

## 1. Introduction

### 1.1 Background

Cancer is one of the world's primary health issues which has been known as the second leading cause of death globally after cardiovascular diseases (WHO, 2018). Therefore, developing cancer treatment is challenging since many factors can cause cancer such as lifestyle, epigenetic or genetic mutation. Also, the cancer cells have heterogeneity characteristic, which means the bulk tumor can contain a complex collection of cells carrying distinct molecular signatures with differential degrees of sensitivity to treatment that makes it more difficult to be handled (Fentahun Darge et al., 2020). Chemotherapy is widely used to treat cancer since it can target cells with high replication rates, such as cancer cells and inhibit its replication. However, chemotherapy drugs are non-specific drugs that can also affect healthy cells with high replication rates, such as bone marrow, hair follicle, and GI tract mucosa (Nurgali, Jagoe & Abalo, 2018).–

To overcome this challenge, the researchers that work on cancer treatment development have put their interest in medicinal plants for their anticancer potential, since it may have lower side effects compared with chemotherapy and conventional cancer drugs (Arpita et al., 2017). Papua is one of the regions in Indonesia that is rich for its biodiversity. One of the plants that have been used for medicinal purposes is *Laportea. sp* or locally known as daun gatal. This plant has been used as traditional medicine as an anti-fatigue and anti-stiff. In Papua there are five species that have been identified, there are *Laportea aestuans*, *Laportea decumana*, *Laportea sinuata*, *Laportea interrupta*, *Dendrocnide peltata* and *Laportea sp* (Simaremare et al., 2018). In this experiment, *L. decumana* is extracted and used as the sample. A study conducted by Simaremare et al., (2014), which uses ethanol as the solvent for extraction, showed that *L. decumana* contains alkaloid, glycoside, and steroid/triterpenoid and negative for flavonoid, saponin, and tannin. All

of those compounds have been studied for their anti-cancer potential. Most of the studies about *L. decumana* using ethanol and methanol as the solvent for extraction. Therefore, in this study, a non-polar solvent (hexane) was used to extract the compounds from *L. decumana* that might have potential for anti-cancer treatment.

To analyse the phytochemical compounds that might be present in the extract, several phytochemical tests were conducted. To assess the viability of the cell, the MTT assay was conducted in cancerous cells (HeLa) and Observing the viability of the cell after the treatment is important to assess if sample molecules affect cell proliferation or have direct cytotoxic effects that ultimately contribute to cell death.

## **1.2 Research Objective**

The primary objective of this study is to analyse the compounds with anti-cancer properties in the hexane extract of daun gatal (*Laportea decumana*) and investigate the effect of the extract on HeLa cells.

## **1.3 Research Scope**

Method that would be used to pursue the objectives include:

- Extraction of *Laportea decumana*
- Phytochemical test
- MTT Assay