Supporting information

Mechanisms of Enzymatic Degradation of Amyloid Beta Microfibrils Generating Nanofilaments and Nanospheres Related to Cytotoxicity†

Keiji Numata, *David L. Kaplan**

Department of Biomedical Engineering, Tufts University, 4 Colby Street, Medford, Massachusetts 02155.

*To whom correspondence should be addressed.

E-mail: david.kaplan@tufts.edu

CORRESPONDING AUTHOR FOOTNOTE

Phone: +1-617-627-3251,

Fax : +1-617-627-3231,

E-mail: david.kaplan@tufts.edu.

Table S1. Percentage of the secondary structure of Aβ fibrils before and after enzymatic degradation based on the CD measurements.

Samples	Helix	Strand	Turn	Unordered
Aβ (overall)	11 ± 3	37 ± 5	23 ± 1	30 ± 1
Aβ (filtered)	29 ± 3	18 ± 3	23 ± 1	30 ± 1
*DP protease (overall)	17 ± 9	30 ± 8	22 ± 1	32 ± 3
*DP protease (filtered)	30 ± 5	13 ± 2	23 ± 1	34 ± 2
*DP chymotrypsin (overall)	13 ± 6	33 ± 9	22 ± 1	31 ± 3
*DP chymotrypsin (filtered)	31 ± 7	14 ± 4	22 ± 1	33 ± 3
*DP NEP (overall)	8 ± 3	42 ± 9	21 ± 1	29 ± 2
*DP IDE (overall)	3 ± 2	47 ± 10	34 ± 2	19 ± 2

*DP: Degradation Products. Units: %. Data are represented as mean ± standard deviation (*n*=6).

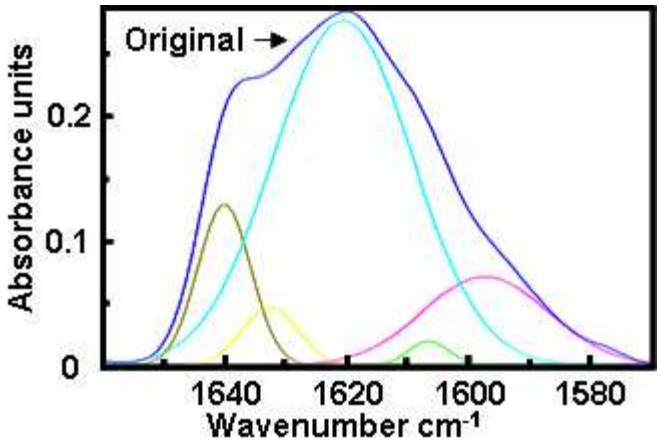

Figure S1. Representative MFTIR spectra (original) and deconvoluted bands of Aβ fibrils before enzymatic degradation.

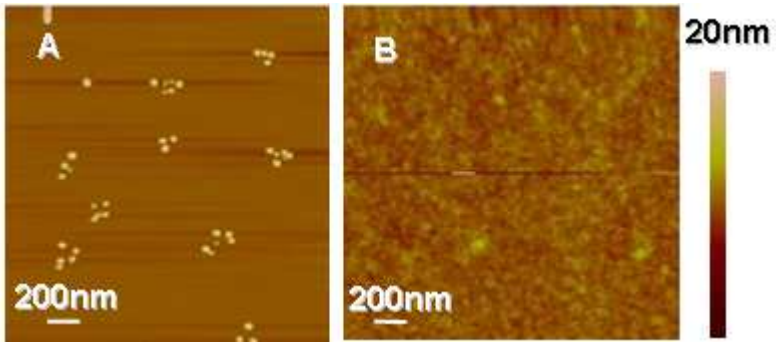

Figure S2. AFM height images of protease XIV (A) and by alpha-chymotrypsin (B) at a concentration of 100 µg/mL.

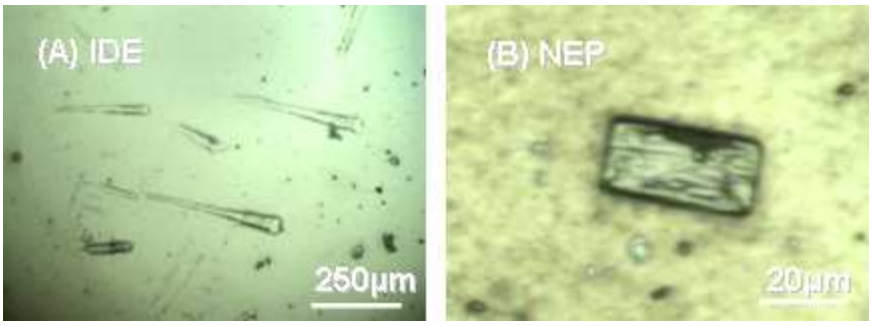

Figure S3. Optical microscopy images of Aβ fibrils after the enzymatic degradation by IDE (A) and NEP (B).

