Unique method creates correct mirror image of molecule

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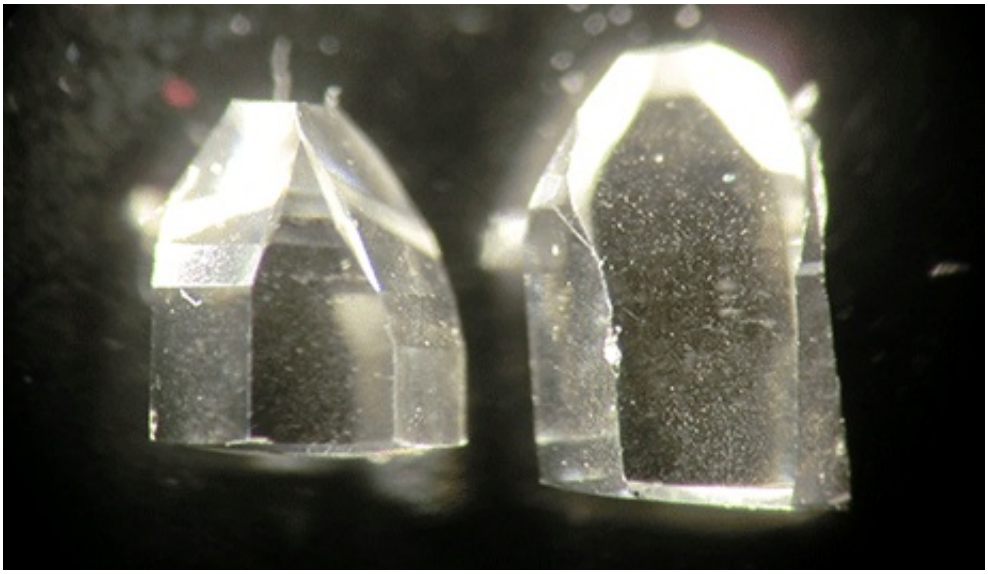

Researchers at the University of Gothenburg, Sweden, have been able to produce the one mirror image by using crystals with special properties. This can have a major impact on the production of pharmaceuticals. Credit: Susanne Olsson

Many molecules have a right and a left form, just like shoes. In pharmaceuticals, it is important that the correct form of the molecule is used. Researchers at the University of Gothenburg, Sweden, have been able to produce the one mirror image by using crystals with special properties. This can have a major impact on the production of pharmaceuticals.

Molecules that are the same, but mirror images are called chiral after the Greek word for hand.

The mirror image forms of chiral molecules have identical properties except when they interact with other chiral molecules, sort of like the left shoe fitting the left foot better than the right shoe.

Our bodies contain chiral molecules, such as amino acids in proteins and sugar molecules in our genetic material. But in all living organisms, only one of the two mirror image forms is used.

"Why it is like this is a mystery to the scientific community, but this is of major significance, to the production of pharmaceuticals for instance," says Susanne Olsson at the Department for Chemistry and Molecular Biology, University of Gothenburg.

The mirror images can have different effects in our bodies where one can provide the desired effect while the other in the worst case can give rise to serious side effects.

"Today, all new pharmaceuticals must contain only the mirror image form with the desired effect. But when a chiral molecule is produced in a laboratory, equal amounts of the two mirror images are obtained," says Susanne Olsson.

To-date, the active mirror image form has been produced by adding a mirror image form of another substance. The problem is then that this substance must be separated from the pharmaceutical.

Being able to produce the desired mirror image form without having to add mirror image forms of some other substances is considered by some chemists to be impossible.

"But by using compounds where the mirror image molecules switch between being the right form and the left form, I have succeeded in getting all crystals to contain only the one mirror image. I have thereby done the impossible, produced only the one mirror image form without using any other substance," says Susanne Olsson.

She believes that the method is industrially usable since crystallisation is a process that is good for large-scale production.

More information: gupea.ub.gu.se/handle/2077/32316

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