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Localization of Fluorescent Endothelial Progenitor Cells in Rat Lungs

Acute lung injury, a critical respiratory illness, causes death in 40% - 60% of patients. Despite current advances in therapies for acute lung injury, an effective treatment remains unfound. Resident microvascular endothelial progenitor cells (RMEPC) possess vasculogenic capabilities that provide a possible treatment for patients with acute lung injury. If true, RMEPC should localize in damaged areas to undergo repair. Therefore, we investigate whether fluorescent resident microvascular endothelial progenitor cells localize in damaged lung one week following acute lung injury in rats. To test this hypothesis, we injected *Pseudomonas aeruginosa* into two groups of rat intratracheally followed by an intravenous injection of saline into the first group of rats and fluorescently labeled RMEPC suspended in saline into the second group of rats. 1 week following injections, the isolated lungs were analyzed via fluorescent microscopy. The presence of RMEPC in pulmonary tissue was determined by the detection of the green fluorescent protein signal. Following *Pseudomonas aeruginosa*-induced lung injury, accumulation of RMEPC was observed in the pulmonary tissue of rats injected with green fluorescent-tagged RMEPC. However, 1% of green fluorescent concentration was found in saline-injected rats; this indicates that false positives can be detected in the pulmonary tissue of both control and fluorescent RMEPC-injected animals. These data suggest that RMEPC may localize in damaged lung in a rat model of acute lung injury. Further investigation is needed to improve our technique in order to eliminate the amount of false positives detected.