## S06-3 **Bioorganic studies on triterpene biosynthesis**

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Isoprenoids are major classes of natural products found in higher plants. Due to their large structural diversity, isoprenoids exhibit various biological activities. Triterpenes are member of isoprenoids that play important roles in plants such as a precursor of sterols. Besides, triterpenes are often found as glycosides, triterpene saponins, and are active constituents of numerous medicinal plants. All of these triterpenes are biosynthesized from a common precursor, 2,3-oxidosqualene, by the enzyme oxidosqualene cyclase (OSC). Therefore, these OSCs are responsible for generation of triterpene structural diversity. We have been involved in the study of OSCs to elucidate the mechanism of complex cyclization reaction and to produce useful triterpenes in bacterial hosts. To our surprise, OSC posess not only the ability to generate poly-cyclic ring system but also the ability to cleave the pre-formed rings to generate seco-type triterpenes. After the formation of the carbon skeleton by OSC, various tailoring steps are necessary to produce biologically active triterpenoids, such as oxidation and glycosylation. An attempt to clone the gene for these oxygenases and glycosyltransferases are now underway. Besides plants, some fungi are known to produce unique triterpenes. By analyzing the recently uncovered genome sequence of some fungi, we were able to identify the biosynthetic gene cluster for the fusidane type triterpene. This included not only OSC but also several oxygenases that are responsible for the tailoring steps.