Head & Neck Oncology

Poster presentation

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Investigation of photochemical internalisation in HN5 head and neck carcininoma cells and in an *in vivo* rat model

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Aim of study

Early diagnosis of cancerous lesions renders them suitable for minimally invasive therapy. Photochemical internalisation (PCI) is a new technique which involves sub-lethal photodynamic treatment to modify the intracellular distribution of co-administered drugs and other agents which are sequestered in lyso/endosomes. In this study, we investigated the PCI effect induced by a new photosensitiser, $TPCS_{2a}$, in combination with a cytotoxic macromolecular drug, saporin, both *in vitro* and *in vivo*.

Materials and methods

The cytotoxicity experiments in combination with saporin were carried out with HN5 carcinoma cells by the MTT assay. Using a rat liver model, various light and drug doses were evaluated for optimizing the PCI conditions. The surface area and volume of necrosis induced after light treatment in the liver were measured 3 days later.

Results

With saporin (25 nM) and $TPCS_{2a}$ (0.1 μg/ml), PCI enhanced the cell kill, reducing the cell viability by a factor of 27 after 3 min light exposure compared to saporin treatment alone. Under optimum PCI conditions ($TPCS_{2a}$: 0.25 mg/kg; light dose:10 J; saporin given 1 hr prior to light treatment), the size of necrosis on the liver was 3 times larger in surface area and more than 3.5 times in volume in combination with 250 μg/kg saporin compared to saporin free groups.

Conclusion

In combination with saporin, $TPCS_{2a}$ PCI displayed a synergistic inhibition of cell growth with HN5 cells and showed a significant enhancement in inducing the necrosis on normal rat liver. PCI may be a useful modality for treating small tumours or local recurrence. Further studies in tumour models are in progress.