Cytotoxic, Anti-inflammatory and Adipogenic Effects of Selected Flavonoids on Cell Lines

Muhammad Taher bin Bakhtiar1, Amnani binti Aminuddin2

1Department of Pharmaceutical Technology, Faculty of Pharmacy, International Islamic University Malaysia
2Department of Biomedical Science, Faculty of Science, International Islamic University Malaysia

Introduction
In this research study, the selected natural-occurring flavonoids which are inophyll D, calanone, and isocordata oblongic acid from Calophyllum symingtonianum as well as morelloflavone from Garcinia prainiana have been chosen to be studied for their bioactivities that may provide potential therapeutic value to the human being. Several in vitro effects of these selected compounds which have been studied were cytotoxic effects against MCF 7 human breast cancer cells, anti-inflammatory activity on RAW 264.7 macrophages and adipogenic effects on 3T3-L1 pre-adipocytes. It was expected that the finding of this study may provide significant implication in the discovery of the potential new alternative therapeutic approaches on many current dreaded diseases, such as cancers, diabetes and inflammatory diseases. Positive results were highly anticipated since flavonoids are widely known for their various biological activities that may provide therapeutic benefits to human being such as anti-inflammatory, anti-oxidant, anti-tumor and anti-bacterial properties (Harborne & Williams, 2000).

Objectives
1. To evaluate cytotoxic activity of selected flavonoids against MCF 7 human breast cancer cells.
2. To evaluate anti-inflammatory effects of selected flavonoids on RAW 264.7 macrophages.
3. To evaluate adipogenic effects of selected flavonoids on 3T3-L1 pre-adipocytes.

Methodology

<table>
<thead>
<tr>
<th>Sample Preparation</th>
<th>Cell Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytotoxicity Study on MCF 7 Human Breast Cancer</td>
<td>Anti-Inflammatory Study on RAW 264.7 Macrophage</td>
</tr>
<tr>
<td>MT assay</td>
<td>MTT assay</td>
</tr>
<tr>
<td>Nitrile Determination test</td>
<td>Adipocyte Differentiation on 3T3-L1 Pre-adipocyte</td>
</tr>
<tr>
<td>MTT assay</td>
<td>MTT assay</td>
</tr>
<tr>
<td>Adipocyte Differentiation</td>
<td>Qualitative Analysis</td>
</tr>
<tr>
<td>Statistical Analysis</td>
<td>Quantitative Analysis</td>
</tr>
</tbody>
</table>

Conclusion
Inophyll D was the only compound that exhibited significant cytotoxic effect against MCF 7 human breast cancer with IC50 of 84 µg/mL. Further, calanone exhibited the most potential anti-inflammatory effect which then followed by morelloflavone, isocordata oblongic acid and inophyll D successively. Last but not least, all the selected flavonoids exhibited enhanced adipogenic effects on 3T3-L1 pre-adipocytes.

Results

Cytotoxic Effects on MCF 7 Human Breast Cancer

Anti-Inflammatory Effects on RAW 264.7 Macrophage

Adipogenic Effects on 3T3-L1 Pre-adipocyte

References