
Bacterial fermentation of carbohydrates in ileal pouches may be of importance in the prevention of pouchitis. It is unclear to what extent this fermentation takes place and if it can be modified by dietary interventions. We investigated the fermentation of two non-digestible carbohydrates: oligofructose and resistant starch, in healthy humans these carbohydrates show different rates of fermentation: oligofructose is rapidly fermentable whereas resistant starch leads to a slow and prolonged fermentation. Dietary supplementation with oligofructose and resistant starch was compared with a placebo (glucose) in fifteen patients (7 males, 8 females) with an ileal pouch-anal anastomosis. The oligofructose and resistant starch supplements consisted of 14.3 g of indigestible substrate per day. A multiple cross-over design was used with periods of 7d and wash-out periods of 7d between treatments. At the end of each supplement period breath samples and fecal samples were obtained. Fecal recovery of oligofructose was 2.4 g/d and of resistant starch 7.8 g/d, yielding an apparent fermentability for oligofructose of 83% and for resistant starch of 44%. Fecal excretion of total short chain fatty acids did not change, but resistant starch significantly increased butyrate excretion by 69% (P < 0.01) whereas oligofructose significantly reduced the excretion of the amino acid derived iso-butyrate by 94% (P < 0.01) and of iso-valerate by 77% (P < 0.01). None of the samples in the three periods contained any propionate. Oligofructose also significantly increased fecal weight (651 vs 541 g/d; P < 0.01). The 24h integrated excretion of breath hydrogen was significantly higher on oligofructose than on placebo (286 vs 85 ppm; P < 0.001). Breath hydrogen on resistant starch was also elevated but did not reach significance. Dietary supplementation with oligofructose or resistant starch thus leads to a substrate-specific fermentation in the pouch.


The cell cycle inhibitor, p21, is expressed in differentiated villus cells, but not in crypt cells, suggesting a possible role in the cell cycle that withdrawal that accompanies enterocyte differentiation. The present studies were designed to examine the molecular mechanisms of p21 expression during enterocyte differentiation, and to determine its function within intestinal epithelial cells. METHODS: Enterocyte differentiation was accomplished in Caco-2 cells via post-confluence growth (up to 21 days), and in HT-29 cells by treatment with sodium butyrate (3 mM) and exposure to 4% hyaluronan. A decision tree was used to identify the p21 induction event in naive Caco-2 cells, as well as the activation of p21 in differentiated Caco-2 cells. We have also investigated the expression of p21 in vivo in normal human colon tissues. RESULTS: The expression of p21 was upregulated in both cell lines at the onset of differentiation, and increased with further differentiation, and was associated with an increase IAP and/or villin mRNA levels (p < 0.001, in all cases). In Caco-2 cells, p21 expression was also increased (4-fold, p < 0.001) in post-confluent Caco-2 cells, but its induction occurred 7 days earlier than the IAP induction. Similarly, in HT-29 cells, p21 mRNA levels were dramatically increased (12-fold, p < 0.001) by 4 hours of NaBt treatment, whereas IAP and villin mRNA levels were not induced until 24 hours. Simultaneous treatment with protein synthesis inhibitors completely blocked the IAP and villin increases, but had no effect upon p21 induction. (2) p21 Overexpression: Stable p21 transfectants had a 2-3 fold increase in p21 mRNA levels, compared to the parent cells. (3) Thymidine measurements revealed a dramatic decrease in p21 proliferative rate in p21 transfected cells, compared to either control or NEC cells. CONCLUSIONS: The cell cycle inhibitor, p21, is an "immediate-early" gene during enterocyte differentiation in vitro, as opposed to IAP and villin which are "delayed" genes. Based upon its pattern of expression and its effects in stably transfected cells, it is likely that p21 plays a role in the cell cycle withdrawal that accompanies enterocyte differentiation.

THE EFFECT OF DIETARY SUPPLEMENTATION WITH GLUCOSE ON APPETITE AND ANTRYPHLOGIDENIC MOTILITY. J. Hruby*, S. Doran, D. Heston, J.G. Rassias, W.M. Burfman, M. Forster, Dept of Medicine & GI Medicine, Royal Adelaide Hospital, Australia.

