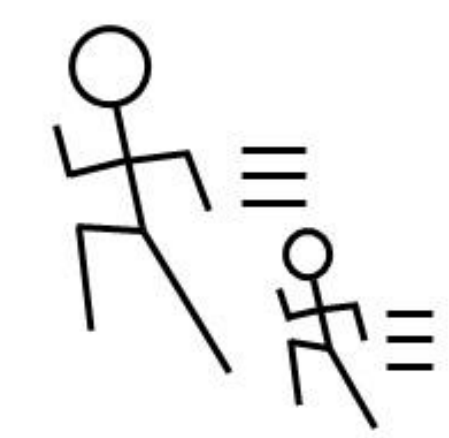


Secondary Structure Changes of Amyloid- β and Albumin Proteins on Inorganic Nanoparticle Surfaces

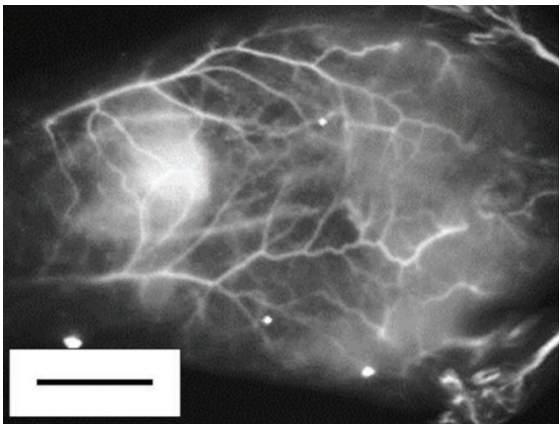
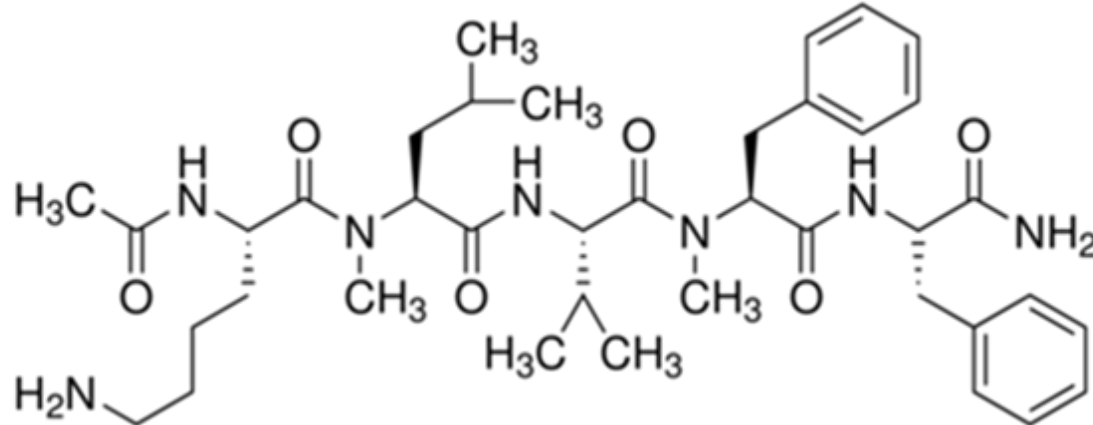
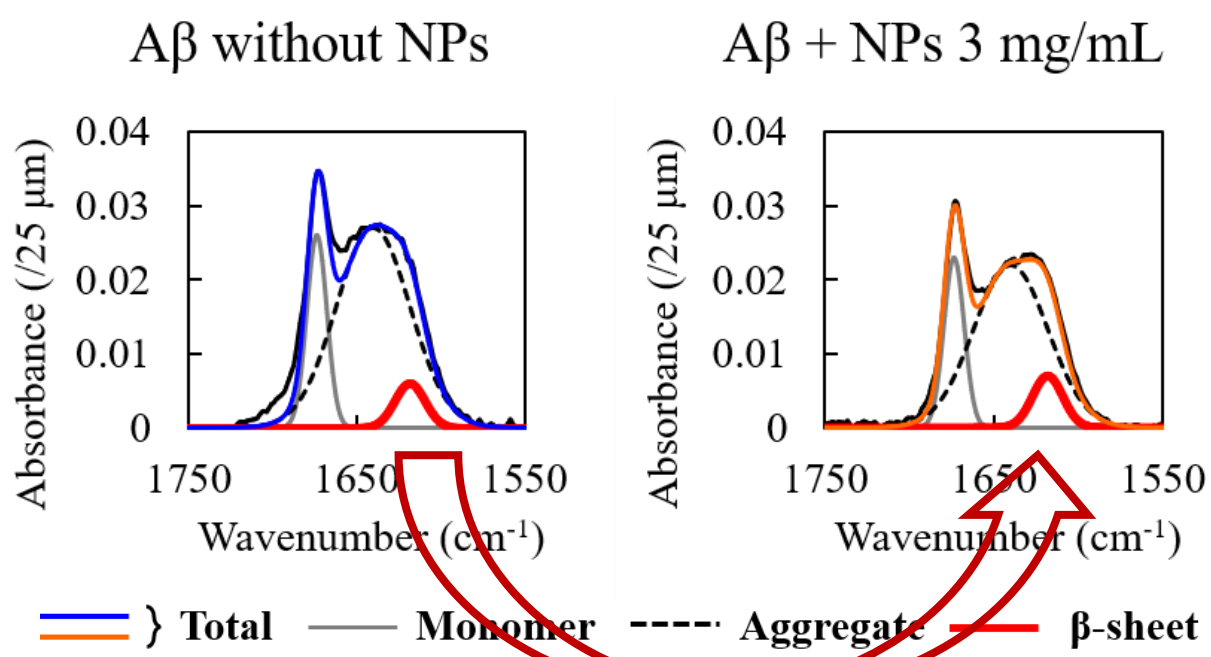


