Study of The Antioxidant Quercetin as Pulpotomy Dressing Agent

---Toxicity of Quercetin---

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[Purpose]
Controversy about calcium hydroxide ([Ca(OH)₂] and formocresol(PC) used in pulpotomy was reported, therefore other agents should be developed to be instead of them. The mechanism of inflammatory response resulted from active oxygen has been proved. The inflammatory response resulted from physical trauma and bacteria in pulpotomy procedures can make WBC produce active oxygen to kill bacteria, but excess active oxygen will damage normal pulp tissues. To eliminate excess active oxygen, the antioxidants such as quercetin, α-tocopherol, ascorbate were considered. What concentration of these antioxidants could be safe to be used in pulpotomy have not been reported, so we propose this study of cell toxicity of these antioxidants.

[Materials & Methods]
Different concentrations of quercetin(1μM-100μM), α-tocopherol(1μM-100μM) and ascorbate (10μM-1mM) were used to be experimental groups, and similar concentrations of ethanol and distilled water were matched as control groups. Toxicity of different concentrations of quercetin, α-tocopherol and ascorbate were evaluated by cell culture of cell lines (V79 and 3T3).

[Results and Discussion]
The more concentration the more toxicity of quercetin was noted. Quercetin was dissolved by ethanol to be tested, toxicity of ethanol was also tested as negative control groups. Cell growth was inhibited by 100, 10 μM of quercetin after 24, 36, 60 hour-culture, but not by ethanol below 1000 fold dilution. The more concentration the more toxicity of α-tocopherol except 1μM was noted. α-tocopherol was also dissolved by ethanol to be tested, toxicity of ethanol was also tested as negative control groups. Cell growth was inhibited by 100, 10μM of α-tocopherol after 36, 48 hour-culture, but not by ethanol below 1000 fold dilution. The more concentration of ascorbate except 10mM the more promotion of cell growth was noted. Ascorbate was dissolved by distilled water to be tested, toxicity of distilled water was also tested as negative control groups. But no toxic reaction appeared. According to the data above we obtain the conclusion below

1. The concentration of quercetin being used as pulpotomy dressing agent should be less than 100μM at least.
2. The concentration of α-tocopherol being used as pulpotomy dressing agent should be less than 10μM at least.
3. The concentration of ascorbate being used as pulpotomy dressing agent should be more than 1mM at least.

[Reference]
2) 大柳善彦：活性酸素と病気．化学同人，京都 1989，51-63
5) 佐田安博：小児歯誌 23:26-32, 1985
6) 伊藤由恭：小児歯誌 28:854-863, 1980