Effects of tetrandrine on vascular permeability and neutrophil function in acute inflammation

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Abstract The effects of tetrandrine (Tet) on vascular permeability and neutrophil (Neu) functions in carrageenin induced subcutaneous air pouch inflammation in rats were studied. It was found that the vascular permeability, Neu emigration, β-glucuronidase (β-G) release, and superoxide anion (O₂⁻) generation were increased in the carrageenin induced inflammation. The vascular permeability, Neu emigration, β-G release, and O₂⁻ generation were suppressed by Tet ip (20, 40, 100 mg/kg), but the intracellular superoxide dismutase (SOD) activity and the cAMP level in Neu were increased by the same dose of Tet. The results indicate that Tet inhibits prostaglandin synthesis and scavenges free radicals. The mechanism of the inhibitory effects of Tet on Neu functions may be related to the increases in SOD activity and cAMP levels in Neu.

Key words tetrandrine, anti-inflammatory agents; carrageenan; inflammation; neutrophils; adenosine cyclic monophosphate; capillary permeability; superoxide dismutase

Materials
Wistar rats were obtained from laboratory animals. Tet (tetrandrine) was obtained from Guangdong Experimental Animals Institute. β-glucuronidase (β-G) was obtained from calf intestine mucosa. SOD was obtained from Sigma Chemical Co. No other reagents were used.

Methods and results

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对血流通透性的影响
角叉菜胶致炎前5-10 min iv Evans蓝 20 mg/kg，致炎6 h后，用5 ml HBBS 浸洗几次，灌注经1800 g离心10 min后，用分光光度法测定分光光度。

<table>
<thead>
<tr>
<th>Parameter</th>
<th>NS</th>
<th>Carragenin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evans blue (ng/ml)</td>
<td>62 ± 17</td>
<td>109 ± 21**</td>
</tr>
<tr>
<td>Neu (10 µl)</td>
<td>5.3 ± 2.6</td>
<td>10.9 ± 2.5**</td>
</tr>
<tr>
<td>β-G (U)</td>
<td>590 ± 37</td>
<td>1380 ± 26*</td>
</tr>
<tr>
<td>O2（mol/ml）</td>
<td>14.1 ± 1.7</td>
<td>14.1 ± 1.6*</td>
</tr>
<tr>
<td>SOD (U/mg protein)</td>
<td>0.6 ± 0.3</td>
<td>0.7 ± 0.2*</td>
</tr>
</tbody>
</table>

Tab 2. Effects of ITP and deferoxamine on vascular permeability, neu emigration, β-G leakage, O2 generation, intracellular SOD activity and cAMP level in Neu in carragenin-induced inflammatory air pouch in rats, n = 10. X ± SD, **P < 0.05, *P < 0.05, vs NS.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>NS</th>
<th>10 µl 0.2%</th>
<th>0.05%</th>
<th>0.01%</th>
<th>0.005%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evans blue (ng/ml)</td>
<td>119 ± 31</td>
<td>46.9 ± 5**</td>
<td>31.0 ± 2*</td>
<td>67.10 ± 10**</td>
<td>53.10 ± 5**</td>
</tr>
<tr>
<td>Neu (10 µl)</td>
<td>7.3 ± 2.2</td>
<td>2.2 ± 0.1*</td>
<td>3.3 ± 0.1**</td>
<td>3.7 ± 1.2**</td>
<td>3.8 ± 1.2**</td>
</tr>
<tr>
<td>O2（mol/ml）</td>
<td>11.6 ± 1.7</td>
<td>8.2 ± 1.2</td>
<td>9.6 ± 1.1**</td>
<td>6.3 ± 1.1**</td>
<td>4.0 ± 1.1**</td>
</tr>
<tr>
<td>SOD (U/mg protein)</td>
<td>12.5 ± 5.2</td>
<td>10.0 ± 2.1*</td>
<td>10.2 ± 1.5**</td>
<td>15.2 ± 1.5**</td>
<td>16.2 ± 2.5**</td>
</tr>
<tr>
<td>cAMP (pmol/10 cell)</td>
<td>0.6 ± 0.1</td>
<td>1.0 ± 0.3*</td>
<td>0.7 ± 0.2**</td>
<td>0.8 ± 0.2**</td>
<td>0.9 ± 0.3**</td>
</tr>
</tbody>
</table>
Dissertation

Tetanus is caused by the bacteria Clostridium tetani, which produces a powerful neurotoxin known as tetanospasmin. The toxin binds to specific receptors on motor neurons, causing them to hyperexcitability and leading to spastic paralysis.

References