Short-term supplementation of the diet with either glucose or fat accelerates upper gastrointestinal transit of subsequent glucose or fat loads. It is not known whether supplementation affects appetite, nor whether it is nutrient specific. To examine these issues we have studied appetite and antryphlogidenic (AP) motility in six healthy young males of normal body weight in response to dietary supplementation with glucose.

On day 1 subjects had a baseline study. Equicaloric intraduodenal (ID) infusions (2.5 kcal min) of glucose (55%) and lipid (10% Intralipid) were given in random order, for 90 minutes each, separated by a 30 minute washout period. Each subject then took 400g of glucose daily for 7 days in divided doses in addition to their normal diet, and had a duplicate study on day 8. During the ID infusions visual analogue scales were used to rate appetite. AP manometry was performed using a multipurpose side hole/bolus/enteric water filled assembly. ID infusions were commenced in phase 1 of the MMC.

The study was well tolerated. All subjects had >83% compliance. There was no significant weight change on day 1 and 3. On day 1 ID lipid was far more potent at suppressing appetite than ID glucose. This differential response was significantly reduced on day 8 due to a decrease in the satiety inducing effect of ID lipid (Table). During the main infusion phases there were no intergroup differences. Lipid was a more potent stimulus of pyloric activity than glucose on both days, but there was no significant difference in the frequency of the pyloric response to the nutrients between days 1 and 8. There was no significant difference in the time to return of antral phase II activity after ID nutrient between days 1 and 8.

Comparison of effect of Lipid vs Glucose on Appetite (p-value:ANOVA)

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<tr>
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<th>Day 1</th>
<th>Day 8</th>
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<tr>
<td>Fability</td>
<td>&lt;0.01</td>
<td>0.036</td>
</tr>
<tr>
<td>Hunger</td>
<td>&lt;0.01</td>
<td>0.028</td>
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<tr>
<td>Desire to eat</td>
<td>&lt;0.01</td>
<td>0.66</td>
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We conclude that:
1. ID lipid has greater "satiating" effect than glucose in healthy males.
2. ID lipid is a more potent stimulus of pyloric activity than glucose.
3. The satiating effect of nutrients can be modified by recent changes in diet, but is not accompanied by clear changes in AP manometry.

MEDICAL ASPECTS & QUALITY OF LIFE ISSUES IN PATIENTS RECEIVING LONG-TERM JEJUNOSTOMY TUBE FEEDINGS FOR GASTROPEPSY: A. Bahar, C. Parrish, J. Kremenich, R. McCallum, Division of Gastroenterology, Univ. of Virginia, Charlottesville, VA

Jejunostomy tube (J-tube) feeding is a useful and life-saving technique providing nutrition to those who for various reasons cannot obtain sufficient nutrition by oral intake. J-tube feeding is available on long-term basis to patients with gastroparesis and/or end stage gastropathy. Jejunostomy tube placement requires an alteration in the patient's quality of life and an increased risk of complications. This study evaluated the quality of life issues in patients receiving long-term jejunal tube feedings. METHODS: Patients were interviewed and were rated using the Short Form-36 Health Survey. The patients were also asked to rate their overall satisfaction with the tube feeding. RESULTS: The average age of patients was 51 years, 85% were female, 34.8% of J-tube patients were placed laparoscopically. The average length of tube was 21.5 months, (range 1-79 months) and a mean of 1199 calories were received per month. With an average infusion rate of 1045 cts/hr, 73.9% of patients were satisfied with the tube, with 39.1% of them "very satisfied". 62.6% of the patients believed the tube was effective in providing their energy needs. 73.9% said they would receive a J-tube if they had to do it again, and 92.6% said they would recommend a J-tube to someone with a similar illness. However, 66.7% gained weight while on J-tube, 62.7% received medication through the J-tube, and of those 73.3% could not tolerate the medications orally. However, there are complications associated with the J-tube, such as avoidable costs, and 73.3% of the patients required at least one ER visit for problems such as coughing, tube fall-out, infection or irritation. Despite the complications, only 26.1% of the patients required hospitalization within a year of J-tube placement.

CONCLUSIONS: 1) this study provides new evidence that long-term J-tube feeding in the setting of refractory gastroparesis is successful by providing important medical, quality of life, and economic advantages. 2) the increasing use of the laparoscopic technique makes the J-tube attractive for both short and long term nutritional support.