

## FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

<b>Project Title:</b> Enhancement of water-solubility and bioavailability for bioactive substances by the formation of supramolecule with peptides	
<b>Name:</b> Tatsuya OSHIMA	<b>Institution:</b> The University of Miyazaki

### 1. Background of research

After oral administration, bioactive substances and drugs must be absorbed in the human body via membrane permeation in the intestine. Substances with poor water solubility are not absorbed well in the body, and do not function efficiently.

### 2. Research objectives

The aim of this research is to prepare supramolecular complexes of poorly water-soluble substances with peptides, which will be prepared as protein hydrolysates. This complexation should improve the water-solubility, membrane permeability, and oral bioavailability of poorly water-soluble bioactive substances and drugs.

### 3. Research characteristics (incl. originality and creativity)

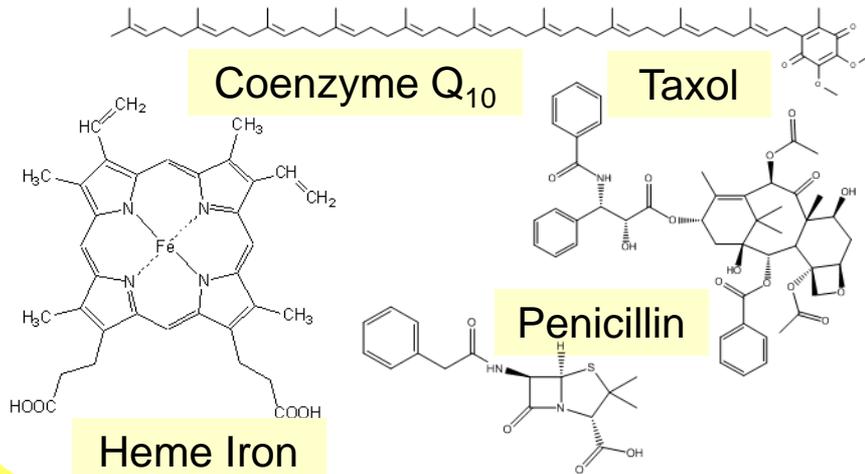
In this research, peptides prepared from proteins by hydrolysis will be used to solubilize poorly water-soluble substances. Thousands of peptide sequences can be obtained using different proteins and methods of hydrolysis. We believe that the mixture of peptides containing a specific peptide that exhibits affinity to the target will allow spontaneous formation of a hydrophilic complex via complexation with the poorly water-soluble substance.

### 4. Anticipated effects and future applications of research

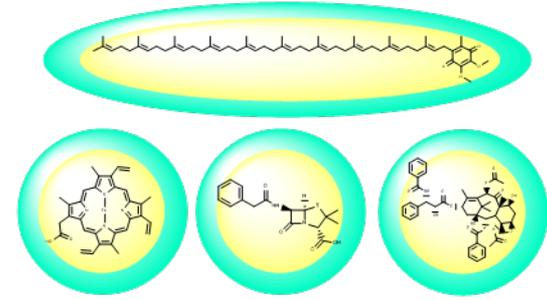
Enhancement of the water solubility of bioactive substances and drugs by complexation will increase their absorption efficiency and bioavailability. This will allow reduction of the dose required to achieve the desired response, and reduction of any harmful side effects of the drug. The formation of the bioconjugate will also enhance resistance of the bioactive substances to digestion. In general, this technique will contribute to advancement of medications for human health.

# Enhancement of water-solubility for bioactive substances by the formation of supramolecular complex with peptides

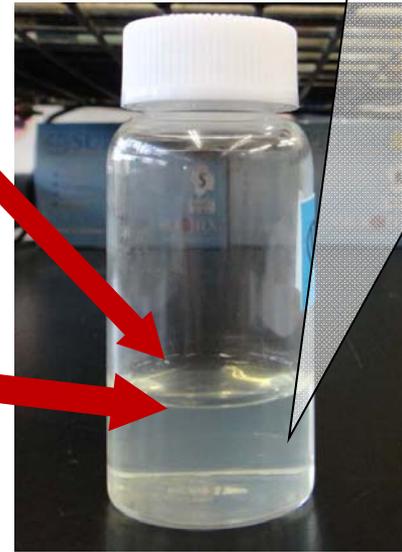
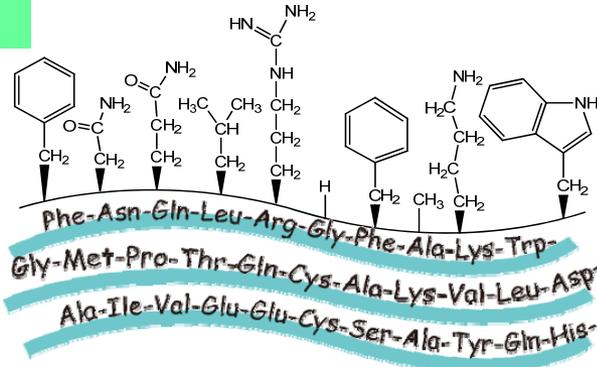
## Poorly water-soluble substances



## The complex between poorly water-soluble substance and peptide



## peptides



The complexation between poorly water-soluble substance and peptide would improve its water-solubility and oral bioavailability.