MASTER'S THESIS

Luminescent bioprobes for imaging and inhibition of tumour cells

Xie, Chen

Date of Award:
2017

Abstract

On the purpose of designing a novel generation of luminescent bioprobes for imaging and inhibition of tumour cells, a series of lanthanide-ruthenium complexes has been synthesized and characterized by ^{1}H NMR, ^{13}C NMR, absorption/emission spectroscopy, high-performance liquid chromatography, and mass spectroscopy. Those complexes are qualified to be considered as photo-activatable anticancer prodrugs which consist of a ruthenium (II) complex linked to a lanthanide-based cyclen chelate via a π-conjugated bridge. Comprehensive studies have been performed to evaluate their efficacy as pro-drugs which requires *in cellulo* activity, inhibiting ability, instant monitoring possibility, and safety to normal cells. The resulting complexes are proved to be promising agents for controllable anticancer therapy because the prodrug remains inactive in dark and the release of the active drug is induced by visible light. Drug delivery process can be quantitatively monitored by either the long-lived red europium emission under one- or two-photon excitation or potentially by magnetic resonance imaging signals. Besides of these, the correlation among the drug releasing amount, signaling emission intensity, and mass spectroscopy response, has been proposed for quick and simple quantitative analysis.

Table of Contents