

PROTECTIVE GROUPS IN DRUG DISCOVERY

Vlasov S. V., Sharin M. P.

National University of Pharmacy, Kharkiv, Ukraine

sergiy.vlasov@gmail.com, foxard@inbox.ru

Introduction. Synthesis of the complex organic compounds is a multi-step process, where the different fictional groups of a molecule in the same conditions may react at the same time, which is mostly not desired. Therefore, the temporary blocking of some fictional groups, which may undergo the reactions performed for the other fictional groups of a compound is commonly used.

Aim. Systematization of the collected information about the functional groups used for synthesis of modern drugs, the methods of their protection methods; the methods of introduction together with the stability and methods for protective groups removal by chemical reactions were also analyzed.

Material and methods. The search engines of Google and the data of the specialized text-books and periodicals, the methods for the analysis the most valuable information selection and scientific induction method were applied for this study.

Results and discussion. Acetal protective group is used for protection of aldehydes and ketones from nucleophiles and bases, the acid catalyzed reaction of ethyle glycol with more electrophilic carbonyl group is the way for its introduction; deprotection is performed by acid catalyzed hydrolysis. TBDMS protects alcohols from nucleophiles; it is introduced in the presence of imidazole and removed by action of water solutions of fluorides. THP protects alcohols from strong bases, it is introduced by dihydropyran reaction with alcohols, and removed by acidic hydrolysis. ArOMe protects phenols form strong bases; for its introduction sodium hydride is used, deprotection is performed by action of HBr. Cbz-group protects amines form the action of electrophiles, it is introduced by action of benzyl chloroformate and removed by action of HBr or by hydrogenation. t-Boc is a group for protection of amines form nucleophiles, which is derived form Boc₂O anhydride; for the cleavage of this group water solution of HCl is applicable. The Fmoc is similar to Cbz but protects amines from nucleophiles; it is introduced fluorenylmethoxycarbonyl chloride and removed by the action of a base.

Conclusions. The protective groups are of the great importance for synthesis and developments of novel drugs. Application of the protective groups helps to block any unsuitable functional group, which presence complicates the synthetic steps. Protective groups enlarges the number of methods for effective drug discovery in laboratory and also in industrial conditions.