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Tomentin-A Targets MMP and Ras/Raf/MEK/ERK Pathway in Cisplatin-Resistant Lung Cancer Cells to Induce Oxidative Stress Mediated Apoptosis

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ABSTRACT The current study investigated Tomentin-A as an inhibitory agent against lung cancer cells. Tomentin-inducing antiproliferative effects on the A549 cisplatin-resistant NSCLC line were examined using an MTT test, revealing cell colonies through microscopy. Apoptosis-inducing activity was assessed via DAPI labelling and Western blotting, while intracellular-ROS and mitochondrial-membrane-potential were measured using DCFH-DA and Rh-123 assays. Migration and invasion were evaluated using transwell assays, and Western blotting explored Tomentin-A's regulation of the Ras/Raf/MEK/ERK pathway. Results showed that Tomentin substantially ($p<0.05$) suppressed A549 drug-resistant NSCLC cell growth and targeted colonies dose-dependently. DNA condensation and fragmentation were observed in nuclear morphology after DAPI labelling, while ROS and MMP assays indicated oxidative stress-induced cell death. Migration and invasion investigations demonstrated Tomentin's strong inhibitory effects, and Western blotting showed considerable downregulation of phosphorylated Ras, Raf, MEK, and ERK. These findings highlight Tomentin's potential as a multifunctional treatment for drug-resistant NSCLC, warranting further clinical investigation.