BACTERIAL FERMENTATION OF OLIGOFRUCTOSE AND RESISTANT STARCH IN PATIENTS WITH ILEAL POUCH-ANAL ANASTOMOSIS.
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Bacterial fermentation of carbohydrates in ileal pouches may be of importance in the prevention of pouchitis. However, it is unclear to what extend 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 caproate. 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.hr; $P < 0.01$). 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 EFFECT OF DIETARY SUPPLEMENTATION WITH GLUCOSE ON APPETITE AND ANTROPYLORODUODENAL MOTILITY.** JM Andrews, S Doran, GS Hebbard, G Rassias, WM Sun, J Dent, M Horowitz. Depts 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 antropyloroduodenal (APD) manometry 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 (2.9 Kcal/min) of glucose (25%) and lipid (10% Intralipid) were given in random order, for 90 minutes each, separated by a 90 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. APD manometry was performed using a multiple side hole/sleeve sensor water perfused assembly. ID infusions were commenced in phase I of the MMC.

The study was well tolerated. All subjects had >83% compliance. There was no significant weight change from day 1 to day 8. 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 satiating effect of ID lipid (Table). During the nutrient infusions there were no antral pressure waves. 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 nutrients between days 1 and 8.

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

	Day 1	Day 2
Fullness	<0.001	0.036
Hunger	<0.001	0.92
Desire to eat	<0.001	0.66

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 APD manometry.

● EXPRESSION OF THE CELL CYCLE INHIBITOR, p21, DURING ENTEROCYTE DIFFERENTIATION *IN VITRO*: A ROLE IN CELL CYCLE WITHDRAWAL. S. Archer, S. Meng, and R.A. Hodin. Dept. of Surgery, Beth Israel Hosp., Harvard Med. School, Boston, MA.

The cell cycle inhibitor, p21, is expressed in differentiated villus cells, but not in crypt cells, suggesting a possible role in the cell cycle withdrawal that accompanies enterocyte differentiation. The present studies were designed to examine the molecular mechanisms of p21 expression during enterocyte differentiation, and to assess p21 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 (NaBu). Northern analyses were carried out using cDNA probes specific for p21, the differentiation markers villin and intestinal alkaline phosphatase (IAP), or the actin control. HT-29 cells were cotransfected with plasmids expressing the human p21 cDNA and/or the NEO resistance gene, and stable lines selected in G418. **RESULTS: (1) p21 Induction:** Both Caco-2 and HT-29 cells underwent differentiation, as evidenced by increased IAP and/or villin mRNA levels ($p < 0.001$, in all cases). 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 NaBu 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}H thymidine measurements revealed a dramatic decrease (50%) in proliferative rate in p21-expressing cells, compared to either control or NEO 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.

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

Jejunostomy tube (J-tube) feeding is a useful and life-saving technique of providing nutrition to those who for various reasons cannot obtain sufficient nutrition by oral intake. No data is available on the long-term use of J-tube feedings in patients with malnutrition secondary to gastroparesis where endoscopic gastrostomy (PEG) tube feeding is contraindicated and PEJ is poorly tolerated because vomiting displaces the tube. **AIM:** A medical, nutritional and outcomes assessment of UVA Medical Center patients who received J-tube feedings because of gastroparesis refractory to pharmacologic treatment and oral caloric supplements. **METHODS:** Patients were mailed a detailed questionnaire and were later interviewed over the phone. 45 patients received J-tubes & we were able to obtain 23 responses to date. **RESULTS:** The average age of patients was 41. 83% were white and 78% were female. 34.8% of the J-tubes were placed laparoscopically. The average length of time with J-tube was 21.5 months, (range 1-79 months) and a mean of 1199 calories were received per night, with an average infusion rate of 104.5 cc/hr. 73.9% of patients were satisfied with the tube, with 39.1% of them "very satisfied". 82.6% 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 again, and 82.6% said they would recommend a J-tube to someone with a similar illness. 66.7% gained weight while on J-tube; 65.2% received medication through the J-tube, and of those 73.3% could not take the medications orally. However, there are complications associated with the J-tube. 87% complained of some pain, 69.6% had tube site infections, and 73.9% of patients required at least one ER visit for problems such as clogging, tube fall-out, infection or irritation. Despite the complications, only 26.1% of the patients required hospitalization while on J-tube, as opposed to 70% before placement. 1/3 of patients were able to have the tube removed due to improved oral intake and response to medical therapy. **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 nutrition support.