Osteoprotegerin (OPG) binds with Tumor Necrosis Factor-Related Apoptosis-Inducing Ligand (TRAIL): Suppression of TRAIL-induced apoptosis in ameloblastomas

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Summary

Osteoprotegerin (OPG) is a useful receptor in inhibiting Receptor Activator of NFκB Ligand (RANKL) in inducing osteoclastogenesis. Tumor Necrosis Factor (TNF)-Related Apoptosis-Inducing Ligand (TRAIL) is a potent apoptosis-inducing ligand in ameloblastomas. Since OPG has been reported to bind to TRAIL as well, the effect of OPG in TRAIL’s function in inducing apoptosis should also be investigated. To investigate on the expression of OPG in ameloblastomas, immunohistochemistry, immunofluorescence and Western blot were performed. From the immunohistochemistry results, we found that OPG was expressed in ameloblastoma tissues. Expression of OPG was clearly seen in AM-1 cells by immunofluorescence as well. Additionally, Western blot analysis confirmed OPG expression in ameloblastoma tissues and AM-1 cells. To investigate on the potential of TNFα, TRAIL and RANKL in inducing apoptosis, we performed an apoptosis assay. From the apoptosis assay, we found that TRAIL had the highest potential in inducing apoptosis compared to TNFα and RANKL. To investigate the binding of OPG with RANKL and TRAIL, we performed a binding assay. We noticed that OPG preferably bind with RANKL than TRAIL. However, at low levels of RANKL, marked binding of OPG with TRAIL was seen. As we suspected that the binding of OPG and TRAIL might cause the effect of TRAIL in inducing apoptosis in ameloblastomas, we combined the treatment of OPG and TRAIL in AM-1 cells. From the apoptosis assay, we found that under treatment of OPG, TRAIL’s function in inducing apoptosis was suppressed. These data suggest that by binding with TRAIL, OPG suppressed TRAIL’s function in inducing apoptosis in ameloblastomas.

Keywords: Ameloblastomas; AM-1; OPG; RANKL; TRAIL; Apoptosis