Apoptosis Event in Hela Cells Treated with Cisplatin, Gallic Acid and Combination of Both

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Abstract

Adverse effect of conventional chemotherapeutic agent using single anticancer drugs had led to application of combination therapy in cancer treatments. Combination of polyphenolic compounds and anticancer agent was studied and shown promising outcomes in vitro. In cancer treatment, mode of cell death through apoptosis is one of the targeted approaches in many preclinical drug development studies and has been identified as a key mechanism of chemotherapy-induced cell death.

Hence, this study was conducted to evaluate the apoptosis event of HeLa cells treated with gallic acid (GA) combined with cisplatin (CIS). HeLa cells were treated for 24, 48 and 72 hours with CIS and GA at IC₅₀ (Table 1) concentrations, and the combination of CIS and GA (CIS– GA) was chosen based on a previous study (66.73 percent cell inhibition [1]). To compare the anticancer effects of cisplatin and gallic acid individually and in-combination on apoptosis in HeLa cells, flow cytometry assay was carried out.

Table 1: IC 50 concentrations of CIS, GA, and combination of both

<table>
<thead>
<tr>
<th>Compound</th>
<th>Concentration</th>
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</thead>
<tbody>
<tr>
<td>CIS (IC₅₀)</td>
<td>8.04 μg/ml</td>
</tr>
<tr>
<td>GA (IC₅₀)</td>
<td>13.44 μg/ml</td>
</tr>
<tr>
<td>Combination (CIS–GA)</td>
<td>0.51 μg/ml</td>
</tr>
<tr>
<td>CIS</td>
<td>0.51 μg/ml</td>
</tr>
<tr>
<td>GA</td>
<td>13.44 μg/ml</td>
</tr>
</tbody>
</table>

According to the findings, during every incubation period, the CIS–GA combination treatment group consistently showed the highest level of antiproliferative activity in HeLa cells, followed by the CIS and GA treatment group. CIS and GA combined treatment response was time-dependent, with an increase in apoptotic cells as incubation time increase (Figure 1). At 72 hours, the combination of CIS and GA treatment showed a significant improvement (74.6%), and improvements were also shown after 24 and 48 hours (56 percent and 60.2 percent).
Figure 1: Percentage of apoptosis in HeLa cells treated with GA, CIS, and combination of both.

Taken together, these findings suggest that combination therapy enhances the cell death magnitude in HeLa cells. Additionally, these findings have positive implications for the use of a combination therapy approach in cancer treatment.

Keywords
Apoptosis, Hela Cells, Combination Treatment

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References