CHAPTER 1

INTRODUCTION

Cancer is a worldwide known disease that affects anyone regardless of their gender or age. It is a disease state where the cells in one part of the body are continuously and abnormally growing that can then invade other nearby healthy cells. Cancer has become one of the most common causes for morbidity and mortality (Stewart & Wild, 2014). According to the World Health Organization International Agency for Research on Cancer (IARC) (2018), it was estimated that there were 18.1 million incidences worldwide in 2018 and predicted to be 29.5 million by the year 2040; while there were approximately 9.6 million cancer mortality in 2018 and predicted to be 16.4 million by the year 2040. In Indonesia, the data of cancer prevalence from Basic Health Research (2018) was 21,600 out of 1.2 million people, that is about 1.8 in 100 people. The most common cases found in Indonesia, based on the Globocan 2018 data, are breast, cervical, lung, liver, and nasopharynx cancer. These types of cancers also have a high mortality rate in Indonesia. Lifestyle, environmental, and behavioral exposure, such as smoking and drinking, are risk factors to most cancers. Unhealthy lifestyles such as tobacco smoking, alcohol consumption, and diets are some factors that can be prevented. Other factors such as infections, hormonal, occupational, radiation, and pollution are also associated with cancers (Stewart & Wild, 2014).

There are many types of treatment available for cancer patients. The aim is to cure the disease, prolonging patients' life, and to improve the quality of life for the patients. Although the treatment for cancer might differ from one type of cancer to another, surgery, radiotherapy, chemotherapy, and hormone therapy are treatments that are most commonly done for cancer patients (World Health Organization, 2008). However, the cost of those therapies is very high. According to ASEAN Cost in Oncology (ACTION) data study in 2016, more than 70 percent of cancer patients in Indonesia experienced financial burden in twelve

months after the patient is diagnosed with cancer. Furthermore, some reasons such as: 1) several failure yet expensive cases of conventional cancer therapy, 2) several successful cases of herbal medicine therapy, and 3) a variety of herbal medicines available in Indonesia, are what causes cancer patients to seek herbal therapy (Hasanah & Widowati, 2016). Hence, a cheaper and more effective alternative for cancer treatment is needed; and herbal medicine, especially *Typhonium flagelliforme,* is one of the potential treatments to be investigated for cancer.

Keladi Tikus or Rodent Tuber in English (*Typhonium flagelliforme*) is a taro-like plant that can be found in Malaysia, South Korea, and Indonesia. In Indonesia, *T. flagelliforme* is spread along Java island, Kalimantan, Sumatera, and Papua. This plant grows up to 30 cm tall, with round and notched tip leaves (Harfia, 2006). There has been a lot of research about *T. flagelliforme* in various cancer cells, and a lot from those research has shown that *T. flagelliforme* possessed anticancer activity (Cutler, Stephen & Cutler, 2000), acted as an antioxidant that potentially inhibit the proliferation of tumor cells (Tietbohl *et al*., 2017) and triggered apoptosis of the cell (Da'i, Fiveri & Meiyanto, 2007). The bioactive compounds found in *T. flagelliforme* are alkaloids, saponins, steroids, glycosides, hexadecanoic acid, and oleic acid; however, the specific active substance that is responsible for its activity against cancer is still unknown (Syahid & Kristina, 2007; Lai *et al*., 2010).

Previous studies on the anticancer activity of *T. flagelliforme* shows that *T. flagelliforme* is a potential candidate as alternative medicine for Indonesian cancer patients. Therefore, this review aims to systematically evaluate the scientific evidence for anticancer activities of *T. flagelliforme*.