

alter their phenotype, morphology, growth pattern and drug sensitivity depending on their culture environment, and these evidences and informations would be essential and exploitable in utilizing these cancer cell lines to clinical or pathophysiological evaluations and researches.

1733 A Comparison of Two Different Approaches to Quantifying Cell Proliferation in Colonic Epithelium

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One of the confounding factors responsible for inconsistent results in studies of epithelial cell proliferation is the lack of an objective method for quantifying cell proliferation.

We compared manual cell counting with a computerized image analysis system in order to obtain better accuracy and standardization and less inter-observer variation.

35 different colonic crypts from 35 different patients were evaluated by 2 independent observers. Proliferating cells were detected using the Ki-67 antigen.

Variation in measured labelling indices between the two observers was slightly less in favor of the computerized method. However, both quantification methods showed unacceptable interobserver variation (limits of agreement: computer: 0.00 ± 0.10 , manual: 0.01 ± 0.12 , $p = \text{ns}$). Computerized counting resulted, for both observers, in a significant lower mean labelling index (LI) in comparison with manual counting (LI obs 1, computer: 0.17 ± 0.12 , manual: 0.28 ± 0.14 , $p = 0.0002$; LI obs 2, computer: 0.17 ± 0.10 , manual: 0.26 ± 0.13 , $p = 0.002$).

We conclude that both quantification methods are not reproducible between two observers. It is suggested that quantification of cell proliferation should be done by only one observer. Furthermore computerized counting is probably the best method for large scale studies.

1734 The Diagnostic Significance of p53 Overexpression in Preoperative Diagnosis of Gastric Cancer

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The alterations of p53 protein which lead to its inactivation and overexpression in the cell nucleus are an almost universal event in human cancer, but diagnostic significance of this phenomenon remains to be defined. The objective of the present study was to investigate the value of immunohistochemical detection of p53 in preoperative diagnosis of gastric cancer.

The expression of p53 was analysed immunohistochemically in 170 gastric carcinomas, 274 tissue samples from benign gastric disorders and 56 from normal gastric tissue. Routinely fixed material and CM 1 antibody were used. The p53 has been detected only in cancer tissue (42% of tumours) and has not been identified in any samples with benign gastric disorders and normal gastric epithelium. Immunohistochemical detection of p53 in endoscopic biopsies used in addition to conventional histology improved accuracy of preoperative diagnosis of gastric cancer from 86.2% to 93.5%.

The results demonstrate that the presence of p53 overexpression in gastric tissue is a marker of malignancy. A simple and inexpensive method as immunohistochemical detection of p53 provides useful conformating data in preoperative diagnosis of gastric cancer. Its greatest potential is for use instead of repeating endoscopies in cases where results of conventional morphological analysis are either unclear or possibly false negative.

1735 Successful Management of Hospitalized Persistent Diarrhoea Children in Bangladesh by Using Inexpensive Diets

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107 hospitalized persistent diarrhoea patients were treated with two simple diets used sequentially. These diets were prepared from inexpensive locally available ingredients. The main purpose of the study was to estimate the rate of success with these diets. The criteria for success was defined as the body weight on day 7 more than admission weight with less than or equal to 2 liquid stools per day. Identification of risk factors of failure to the initial diet was another purpose of this study.

All the 107 patients aged 4–23 months were treated with an initial diet prepared from milk powder, khai powder (popped rice), soya oil and sugar. The children who failed to improve with this diet were given another diet based

on khai powder, egg white, soya oil and glucose. The treatment of associated systemic and gut infections along with vitamin/mineral supplementation were done during hospital stay. 103 patients were either 2nd or 3rd degree malnourished.

65 patients (61%) were successfully treated with the initial low lactose milk cereal diet. Of the remaining 42 patients who failed to improve with the initial diet, 34 patients (32%) recovered from diarrhoea within next 7 days with subsequent lower carbohydrate lactose free diet. So, a total of 99 (93%) were successfully treated with two simple diets based on locally available, culturally acceptable ingredients.

We, therefore, conclude that persistent diarrhoea in children can be successfully managed by using simple, inexpensive diets prepared from locally available ingredients.

1736 Development of a New Test System for Studying Protein Binding to Small Intestinal Brush Border Membranes

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Enterocytes have been shown to process and present food antigens. This might have implications for small intestinal disorders like coeliac disease and cow's milk allergies. In order to study the interaction of food proteins with the first cellular part of the mucosal barrier, we developed a test system using rat intestinal brush border membranes (BBM).

Methods: BBM vesicles were obtained using a divalent cation precipitation technique. Solubilization of peripheral membrane proteins was performed with papain. Intact BBM and native peripheral membrane proteins were used in dot blots, denatured membrane proteins after SDS-PAGE in Western blots for binding experiments. Detection was performed with biotinylated proteins, peroxidase-conjugated streptavidin and a chemiluminescence system.

