Serum After Small Bowel Resection: Effects on Apoptosis in Intestinal Epithelial Cells.

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Introduction

Following massive small bowel resection (SBR), the remnant intestine compensates for the loss of mucosal surface area by undergoing intestinal adaptation. This response is characterized by increased rates of both enterocyte proliferation and apoptosis. The mechanisms and/or mediators of these responses are not presently understood. Prior work in the Warner laboratory identified significant changes in the expression of specific members of the bcl-2 gene family (bax and bcl-w) after SBR, which may be important in the regulation of apoptosis. Further, this laboratory has demonstrated that serum, when harvested from animals after SBR, induces proliferation of intestinal epithelial cells *in vitro*.

Rational

This project tested the hypothesis that like proliferation, enterocyte apoptosis is increased by SBR serum *in vitro*. Further, since alterations in bax and bcl-w expression have been identified after SBR *in vivo*, we sought to determine whether the expression of these genes are affected by SBR serum *in vitro*.

Methods

Rats underwent a 75% mid SBR or sham operation and serum was harvested 24 hours later. The Sham and SBR serum was added to a prototypical rat intestinal epithelial cell line (RIEC-6) and apoptosis was recorded by immunostaining for DNA strand breaks. The expression of bcl-2 family members (bax and bcl-w) protein was determined by Western blotting.

Results

Apoptosis was not induced by addition of SBR serum at early, mid, or late time points. Further, over a wide range of time points (1 hour to 5 days), the effect of SBR serum on the expression of bax or bcl-w protein was variable and inconsistent, and did not coincide with histologic evidence for apoptosis

Conclusions & Significance

Unlike proliferation, the induction of enterocyte apoptosis after massive SBR is likely regulated by factor(s) that do not circulate in the serum. These results support the concept that proliferation and apoptosis are independent pathophysiologic responses to massive SBR, and these are likely governed by different mechanisms.