Abstract

The effort to find a cure for cancer is a big topic nowadays. Some types of cancer cells contain more iron than healthy cells. Iron is a biogenic element that is important for cell proliferation and growth. Since the main site of iron metabolism is in the mitochondria, one way to induce cell death in cancer cells is to reduce the bioavailability of iron in the mitochondria. There are several currently registered therapeutics, some of which contain a hydroxypyridone group as an iron chelating unit, but none of the drugs in use are designed to target the mitochondria. For the chelating unit able to bind iron localized in the mitochondria, it needs to cross the outer and inner membranes of the mitochondria, which can be achieved by coupling the chelating unit with the triphenylphosphonium cation, which is a known membrane transporter, via a lipophilic chain. Triphenylphosphonium should be able to transport the hydrophilic chelating unit into the mitochondria due to its positive charge. The chelator will complex the ferric cations, thereby reducing their availability for other biochemical processes.

In this work, two hydroxypyridone derivatives were prepared differing in the length of the spacer between the chelating unit and triphenylphosphine cation.

Keywords

Iron-binding ligands, mitochondrial membrane, cancer cells, phosphonium salts, hydroxypyridones