Results: Coeliac active gliadin fragments and cow's milk proteins were bound to intact BBM and denatured membrane proteins. There was no similarity between food protein and lectin binding patterns in Western blots. Furthermore sialylation of BBM interfered with food protein binding. Papain-solubilization of membrane proteins did not reverse their binding characteristics. Differential maturational changes were observed in dot and Western blots: Denaturation of membrane proteins of newborn rats reduced food protein binding (Western blot), whereas no uniform pattern in binding intensities in dot blots was seen comparing newborn and adult BBM.

In conclusion, BBM and membrane proteins applied to nitrocellulose membranes are suitable for studying interactions with food proteins. Using the described test system it is possible to investigate the contribution of protein modifications like glycosylation to binding. Our results indicate that native peripheral membrane proteins influence BBM binding of food proteins. Further experiments have to be done to clarify the role of BBM proteins in uptake and processing of food antigens by enterocytes.

1737 The Effect of Diet in Patients with Fructosemalabsorption

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Fructosemalabsorption (fm) is often detected in patients suffering from unspecific abdominal complaints, but also in healthy controls. The importance is still controversially discussed. To further evaluate the clinical role of fm we investigated the effect of dietary restriction of fructose intake in symptomatic patients. Interviews were performed following a standardized questionnaire.

81 patients (36 m, 45 f, age 46.2 ys) were interviewed retrospectively 3–6 months after the diagnosis of fm was established. 46 patients (17 m, 29 f, 41, 4 ys) were followed prospectively for 3–6 months. These groups were further subdivided as for the existence of additional findings and the patients' compliance (graduated strict = s, moderate = m, poor = p). Fm was diagnosed by H₂-exhalation tests.

Success rates according to compliance were:

Retrospective with further findings (n = 46): 73.7% (s), 62.5% (m), 45.4% (p); without (n = 35): 100% (s), 62.5% (m), 33.3% (p).

Prospective with further findings (n = 23): 87.5% (s), 55.5% (m), 50% (p); without: 100% (s), 71.4% (m), 37.5% (p).

Recurrence of complaints was reported after dietary mistakes in 50–100%. Moreover it is important that 90% of all fructose malabsorbers were malabsorbers of sorbitol.

Our data demonstrate the beneficial effect of diet in patients with unspecific abdominal complaints and fm. The influence of the compliance is a further indicator of the importance of fm. After we also could show in another study that patients with symptomatic fm differ from patients with asymptomatic fm significantly by their stool bacteria capacity to metabolize fructose we think that fm must no longer be neglected as differential diagnosis in patients with unspecific abdominal complaints. Diet is a sufficient therapy.

1738 Influence of the Meal Substrate on the Performance of the Hydrogen Breath Test to Measure the Orocecal Transit Time

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The hydrogen breath test (H₂BT) with lactulose (L) is widely used for measurement of orocecal transit time (OTT), although clinical applicability of the test is somewhat limited by its fair reproducibility. Our aim was to determine whether changes in the meal substrate of the lactulose maker improve the reliability of the test. We studied 51 consecutive patients referred to our diagnostic unit for OTT measurement (39 had diarrhea and 12 constipation). OTT was performed twice in each patient, on consecutive days. One group ("L-water") had L 13.3 g in 250 ml water both days. Another group ("L-diet") had L 13.3 g in 500 ml elemental diet (Peptinutril® 2000/10, 400 kcal) both days. A third group ("L-water vs LAC-water") had L 13.3 g in 250 ml water the first day and lactitol 10 g in 250 ml water next day. Alveolar breath samples were obtained every 10 min for H₂ chromatographic analysis. Six H₂ nonproducers were excluded. OTT was defined as the interval between marker intake and sustained breath H₂ >3 ppm. **Results:** Values of first and second determination were similar ($p = ns$) and its differences were not different from 0.

Group	L-water	L-diet
First OTT (min)	80.0 ± 9.6	99.3 ± 11.2
Second OTT (min)	82.6 ± 12.0	109.3 ± 8.5

In groups "L-water" and "L-diet", first and second test were significantly correlated, but the correlation was better in group "L-water" ($r = 0.88$, $p < 0.001$) than in group "L-diet" ($r = 0.65$, $p < 0.01$). Moreover, mean coefficient of variation was also better in group "L-water" (15.5%) than in group "L-diet" (20.9%). In the group "L-water vs LAC-water" the individual results on both days were well correlated ($r = 0.71$, $p < 0.01$) but the delta between tests was different from 0 ($p = 0.03$). **Conclusion:** The meal substrate affects the variability of the OTT determined by the H₂BT. Reproducibility is best with lactulose dissolved in water.

1739 Evaluation of the Intestinal Transferrin Receptors

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It was demonstrated that iron deficiency is accompanied by an increase in intestinal transferrin receptors (TfR). The aim of our study was to evaluate the possibility of intestinal TfR reduction in patients (pts) with iron deficiency anemia not responding to oral iron therapy.

