Chemistry prize reflects tailor-made reactions

Masters of the mirror image: this year's chemistry laureates, from left to right, Barry Sharpless, Ryoji Noyori and William Knowles.

David Adam, London

The ability to steer chemical reactions towards one of two possible symmetrical products is important for the industrial synthesis of many drugs. For three researchers behind the technique of 'catalytic asymmetric synthesis', it also means a Nobel prize for chemistry.

Half of this year's prize goes to K. Barry Sharpless of the Scripps Research Institute in La Jolla, California, for his work on oxidation reactions. The other half is shared by two researchers for their work on hydrogenation reactions: Ryoji Noyori of Nagoya University, Japan, and William

Knowles, a retired chemist who worked for Monsanto in St Louis, Missouri, until 1986.

The winners studied reactions that, under normal circumstances, produce an equal mixture of two products with symmetrical structures. Known as chiral products, these molecules are mirror images of each other, but can have very different properties. The side-effects of the morning-sickness drug thalidomide, for example, were caused by a rogue chiral twin of the molecule that the drug's designers had intended to use.

Sharpless, Noyori and Knowles have been awarded the prize for developing techniques that tailor reactions so that only one of

the two chiral molecules is produced. The techniques are now widely used in industry, particularly to make pure pharmaceuticals.

In 1968 Knowles discovered that, by using a chiral catalyst, he could tweak a hydrogenation reaction, in which hydrogen is added to organic molecules, so that it produced 15% more of one chiral product. His team went on to develop a method for industrial synthesis of the amino acid L-DOPA (3,4-dihydroxyphenylalanine), a chiral molecule that is used to treat Parkinson's disease.

Knowles's work was extended by Noyori, who developed further catalysts, some of which can hydrogenate many types of molecule. Reactions using his catalysts give very pure products and high yields, and are now widely used to manufacture large quantities of antibiotics.

Noyori's success is the second by a Japanese chemist in as many years — taking Japan a little way towards its government's stated, and occasionally ridiculed, objective of obtaining 30 Nobel prizes in the next 50 years (see *Nature* 413, 560–564; 2001).

"I'd be very happy if this Nobel could be useful in promoting basic science in Japan," says Noyori. "Japanese have won many international prizes in chemistry, and I'm happy that this strength is being acknowledged."

Sharpless developed chiral catalysts for oxidation reactions during the 1980s. One of these, which allows the asymmetric oxidation of a class of alcohols, is seen by many chemists as one of the most important discoveries made in the field of synthesis during the past few decades. One product, glycidol, is now used in the production of beta-blockers.

But some researchers are disappointed that Henri Kagan, a chemist at Paris-Sud University who also worked on asymmetric synthesis, missed out on the prize. Together with Sharpless and Noyori, Kagan won this year's Wolf Foundation Prize in chemistry, which is sometimes regarded as an indicator of future Nobel success.

Bid to end EU's transgenic impasse

Quirin Schiermeier, Munich

The European Commission is preparing to restart the approval process for commercial planting of genetically modified (GM) crops, a year before the existing *de facto* ban on such approvals expires.

Approvals stopped in October 1998, after public confidence in GM crops collapsed across Europe. Individual states can block new approvals, and the refusal of six nations — France, Italy, Greece, Denmark, Austria and Luxembourg — to cooperate in the granting of European Union (EU) licences brought the process to a halt. Only five GM crops — three varieties of maize (corn) and two of rape — are currently licensed by the EU, against a total of 53 approved worldwide.

The EU tried to end the impasse this February by adopting stricter and more transparent rules for the use of GM crops. These require biotech firms to carry out risk assessment and long-term surveillance of their crops' effects on human health and the environment (see *Nature* 409, 967–968; 2001). Further amendments on labelling and long-term traceability were added in July.

But this directive will only come into force

in October 2002. In a bid to resume approvals before then, commission officials plan to ask EU member states to approve new licences on the basis of voluntary commitments from the applicants, similar in scope to the compulsory ones featured in the directive.

If the new guidelines are agreed, the approval procedures could be resumed by the end of the year, says David Byrne, head of the commission's Health and Consumer Protection Directorate.

Member states backing the moratorium have reacted cautiously. "If the EU can guarantee the safety standards listed in the new directive, an early start is conceivable," says Alexander Haslberger, head of biotechnology at Austria's social-security ministry, which regulates the country's GM crops.

But even the new directive is unlikely to end Europe's fierce debate over the acceptability of GM crops. Environmental groups are still calling for a complete ban. Meanwhile, some US firms argue that the rules on labelling and risk assessment amount to trade restrictions, and have called for them to be challenged under World Trade Organization rules.