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Platelet-rich plasma protects tenocytes from adverse side effects of dexamethasone and ciprofloxacin.

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Abstract

BACKGROUND: Ruptured tendons heal very slowly and complete recovery from injury is uncertain. Platelet-rich plasma (PRP), a rich source of growth factors, is currently being widely tested as a soft tissue healing agent and may accelerate tendon repair. The authors assessed the ability of PRP to prevent in vitro adverse effects of 2 drugs commonly linked to tendon rupture and tendinopathy, glucocorticoids and fluoroquinolone antibiotics.

HYPOTHESIS: The pro-healing response induced by PRP protects human tenocytes against the cytotoxic effects of dexamethasone and ciprofloxacin.

STUDY DESIGN: Controlled laboratory study.

METHODS: Human primary hamstring tenocytes were exposed to different doses of ciprofloxacin and dexamethasone with and without PRP. AlamarBlue, β -galactosidase assay, and live/dead stain were used to measure, respectively, viability, senescence, and death in tenocyte culture.

RESULTS: The viability of cells exposed to high doses of ciprofloxacin was significantly decreased compared with controls, with no induced senescence but increased cell death. Dexamethasone reduced viable cell number without inducing overt cell death, but the number of senescent cells increased considerably. After co-treatment with 10% PRP, viable cell number increased significantly in both conditions and the number of dead cells decreased in ciprofloxacin-treated cultures. Moreover, dexamethasone-induced senescence was markedly reduced by co-treatment with 10% PRP.

CONCLUSION: This study demonstrates that ciprofloxacin and dexamethasone have differing adverse effects on human tenocytes, with ciprofloxacin inducing cell death while dexamethasone primarily induces senescence. The authors showed that PRP can protect cultured human tenocytes against cell death or senescence induced by these drugs.

CLINICAL RELEVANCE: Both ciprofloxacin and dexamethasone are highly effective in treatment of inflammatory and infectious conditions, therefore new strategies to minimize their adverse effects are of strong interest. These findings suggest the potential for local administration of PRP to enhance tendon healing in patients undergoing glucocorticoid or fluoroquinolone treatment.

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