

Abstract

Much of science is based on the ideas and theories of chemistry, and one of its most foundational fields of study is organic chemistry. Organic synthesis has been at the forefront of discovery for numerous medicinal drugs and incredible materials that are essential for present day's lifestyle. Unfortunately, synthesis may entail much investment of time and money. Multi-step processes may drain much of this funding and therefore, reactions that yield desired products in a quick, cost-efficient fashion encourages the synthesis of complex molecules. One of the most time-consuming steps in synthesis is the isolation and purification of individual intermediates. Tandem reactions do not require these costly periods and allow chemists to synthesize organic molecules in one piece of glassware. Comins and his coworkers used tandem reactions in their synthesis of camptothecin (1). Our research goal was to see if tandem reaction schemes could be widely applicable for the synthesis of benzaldehyde derivatives. These derivatives all pertained to attaching of an additional functionality group at the ortho position. The strategy utilizes a directed metalation to target the desired benzaldehyde analogs. The beginning of their research started with phenyl lithium and formamide to form an α -amino alkoxide in situ. The theory was that the addition of butyllithium followed by the addition of an electrophile should lead to an ortho-substituted benzaldehyde. Compounds were synthesized under inert atmospheres, such as argon, and were performed in low temperatures. The products were then purified by radial preparative layer chromatography. Identification of compound was completed by infra-red (IR) spectroscopy followed by nuclear magnetic resonance (NMR) spectroscopy. Known compounds were first sought after due to the ease of structure determination; however, future studies will focus on innovative structures.

1. **Comins DL, Baevsky MF, and Hong H.** A 10-Step, Asymmetric-Synthesis of (S)-Camptothecin. *Journal of the American Chemical Society* 114: 10971-10972, 1992.