

A new animal model of chemotherapy induced peripheral neurotoxicity : the immunodeficient mouse

Valentina Carozzi, Alessia Chiorazzi, Annalisa Canta, Cristina Meregalli, Norberto Oggioni, Federica Avezza, Guido Cavaletti, P. Marmioli

Dipartimento di Chirurgia e Medicina Traslazionale – Università di Milano-Bicocca – Monza (MB)

Cisplatin, paclitaxel and bortezomib are anticancer drugs widely employed in the treatment of different solid tumours even though peripheral neurotoxicity represents a major limitation in their clinical use.

During the last decades many rat and mouse models of chronic chemotherapy-induced peripheral neurotoxicity (CIPN) have been characterized from the clinical, pathological, neurophysiological and behavioural point of view.

These models were based on immune-competent animals, however immune-deficient mice are mainly used in preclinical oncology. .

In this respect, the development of immune-deficient mice models could represent a basis for the concurrent investigation of the mechanisms of both anticancer drug efficacy and neurotoxicity in animals implanted with human derived cancer. Moreover, in the same models, neuroprotective and non-interfering strategies could be better studied.

In this study we established the feasibility of new immune-deficient murine models of peripheral neurotoxicity induced by three anticancer drugs.

Forty-eight athymic nude mice were randomized in 4 groups of 12 animals, three were treated respectively with cisplatin, paclitaxel and bortezomib, and one was left untreated. All animals were followed up for 6 weeks. They were examined at baseline, week 4 and 6 for neurophysiological functions and behavioural tests, whilst morphological and morphometric analysis were performed on dorsal root ganglia (DRG) and peripheral nerves collected after 4 and 6 weeks of treatment.

The results of the study demonstrate that athymic nude mice show CIPN features similar to those of conventional models even if some differences must be remarked as the prolonged time of treatment required to develop a chronic neuropathy.

The characterization of this new mice model of CIPN will allow studies of antineoplastic and neurotoxic effects in the same animal.

References

Carozzi et al. Neurophysiological and neuropathological characterization of new murine models of chemotherapy-induced chronic peripheral neuropathies. *Exp Neurol* 2010;226:301-9.

Keywords

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