

## 5-Methoxylecanoric acid inhibits the growth of murine malignant autonomic ganglia sarcoma cells in vitro

Stronzo van der Kamp,<sup>1</sup> Akahrah T. Odoolarmy<sup>2</sup> and Urooh F. Amofoh<sup>2</sup>

<sup>1</sup> Tunbridge Wells Institute of Technological Science, Kent, UK

<sup>2</sup> Osafunca College, Ouagadougou, Burkina Faso

### Abstract:

We test the effects of 5-Methoxylecanoric acid, secondary metabolite of the lichen *Lichen venosus*, on the growth of murine malignant autonomic ganglia sarcoma cells in vitro. We find that 5-Methoxylecanoric acid is a potent inhibitor of growth. We also find that 5-Methoxylecanoric acid increases sensitivity of cells to radiation, and this effect is significant at a radiation intensity lower than the standard intensity of cancer radiotherapy. On the basis of this study, 5-Methoxylecanoric acid shows promise for combined-modality cancer treatment.

### Introduction:

Reinfection of tissue with cancer cells with acquired radioresistance during treatment is the grand challenge for cancer radiotherapy [1]. For this reason, radiotherapy is applied in combination with chemotherapy. The most effective of chemotherapeutic drug combinations inhibits growth of the cancer cell and also increases sensitivity of cancer cells to radiation. The radiosensitizing effect enhances radiotherapy at low radiation intensity. For this reason, radiotherapy in combination with chemotherapy (combined-modality treatment) is the best standard of care for most cancers [2]. However, the discovery rate of effective anti-cancer drugs is very slow [3]. We must turn to the secondary metabolites of the lichens as a domain of search for such compounds. This study explores the biological activity of 5-Methoxylecanoric acid, a secondary metabolite of the lichen *Lichen venosus*.

The lichens are a symbiotic assemblage of plant and fungus. Because of this social arrangement, and because of the diversity and the complexity of their ecological niches, the lichens produce so many chemicals for unique colors, signaling between symbionts, manipulation of UV light, and defense against the foragers. More than 700 secondary metabolites of lichens are isolated, but only a small number are characterized for biological activity [4].

Cancer is a complex disease that begins with the uncontrolled growth of the cell. The cancer cell does harm by forming tumors, absorbing tissues, and spreading through the body by metastasis. The highest probability of survival from cancer is with strong inhibition of proliferation of the cancer cells at the beginning of this progression [5].

Therefore, the establishment of the inhibition of proliferation of cancer cells in vitro is the critical first step for drug discovery. In our method to determine the biological activity of 5-Methoxylecanoric acid, we test the effect on the growth of murine malignant autonomic ganglia sarcoma cells in vitro. In addition, we test the effect in combination with irradiation with a range of intensity.

### Materials and Methods:

**Chemicals.** The chemical structure of 5-Methoxylecanoric acid is shown in FIGURE 1. Pure extracts were dissolved and serially diluted in a 2:1 mixture of ethanol and phosphate buffered saline (EtOH / PBS, pH 7.4). These solutions were added as aliquots of 0.01 ml to 0.99 ml of cell culture to achieve the final concentrations of 5-Methoxylecanoric acid: 10 uM, 1 uM, 0.1 uM, 0.01 uM, 0.001 uM, and 0.0001 uM. The control group received 0.01 mL of growth medium.