P4-05

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A β_{16-20} peptides form β -sheet structures on the surface of CeF₃ nanoparticles, driven by adsorption of hydrophobic regions that promotes peptide aggregation. β -sheet formation is enhanced in the presence of NH₄⁺ but suppressed by NO₃⁻. These findings suggest that CeF₃ nanoparticles modulate A β aggregation in an ion-dependent manner, a key process in Alzheimer's disease pathology.

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES																														
Fluoride NPs² ✓ Low phonon energy ✓ High chemical stability → Promising for bioimaging Clear visualization of blood vessels in a live mouse³ Scale bar: 10 mm 	✓ CeF₃ NPs (80 nm) were synthesized via thermal decomposition. ✓ Aβ_{16-20} peptides (KLVFF, Sigma-Aldrich) were used.  Molecular structure of KLVFF ✓ Aβ aggregation and secondary structure were analyzed by FT-IR spectroscopy. ✓ The amide I region (1600–1700 cm⁻¹, C=O stretching vibration) was deconvoluted by Gaussian fitting to estimate β-sheet content.⁴  FT/IR-6200 spectrometer (Shimadzu Co., Kyoto, Japan)	Effects of Fluoride NPs  — Total — Monomer - - - Aggregate — β-sheet β-sheet content increased by 1.48-fold. Effects of Coexisting Ions <table><tr><th></th><th>Aβ</th><th>Aβ + NaCl</th><th>Aβ + NH₄Cl</th><th>Aβ + NaNO₃</th></tr><tr><td>Monomer</td><td>0.21</td><td>0.21</td><td>0.19</td><td>0.23</td></tr><tr><td>Aggregate</td><td>0.72</td><td>0.73</td><td>0.74</td><td>0.71</td></tr><tr><td>β Sheet</td><td>0.067</td><td>0.062</td><td>0.075</td><td>0.057</td></tr></table> NH₄⁺ increased β-sheet content by 1.12-fold.		A β	A β + NaCl	A β + NH ₄ Cl	A β + NaNO ₃	Monomer	0.21	0.21	0.19	0.23	Aggregate	0.72	0.73	0.74	0.71	β Sheet	0.067	0.062	0.075	0.057	✓ Aβ_{16-20} peptides are more likely to form β-sheet structures on the surface of CeF₃ NPs. ✓ Hydrophobic regions of the peptides adsorb onto the NPs surface, facilitating peptide aggregation. ✓ β-sheet formation of Aβ peptides was promoted in the presence of NH₄⁺ but suppressed in the presence of NO₃⁻. ✓ These findings suggest that CeF₃ NPs may modulate Aβ aggregation, a key pathological event in Alzheimer's disease.	1) N. Sakaguchi et al., <i>ACS Appl. Bio Mater.</i>, 5 (2022) 2843-2850. 2) K. Okubo et al., <i>ECS J. Solid State Sci. Technol.</i> 10 (2021) 096006. 3) M. Kamimura et al., <i>J. Mater. Chem. B</i>, 5 (2017) 1917. 4) A. Barth and C. Zscherp, <i>Quart. Rev. Biophys.</i> 35 (2002) 369–430. 5) N Sakaguchi et al., <i>Langmuir</i>, 41 (2025) 15143–15148. 6) N Sakaguchi et al., <i>Langmuir</i>, 42 (2026) 3089–3095. <tr><td colspan="5">CONTACT</td></tr> <tr><td colspan="5"> Naoya Sakaguchi Email : 8224701@ed.tus.ac.jp LinkedIn ALZHEIMER'S ASSOCIATION AAIC 26 </td></tr>	CONTACT					 Naoya Sakaguchi Email : 8224701@ed.tus.ac.jp LinkedIn ALZHEIMER'S ASSOCIATION AAIC 26				
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