Inhibiting effects of *Panax notoginseng* extracts on proliferation of GES-1 cells and MNNG-transformed GES-1 cells

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**ABSTRACT** Objective: Through cell cultivation, we studied the inhibiting effects of the serum dog fed with *Panax notoginseng* extracts on precancerous gastric cells, trying to find the best time points or periods when the extracts’ function was the strongest after administration of the extracts to the dog. Methods: The experiments adopted externalized human gastric mucosa epithelium GES-1 cells and MC cells gained from GES-1 cells transformed by N-methyl-N’-nitro-N-nitroso-guanidine (MNNG) as the model of precancerous lesions for study in vitro. We took the serum of a dog before and at different points of time after feeding the dog with *Panax notoginseng* extracts for experiment. By means of MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay, we examined the inhibiting effects of the serum after culturing the GES-1 and MC cells for 72 hours with different concentration (8%, 4%, 2%) of medicated serum obtained from the dog at different points of time, so as to find that, at which points of time the medicated serum obtained, it would be the most effective. Results: The results showed that the GES-1 and MC cells inhibition rates of medicated serum from the points of 2-hour and 6-hour were the highest, and the culture medium containing 8% of medicated serum from these two points had prominent inhibiting effects on both kinds of cells. The GES-1 cells inhibition rate in culture medium containing 8% of medicated serum from the point of 2-hour was 70.8% (P < 0.01) and that of the MC cells was 45.3% (P < 0.01). The GES-1 cells inhibition rate in culture medium containing 8% of medicated serum from the point of 6-hour was 88.5% (P < 0.01) and that of the MC cells was 42.4% (P < 0.01). Conclusion: The points of time with the strongest inhibiting effects are 2 hours and 6 hours after being fed with *Panax notoginseng* extracts. At these two points, the serum is most effective in inhibiting the proliferation of GES-1 and MC cells.

**KEY WORDS** *Panax notoginseng*; gastric cancer; cell culture; animals, laboratory
### 实验方法

#### 1. 实验材料

- **细胞**：胃癌前细胞系GES-1、MC
- **培养基**：基本培养基、完全培养基
- **药物**：三七提取物由北京中医药大学中药研究所制备
- **试剂**：四甲基固氮唑盐(MTT)
- **血清**：Gibco公司提供

#### 2. 仪器

- **流式细胞仪**
- **酶标仪**
- **显微镜**

#### 3. MTT实验

- **操作**：每孔加20μl不含药血清的含药培养基
- **结果**：观察细胞增殖抑制情况

#### 4. 检测指标

- **MTT**
- **OD值**

#### 5. 统计学方法

- **数据**：采用SPSS软件进行统计学分析
- **参数**：采用t检验

### 结果

- **结果**：三七提取物对胃癌前细胞的抑制作用
- **结论**：三七提取物对胃癌前细胞有显著的抑制作用

### 讨论

- **背景**：胃癌前病变的治疗
- **研究**：制备三七水提物
- **结果**：观察细胞增殖抑制情况

### 结论

- **结论**：三七提取物对胃癌前细胞有显著的抑制作用
- **展望**：进一步研究三七提取物的机理

### 参考文献

- **文献**：[1][2][3]
GES-1 cells cultivated for 72 hours in culture medium containing normal serum

Fig 1: GES-1 cells cultivated for 72 hours in culture medium containing normal serum (×200)

Fig 2: GES-1 cells cultivated for 72 hours in culture medium containing 4% of medicated serum from the point of 2-hour (×100)

Tab 1: Inhibiting effects of medicated serum on GES-1 cells

<table>
<thead>
<tr>
<th>Time point after administration</th>
<th>Percentage of serum</th>
<th>Inhibiting rate in culture medium containing different concentration of serum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before administration of extracts to the dog</td>
<td>8% of serum</td>
<td>4% of serum</td>
</tr>
<tr>
<td>7</td>
<td>21</td>
<td>±7.0</td>
</tr>
<tr>
<td>7</td>
<td>28</td>
<td>5.3±3.6</td>
</tr>
<tr>
<td>7</td>
<td>39</td>
<td>3±1.7</td>
</tr>
<tr>
<td>7</td>
<td>33</td>
<td>4±10.2</td>
</tr>
<tr>
<td>7</td>
<td>54</td>
<td>5±3.0</td>
</tr>
<tr>
<td>7</td>
<td>70</td>
<td>8±3.0</td>
</tr>
<tr>
<td>7</td>
<td>55</td>
<td>1±3.7</td>
</tr>
<tr>
<td>7</td>
<td>52</td>
<td>3±2.9</td>
</tr>
<tr>
<td>7</td>
<td>79</td>
<td>4±3.2</td>
</tr>
<tr>
<td>7</td>
<td>88</td>
<td>5±1.5</td>
</tr>
<tr>
<td>7</td>
<td>43</td>
<td>6±6.9</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
<td>1±7.3</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>3±4.8</td>
</tr>
<tr>
<td>7</td>
<td>36</td>
<td>5±12.1</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>7±4.8</td>
</tr>
<tr>
<td>7</td>
<td>14</td>
<td>0±4.3</td>
</tr>
</tbody>
</table>

