Utilization of lymphatic vessels as a drug delivery route

Akira Fujimura[1)], Masao Onodera[1)], Yohichiro Nozaka[1)], Nobuo Saito[2)], Toshihiro Ohta[2)]
Koichiro Sera[3)], Shoji Futatsugawa[4)]

[1)] First Department of Oral Anatomy, School of Dentistry, Iwate Medical University
1-3-27 Chuo-dori, Morioka, Iwate 020-8505, Japan

[2)] First Department of Maxillofacial Surgery, School of Dentistry, Iwate Medical University
1-3-27 Chuo-dori, Morioka, Iwate 020-8505, Japan

[3)] Cyclotron Research Center, Iwate Medical University
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

[4)] Nishina Memorial Cyclotron Center, Japan Radioisotope Association
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

Abstract

PURPOSE: We considered the quantity of the platinum movement which was included in Cisplatin, anti-tumor agent, from the tongue to the submandibular lymph node. There is no platinum in the living body.

MATERIALS AND METHODS: Micce were injected in the tongue 10μl of Cisplatin (1, 0.1, 0.01mg/ml). Mice were sacrificed by over dose of anesthesia after 0.5, 1, 3, 6, 24 hours and 3, 7days, and extracted the tongue, right and left submandibular lymph node, kidney and blood. The samples were treated by chemical ashing method using nitric acid and adding with Indium as a internal standard. The platinum was measured by means of Particle Induced X-ray Emission (PIXE).

RESULTS: The quantity of the movement of platinum to the submandibular lymph node increased until 24 hours, and then decreased after 3 days (Fig.1). High concentrations (1, 0.1 mg/ml) of Cisplatin moved to submandibular lymph node more than low dose, but there was the necrosis of tongue. It was thought that these concentrations were inadequate because of our purpose, the reduction of operation area after treatment.

CONCLUSION: From above-mentioned consequence, we concluded (1) effectual concentration of Cisplatin was 0.1～0.01mg/ml to the mouse, (2) normal tissue is suitable for injection, and (3) administration of agent should be performed some time every other day because of keeping the concentration of agent in the tissues We hope this method will contribute to rise up for QOL of cancer patients.