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Alpha V Integrins on Podocytes Have a Protective Role During Adriamycin-Induced Glomerular Injury in Murine Models

Integrins are an important class of cell-surface proteins that mediate extracellular-matrix adhesion. Our interest is in the role of integrins during glomerular disease. In this study, we investigate the role of αV integrins on podocytes in the repair response after Adriamycin-induced glomerular injury in adult mice. We hypothesize that αV integrins have a protective function during injury, and can be used as a therapeutic target to treat kidney diseases such as focal segmental glomerulosclerosis. To test our hypothesis, we conditionally deleted the ItgaV gene in podocytes of adult mice, using a podocyte-specific, tamoxifen-inducible Cre-loxP system. We successfully generated viable mice with the inactivated ItgaV gene. Prior to Adriamycin-induced injury, knockout mice were non-proteinuric and had intact glomerular filtration barriers, although glomerular capillaries were segmentally dilated. After Adriamycin-induced injury, we observed massive proteinuria in knockout compared to control mice, indicating the role of αV integrins on podocytes are not essential; however, after injury their role becomes crucial for the ability of podocytes to respond to injury. We suggest that αV integrins have a protective function during glomerular injury and are a potential therapeutic target.