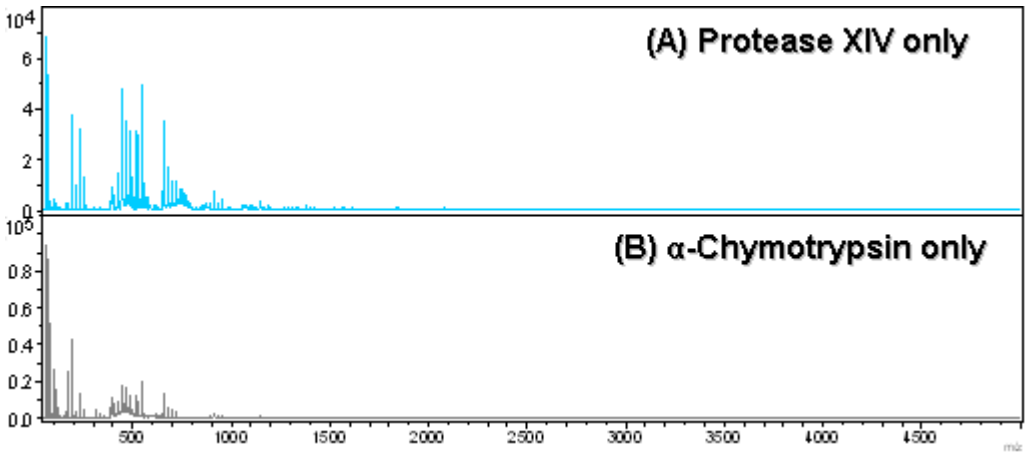

Figure S4. MALDI-TOF analysis of protease XIV (A) and alpha-chymotrypsin (B) at a concentration of 100 µg/mL without Aβ peptides.

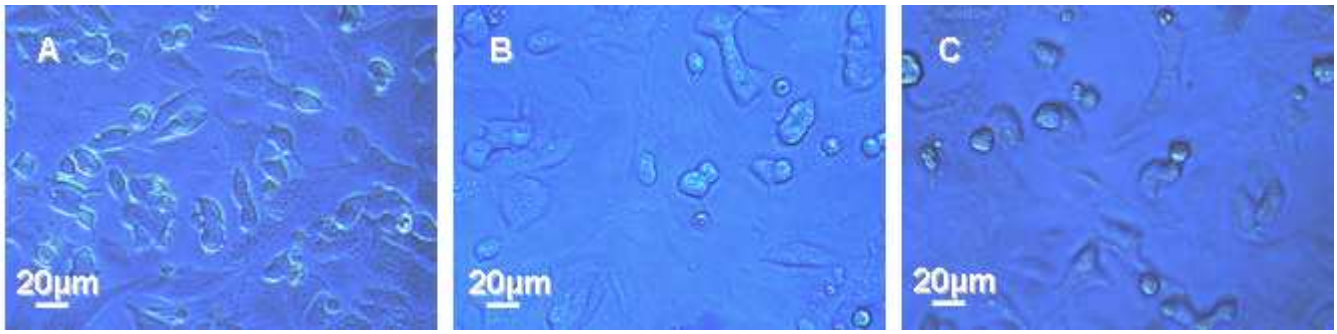

Figure S5. Optical microscopy images of PC 12 cells. (A) PC12 cells before differentiation. (B) PC12 cells differentiated by NGF. (C) PC12 cells after the incubation with the overall degradation products from protease XIV digestion.

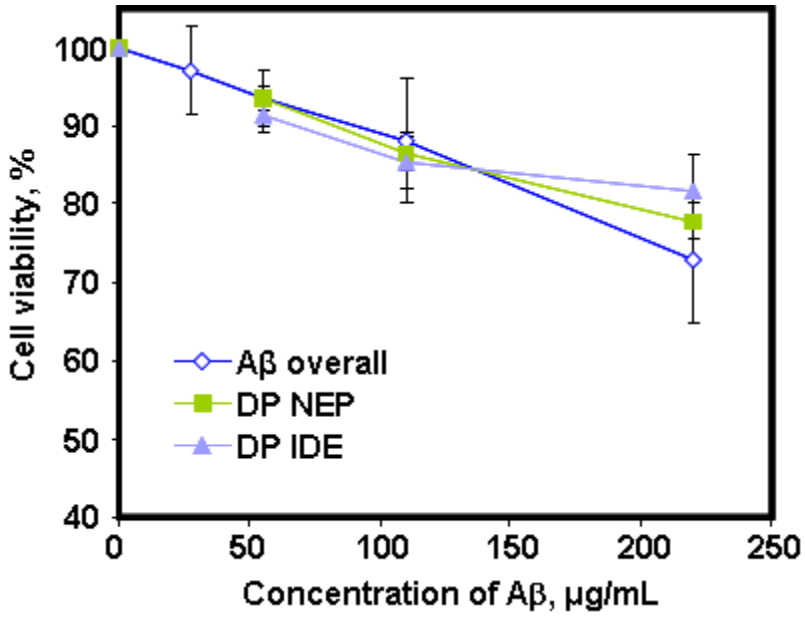

Figure S6. Cell viability with the Aβ fibrils and their degradation fragments on differentiated PC-12 cells. Dependence of cell viability (percentage of active cells as compared to controls) on the Aβ peptides measured by MTS assay. Overall Aβ fibrils (blue open diamonds) show cell viability percentages of Aβ fibrils before the enzymatic degradation. Overall Degradation Products (DP) by NEP (light green squares) and IDE (light blue triangles) show the percentages of each degradation products. Data are represented as mean ± standard deviation (n=8).