A comparison of *in vitro* bioassays to determine cellular glucocorticoid sensitivity

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An altered cellular glucocorticoid sensitivity is associated with various pathophysiological conditions such as asthma, diabetes, or rheumatoid arthritis. Currently available assays to determine individual sensitivity to glucocorticoids either seem imprecise, or they are based on mitogen-activated lymphocytes, although mitogens themselves may affect cellular glucocorticoid sensitivity. As an alternative, we developed an assay based on the glucocorticoid-induced increase of 51 kD FK506 binding protein (FKBP51) mRNA in unstimulated peripheral blood mononuclear cells (PBMC), as detected by real time PCR. To validate our results, we determined the individual cellular glucocorticoid sensitivity of 10 controls and a glucocorticoid resistant patient simultaneously in four different mitogen-based assays and the FKBP51 mRNA induction assay. Mitogen-based assays and the FKBP51 assay appear to complement each other. Alterations in the capacity of the glucocorticoid receptor (GR) to engage in nuclear protein-protein interactions may be more pronounced using PBMC proliferation assays, whereas alterations in GR/DNA-binding and the GR-associated transcription machinery may be reflected better by the FKBP51 assay.
We conclude that, although the results obtained with the FKBP51 assay have yet to be correlated with clinical outcome when glucocorticoids are used for immunosuppression, it is clear that the FKBP51 assay has its advantages compared with mitogen-based assays. Not only shows the FKBP51 assay smaller assay variations, it is less likely to be influenced by serum-related variables and does not require mitogen-activated blood cells. It may therefore overall be better suited to assess *in vivo* cellular glucocorticoid sensitivity.

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