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A novel route for determining the stereochemistry of natural product diepomuricanin A

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Annonaceous acetogenins are a group of natural products that have been isolated from different species of the Annonaceae plant family. Uvaricin was the first Annonaceous acetogenin isolated (1982) from roots of Uvaria accuminata and was fully characterized. The great interest in acetogenins was initiated from the biological activity of uvaricin against P-388 lymphocytic leukemia in mice. This significant discovery led to the isolation of more than 450 acetogenins since 1982. Diepomuricanin A (syn and anti-forms), are bis-epoxy acetogenins and was isolated from the seeds, roots and stem barks of Annona muricata in 1992 by Cavé's group. Additionally, it has been isolated from the seeds of Rollina membranacea and leaves of Rollina and Ulei. Natural diepomuricanin A was later found to be a mixture of syn-diepomuricanin A (syn-1a) and anti-diepomuricanin A (anti-1b) in 1:1 ratio (Figure 1). However, the absolute stereochemistry remains undetermined. In order to identify the absolute stereochemistry of the natural product diepomuricanin A, we designed a synthetic route for the synthesis of the four possible stereoisomers (1a-d). We believed that HPLC comparison of the synthetic diastereoisomers with the natural product would then allow the stereoisomers of the natural product to be defined. The synthesis strategy involves synthesizing fragments (19S, 20S)-2 and (15R, 16R)-3 with their enantiomers (19R, 20R)-2 and (15S, 16S)-3 (Scheme 1).

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Chemical pollution and cancer

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Chemical pollution mainly refers to the pollution caused by agricultural chemicals, food additives, food packaging containers and industrial wastes; such as mercury, cadmium, lead, cyanide, organic phosphorus and other organic or inorganic compounds namely, environmental pollution caused by the entry of chemicals or chemical pollutants into the environment. These chemicals involve in organic and inorganic substances, most of which are artificially produced by human activities. It is shown that about 140 chemicals have a carcinogenic effect on animals; in particular, there are about 40 human carcinogens and suspected carcinogens. About 80-85% of human cancer cases are associated with chemical carcinogens. In this report, 12 important chemicals that can induce cancer, including formaldehyde, acetaldehyde, tetrachloroethylene, and propylene epoxide will be analyzed and summarized; in particular, eight emerging chemical pollutants with carcinogenic effects will be firstly expounded.

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