experiments using animals)

---

This study was supported by research grant 2013/10/M/NZ4/00311 from the Polish National Science Centre.

<sup>1</sup> Alzheimer's Association. 2017 Alzheimer's Disease Facts and Figures. Alzheimer's Dement. (2017) 13: 325-373.

<sup>2</sup> Alzheimer Disease International, Dementia statistics, <http://www.alz.co.uk/research/statistics>, accessed November 2015.

<sup>3</sup> Nieznanska H, Bandyszewska M, Surewicz K, Zajkowski T, Surewicz WK, Nieznanski K. Identification of prion protein-derived peptides of potential use in Alzheimer's disease therapy. Biochim. Biophys. Acta. (2018) 1864: 2143-2153.

## 2. Product commercialization – licensing opportunity:

After successfully finished pre-clinical stage of development we will be looking for the Investor to license invention (**upfront payment + royalties**) to conduct the **clinical trials** and launch the product to the market.

### Project Core Team

**Krzysztof Nieznański** – principal inventor; Associate Professor at the Nencki Institute; biochemist; expert in protein biochemistry, amyloidogenesis and neurodegenerative diseases;

**Hanna Nieznańska** – Adjunct at the Nencki Institute; biochemist, pharmacist; expert in protein biochemistry, pharmacology, amyloidogenesis and neurodegenerative diseases;

**Witold Surewicz** – Professor at Case Western Reserve University, USA; biophysicist; expert in protein biophysics, amyloidogenesis and neurodegenerative diseases;

**Krystyna Surewicz** – Senior Research Associate at Case Western Reserve University, USA; biochemist; expert in protein biochemistry, molecular biology, amyloidogenesis and neurodegenerative diseases.

### About Nencki Institute

The Nencki Institute of Experimental Biology of the Polish Academy of Sciences is the largest non-university biological research center in Poland. High quality of research, excellent publication record, and strong international links place the Nencki among the leading biological institutions of Central and Eastern Europe. The main focus of Institute's research relates to novel therapies and diagnostic methods in diabetes, neurodegenerative diseases, neurological disorders, cancer and other diseases of modern civilization. The Nencki Institute also provide a wide range of services including preclinical trials, dermo-cosmetology studies, genetic engineering, transgenic animals production and biological imaging from electron microscopic to MRI levels. We appreciate the existing collaborations and **we are open to new cooperation with industrial entities to bring novel products to the pharmaceutical, biomedical and biotechnological market.**



### Contact

Urszula Rybak

phone (+48 22) 589 22 63

e-mail: [u.rybak@nencki.gov.pl](mailto:u.rybak@nencki.gov.pl)

Nencki Institute of Experimental Biology PAS

Pasteur 3, 02-093 Warsaw, Poland

<http://www.nencki.gov.pl>