

SELENIUM HALIDES AS A SOURCE FOR THE SYNTHESIS OF NOVEL PHARMACOMODULATORS

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Selenium has attracted a great interest as an essential element and certain diseases have been eradicated by dietary supplementation of this element. Selenohalogenation of phenyl acetylene derivatives is the only general method for the preparation of benzo[*b*]selenophenes in one step from commercially available starting materials without using dry solvents and inert atmosphere. Despite all these advantages and the fact that this method is known for 40 years, the substrate scope is very limited and purification of reaction products in most cases is complicated. Therefore we have elaborated a new approach for selenohalogenation, which allows expanding the scope of substrates and significantly simplify purification of desired products. Moreover, for the first time selenohalogenation is applicable for the synthesis of selenopheno[3,2-*b*]- and -[2,3-*b*]thiophenes by cyclization of alkynylthiophenes. The treatment of substituted ethynylpyridines, -thiazoles and -imidazoles with Se_xHal_y leads to the formation of selenazolopyridinium, -thiazolium, and -imidazolium salts. Synthetic protocols based on 5-endo-*dig* cyclization were elaborated for the preparation of novel Se-, Te-substituted indolizinium, pyrroloimidazolium and pyrrolothiazolium salts. With the aim to develop new drugs for treatment of cancers we have elaborated convenient synthetic pathway for preparation of selenium analogues of Raloxifene and Chlopidogrel as a key step using cyclization of diarylalkyne under selenobromination conditions. Recently, we discovered a number of new selenium-containing compounds that display antimetastatic activity. The best compound prepared so far exhibits very low acute toxicity, yet it also possesses the ability to almost completely prevent carcinoma 4T1 (breast cancer model) metastases formation *in vivo*. Moreover, the same compound inhibits aggressive melanoma B16-F10 metastases administration into lungs by 82%. Remarkably, no side effects have been observed so far.