

### Enzyme activity assay of horseradish peroxidase encapsulated in peptide nanotubes

김태윤, 박병욱<sup>1</sup>, 김동식<sup>1</sup>, 윤도영\*  
광운대학교; <sup>1</sup>University of Toledo  
(yoondy@kw.ac.kr\*)

The objectives of this study are to demonstrate the encapsulation of horseradish peroxidase (HRP) inside a peptide nanotube (PNT) and to measure the activity of the encapsulated enzyme. The bulk enzymes of 0.15  $\mu\text{g}$  were observed to be encapsulated into 1 mg of PNTs by enzyme assay. The encapsulation was also verified with TEM. The enzyme activity of HRP encapsulated inside PNTs was examined in terms of thermal stability, long-term stability, and resistance to a denaturant. The enzyme assay results showed that the encapsulated HRP had good storage stability and retained its activity up to 90% for 18 days while the free HRP in the solution lost about 50% activity during the same period. At a raised temperature of 55 °C, the enzyme activity of HRP in PNTs stayed constant at 20% higher than that of the free HRP. In the presence of the denaturant such as guanidine hydrochloride (GmHCl), the activity of the encapsulated HRP was maintained around 10% higher than the activity of the free HRP.

This work was supported by NANO-Star center under the CRADA of AFIT-UT-KWU.