Comparison of In Vivo Efficacy of Nanoencapsulated Paclitaxel with Taxol and Abraxane
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Purpose
To develop a nanoencapsulated paclitaxel (FID-007) using polyethyloxazoline (PEOX)-based branched polymers to lower
the drug’s toxicity, and improve its solubility, bioavailability, and tumor-shrinking efficacy.

Methods
Paclitaxel was mixed with PEOX-based branched polymers at drug loading percentages of 11 - 17% to form nanoparticles <
120 nm in diameter. The product was purified and lyophilized as a white powder, designated FID-007.

The cytotoxicity of FID-007 was tested on normal human dermal fibroblast cells and cell lines for human lung (A549), triple
negative breast (MDA-MB-231) and ovarian (OV-90) cancers. Commercially available paclitaxel drugs, Taxol and
Abraxane, were similarly tested. The single maximum tolerated dose (MTD) of FID-007, Taxol and Abraxane were
determined in vivo in CD-1 mice. The multiple dose MTD for FID-007 was evaluated with CD-1 and Scid mice. The
efficacy of FID-007 in controlling tumor growth was compared to the other drugs in vivo using xenograft tumor models in
Scid mice with the aforementioned human cancer cell lines (20 mice per cancer). Dosages for the drugs were equitoxic based
on previous MTD studies. Saline and polymer (NanoCarrier-001B) were used as negative control treatments for the
xenograft studies.

Results
Cytotoxicity of FID-007 was similar to that of Taxol and Abraxane. FID-007 was cytotoxic to A549 lung cancer cells (IC50
2.8 ng/mL), to MDA-MB-231 triple negative breast cancer cells (IC50 4.9 ng/mL), and to OV-90 ovarian cancer cells (IC50 5.0
ng/mL). FID-007 was over 10-fold less active in normal fibroblast cells than in tumor cells.

The single IV dose MTD in CD-1 mice was less than 30 mg/kg for Taxol, 175 mg/kg for FID-007 and >180 mg/kg for
Abraxane. FID-007 exhibited significantly better efficacy in tumor growth control compared to Taxol and comparable or
better efficacy than Abraxane with the three human cancer cell lines in mice. Representative results are shown in Figures 1 -
3.

Conclusion
Encapsulation with PEOX branched polymers reduced the toxicity and significantly improved the efficacy of paclitaxel in
controlling tumor growth in vitro and in vivo.