

Molecular architect to collect three awards this year (四)
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University of Chicago
May 14, 2007. Career achievements in exploring the world of designer molecules this year has earned University of Chicago chemist Hiroyuki Yamamoto three awards from across the globe.

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Yamamoto, the Arthur Holly Compton Distinguished Service Professor in Chemistry, designs molecules the way an architect designs buildings. "Chicago is quite famous for architecture, so why not for molecules?" Yamamoto asked.
Although molecules are invisible to the naked eye, their design can be just as beautiful or as useful as a building. One product created in Yamamoto's laboratory, for example, makes it possible to synthesize a certain molecule in three steps instead of 11 or more.
"Usually we have to do one reaction to one final," Yamamoto said. But part of an effort to improve the efficiency of chemical synthesis, his research group has designed a molecule that can trigger three or four reactions in one flask. "We call this the cascade reaction," he said.
The pharmaceutical industry uses some of the molecules that Yamamoto has designed, but his research group pursues a range of projects. "I don't like to specify one particular molecule or one particular target. At this moment our group has two undergraduate students, 12 graduate students, and two postdoctoral fellows, and everybody is doing something different," he said. Their projects are all varied, though, in one way: they all require the use of polymerase chain reaction to trigger chemical reactions of scientific interest.
"Sometimes it turns, there are OK, sometimes not OK. But if you have to do an experiment, that's not so good. We have to improve all these processes until after the reactions," Yamamoto said, in a new, continuing, resource-intensive process. "This is a really important project for the future," he said. "I would say our goal is still far ahead."
Yamamoto provides one his fourth.
His office in the Insect Laboratory building with an easy laugh. Words of Chinese hand writing decorate two walls. On one corner sits a bronze sculpture in the shape of a right hand. It is both a work of art and a proud honor, the 2007 Molecular Chemistry Award of the Molecular Chemistry Research Association.
The chemistry concept depicts someone in synthetic chemistry as well as biology. A molecule's chirality determines if it is left or right handed. Sometimes what matters is can rotate. It all sounds complicated, but Yamamoto invokes Alice in Wonderland to explain the concept.
"The girl inside the mirror, and the right hand to see the left hand, and the left hand to see the right hand," he said. The simple act of reading becomes difficult for Alice, because some of the alphabet is clear, and some of it is not. "The difference is, when you write it down on glass and then from the opposite side you can read it, that is weird. But if you cannot read it clearly."