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Pharmacokinetic modeling of cortisol binding to dietary fiber in the gastrointestinal tract

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Cortisol is a glucocorticoid hormone produced in the adrenal cortex during stressful situations. The purpose of this project was to determine whether cortisol binds to dietary fiber and to design a pharmacokinetic model to predict whether or not fiber has a significant binding capacity in the human gastrointestinal tract. Studies have shown that estrogen binds to dietary fiber. Coumesterol, a cholesterol derived steroid structurally similar to estrogen, is also thought to bind to dietary fiber. The fluorescence of coumesterol bound to oat, wheat and psyllium fiber was analyzed in order to determine the binding capacities of each. This indicates that steroids have different binding capacities important in the pharmacokinetic model. This model would provide useful information capable of predicting physiological changes due to changes in dietary habits as well as medicines such as antibiotics that may alter steroid secretion. If steroids do have a recycling route and dietary fiber has a significant binding capacity in the human body then an increase in dietary fiber may result in a decrease in cortisol.