Research Progress and Synthesis Methods of Deuterated Drugs

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Abstract

Many drugs have adverse absorption, distribution, metabolism, and excretory (ADME) properties that prevent their widespread use or limit their use in some indications. In addition to preparation techniques and prodrug strategies, deuterium modification is a viable method for improving ADME properties. Deuteriated drugs have attracted increasing attention from the pharmaceutical industry in recent years. To date, two deuterated drugs have been approved by the FDA. In 2017, austedo was approved by the FDA as a new drug for huntington's disease in the United States, which is the first deuterium drug to be marketed in the world. Recently (June 9, 2021), donafinil is listed in China, this result has caused major pharmaceutical companies and the pharmaceutical industry to pay attention to deuterium technology again. In addition, BMS-986165, RT001, ALK-001, HC-1119, AVP-786 and other drugs are in phase III clinical studies, and some deuterium solid compounds have entered phase I and IIclinical trials. At present, deuterium strategy has been widely used in pharmaceutical research, and has become a hot spot in pharmaceutical research in recent years.In this paper, the research and development of deuterated drugs are reviewed, and the influence of deuterium modification on drugs, the advantages of deuterium strategies and the synthesis strategies of deuterated drugs are mainly introduced. Hope to provide reference for clinical application, discovery of new deuterium chemical entities and research and development of new deuterated drugs.

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