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Gallic acid reduces cell viability, proliferation, invasion and angiogenesis in oral squamous cell carcinoma

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Introduction: Gallic acid (GA) is a trihydroxybenzoic acid present in plants worldwide. Gallic acid has been shown to have cytotoxic effects in certain cancer cells, without damaging normal cells. The objective of the present study was to determine whether gallic acid is able to inhibit oral squamous cell carcinoma cell viability, proliferation and invasion and suppress cell-mediated angiogenesis. Treatment of oral squamous cell carcinoma (SCC9 and SCC4) with gallic acid decreased cell viability in a dose-dependent manner.

Methods and Results: We first confirmed that GA decreases proliferation, invasion and migration in squamous cell carcinoma lines. Next, SCC-9 and SCC-4 cells were incubated in a well humidified incubator with 5% CO₂ and 95% air at 37 °C (normoxic conditions). For hypoxic cultures, cells were incubated 150 μM CoCl₂ for 24 hours and maintained in a 5% CO₂ atmosphere at 37 °C. Then, we divided cells into 4 groups including control, CoCl₂, GA (10 μg/mL) and CoCl₂ + GA (10 μg/mL). Col1A1 mRNA was decreased in hypoxic cells after treatment with GA. Besides, GA increased HIF-1α and e-cadherin mRNA levels. In conclusion, our current findings suggest that GA increased HIF-1α and e-cadherin mRNA levels, and decreased Col1A1 mRNA levels. In addition, we found that the GA inhibit oral cancer cell migration, proliferation and invasion.

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