* P < 0.05, ** P < 0.01, vs before administration of extracts to the dog
Fig 3  MC cells cultivated for 72 hours in culture medium containing normal serum (×100)

Fig 4  MC cells cultivated for 72 hours in culture medium containing 4% of medicated serum from the point of 2-hour (×100)

Tab 2  Inhibiting effects of medicated serum on MC cells

<table>
<thead>
<tr>
<th>Time point serum obtained from the dog</th>
<th>n</th>
<th>8% of serum</th>
<th>4% of serum</th>
<th>2% of serum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before administration of extracts to the dog</td>
<td>7</td>
<td>13.6±5.0</td>
<td>3.6±4.1</td>
<td>0.23±0.15</td>
</tr>
<tr>
<td>5 min after administration</td>
<td>7</td>
<td>16.8±2.9</td>
<td>8.4±5.5</td>
<td>0.24±0.4</td>
</tr>
<tr>
<td>10 min after administration</td>
<td>7</td>
<td>21.6±3.0</td>
<td>9.6±9.7</td>
<td>0.17±8.5</td>
</tr>
<tr>
<td>30 min after administration</td>
<td>7</td>
<td>14.2±8.2</td>
<td>13.5±10.5</td>
<td>0.16±8.6</td>
</tr>
<tr>
<td>1 h after administration</td>
<td>7</td>
<td>36.9±24.0</td>
<td>1.2±7.1</td>
<td>0.75±4.5</td>
</tr>
<tr>
<td>2 h after administration</td>
<td>7</td>
<td>45.3±4.4</td>
<td>8.6±4.4</td>
<td>0.13±7.2</td>
</tr>
<tr>
<td>3 h after administration</td>
<td>7</td>
<td>26.9±4.1</td>
<td>2.3±4.2</td>
<td>0.70±4.3</td>
</tr>
<tr>
<td>4 h after administration</td>
<td>7</td>
<td>28.8±3.7</td>
<td>8.2±3.0</td>
<td>0.12±4.4</td>
</tr>
<tr>
<td>5 h after administration</td>
<td>7</td>
<td>23.9±7.6</td>
<td>5.3±10.9</td>
<td>0.55±8.5</td>
</tr>
<tr>
<td>6 h after administration</td>
<td>7</td>
<td>42.4±3.0</td>
<td>4.6±4.6</td>
<td>0.63±5.9</td>
</tr>
<tr>
<td>8 h after administration</td>
<td>7</td>
<td>41.4±3.6</td>
<td>7.4±6.0</td>
<td>0.01±1.9</td>
</tr>
<tr>
<td>10 h after administration</td>
<td>7</td>
<td>41.8±1.8</td>
<td>8.5±7.9</td>
<td>0.31±5.3</td>
</tr>
<tr>
<td>12 h after administration</td>
<td>7</td>
<td>30.5±4.1</td>
<td>13.4±5.8</td>
<td>0.19±2.3</td>
</tr>
<tr>
<td>14 h after administration</td>
<td>7</td>
<td>29.8±5.3</td>
<td>14.9±4.0</td>
<td>0.21±4.8</td>
</tr>
<tr>
<td>16 h after administration</td>
<td>7</td>
<td>25.5±7.3</td>
<td>22.3±2.8</td>
<td>0.11±5.3</td>
</tr>
<tr>
<td>20 h after administration</td>
<td>7</td>
<td>20.3±6.8</td>
<td>12.0±7.6</td>
<td>0.10±3.7</td>
</tr>
</tbody>
</table>

* P < 0.05, ** P < 0.01, vs before administration of extracts to the dog.

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GES-1

SV-40

MNNG

MTT

GES-1 MC

MC
cell

MC
cell
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