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Nano-Mediated Targeting of Activated Circulating Neutrophils for Treatment of Acute Lung Inflammation

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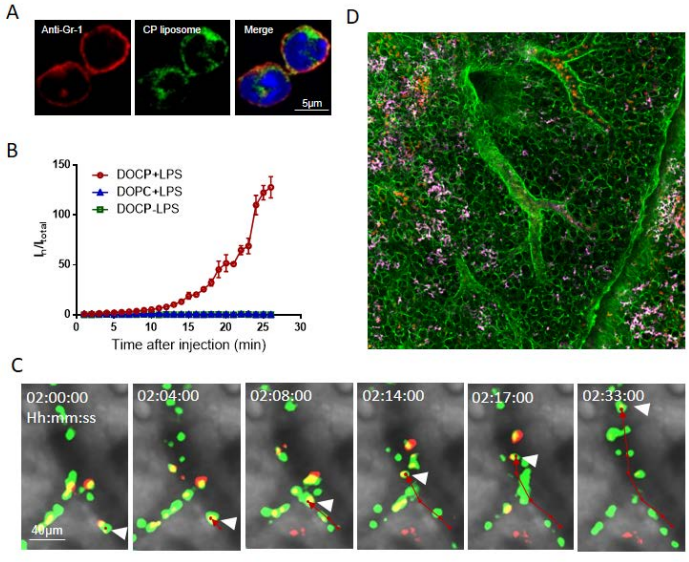
Acute lung injury (ALI) is a severe inflammatory disease without efficient clinical treatments. There is a strong need to develop strategies for effective treatment of ALI. Neutrophils are a type of white blood cells which can rapidly respond to inflammation and be activated and recruited to inflammatory tissues. Therefore, the activated neutrophils could be an excellent carrier to mediate the delivery of therapeutics to target inflammation. Here, we report a strategy for delivering therapeutics to treat ALI based on a choline phosphate liposome. Upon systemic injection into the ALI mice, the liposome rapidly bound with activated neutrophils (Figure A and B). The neutrophils containing the liposome were then recruited to the inflammatory lung and extravagated through the endothelial cell layers of the blood vessel (Figure C and D). This strategy efficiently delivers dexamethasone to the lung, resulting in an over 10 times higher local concentration of dexamethasone. These results demonstrate the use of choline phosphate liposome platform for in situ targeting of activated neutrophils for delivery of therapeutics across the blood vessel barriers into diseased sites.



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