N-Glycoalbumin-Ru artificial metalloenzyme for therapeutic drug synthesis.

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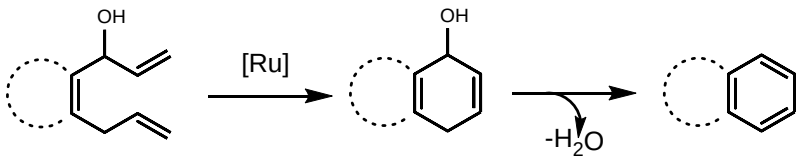
Artificial metalloenzymes (ArM) are the most promising systems for catalysis of the new-to-nature reactions in biological environments. In order to design a biocompatible ArM we hypothesized that natural non-metal proteins acting as carriers of small molecules in living organisms, might be an efficient basis for using in creation of the ArM. Due to protein stability and ability to bind with various hydrophobic molecules, metal catalyst with appropriate hydrophobic anchor can tightly bind with protein at the desired binding site.

In our study, we have designed an efficient albumin-based Ru-type metalloenzyme suitable for therapeutic in vivo drug synthesis via ring-closing metathesis reaction.1,2 In particular, high activity has been found for aromatization reaction by sequential cyclization/dehydration steps. The catalytic synthesis of various carbo- and heteroaromatic compounds was performed. Acyclic precursor (prodrug) of anticancer drug has been developed to reduce the biological activity, as well as the side effects of the anticancer drug. Site-selective catalytic cyclization of a biologically inactive prodrug caused a significant inhibitory effect on the cancer cells growth.



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