Patients and methods. We studied 10 pts with iron deficiency anemia (2 M and 8 F; mean age 34 aa, range 20–50 aa) not responding to oral iron therapy; in these pts we excluded the presence of pathology causing blood loss or iron malabsorption. We considered also 14 dispeptic pts as a control group (6 M and 8 F; mean age 43 aa, range 21–71 aa). An EGDS with bioptic samples in second duodenal tract was performed in all the pts. To determine the TfR we used a semiquantitative immunohistochemical technique with a monoclonal antibody against human TfR, OKT9.

Results. An increase in TfR was shown in 8 (80%) of the 10 pts with iron deficiency anemia and only in 1 of the 14 pts of the control group. The difference between the two groups was statistically significant ($p < 0.01$, Chi-square).

Conclusions. The present study shows an increase of intestinal TfR in pts with iron deficiency anemia not responding to oral therapy. These results suggest that the lack of response to iron therapy isn't due to TfR quantitative deficiency, probably it is caused by functional autoimmune disorder.

1740 Calcium Homeostasis and Adult Celiac Disease (CD): Age-Related Recovery of Bone Mineral Density (BMD) After Gluten Free Diet

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Adult CD may present with different clinical expressions, ranging from the classical malabsorptive syndrome to minimal alterations of the absorption of minerals and vitamins and absence of diarrhea (subclinical CD).

Aim: to investigate whether adult patients with subclinical CD, altered calcium homeostasis (reduced absorption and low BMD) may recover after gluten free diet.

Methods: 45 CD patients (30 f, 15 m, mean age 34.54 ± 8.12, range 20–47) underwent to Strontium absorption test (Sr-test) as marker of intestinal Calcium absorption, and BMD (rachis and right femur) before and after 1 year of gluten free diet.

Results: Sr-test was altered, before diet, in 22 patients, BMD was below normal in 25 patients. They were asked to drink at least 250 ml of partially skimmed milk or 300 ml of yoghurt starting from the second month of gluten free diet. Seven patients were unable to assume dairy products because they were milk intolerant.

One year later Sr-test was repeated and was found normal in 22/25 patients, BMD recovered in 10/25, all younger than 25 years. Three patients were not strictly following the diet: they had low Strontium absorption, low BMD and milk intolerance. Twelve patients, even if the Sr-test was normal, still showed low BMD. Their age was >25 years.

Conclusion: Calcium homeostasis is often altered in subclinical CD; Gluten free diet allows a complete recovery of Calcium absorption but recovery of low BMD seem possible only if the diagnosis is made before 25 years.

1741 Permeability of Human Ileal Mucosa Studied in Vitro in Diffusion Chambers

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In vivo studies of regional intestinal permeability and mechanisms of mucosal transport are difficult in man. There is a need for new methods to study transport mechanisms in various regions of the bowel. Diffusion chambers are well established in the study of cell lines and in animal studies. They have also been used to study electrolyte transport in human intestinal mucosa.

The purpose of this study was to evaluate diffusion chambers as a model for in vitro permeability in human small bowel mucosa.

Methods: Five cm of the ileum was taken from patients undergoing resection for colonic carcinoma. The bowel was immediately immersed in cold, oxygenated Krebs-buffer. The mucosa was carefully dissected from the muscle layers and mounted in the diffusion chambers. During experiments temperature was kept at 37°C and the Krebs-buffer was continuously oxygenated with carbogen gas. Viability parameters followed were: Transmucosal potential difference (Ag/AgCl electrodes in agar with 3 M KCl); Transport of 3H-labelled methyl-D-glucose with and without ouabain (inhibitor of Na/K-ATPase); Light and electron microscopy. Samples for mucosal to serosal passage of CrEDTA were taken every 30 min for 180 min.

Results: Transmucosal potential difference was stable for 120 min. Transport of methyl-D-glucose was linear and significantly inhibited by ouabain. CrEDTA passage was linear with time.

Conclusion: Human ileal mucosa maintained a stable potential difference, active transport and passive transport for 120 min in the diffusion chamber system. The diffusion chamber offers an opportunity to study mucosal transport mechanisms and permeability in human small bowel mucosa in vitro.

1742 Regional Jejunal Absorption of Polyethylene Glycols in Healthy Humans

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Studies of intestinal permeability after oral load are simple to perform, but cannot say neither in what part of the GI-tract different probes are absorbed, nor the location of a possible permeability disorder. A technique for permeability studies in a well-defined segment of the human small bowel has been missing. The aims of this study were to evaluate segmental intestinal perfusion as a technique for regional permeability studies and to investigate the absorption pattern of polyethylene glycols (PEG) in a defined segment of the jejunum in healthy individuals.

Methods: Six healthy volunteers were studied. The jejunum was intubated with a six channel tube (Loc-I-Gut™) and a 10 cm segment was isolated between two occluding balloons. The segment was rinsed with NaCl for 30 min, perfused with a marker solution, containing PEG 400 and PEG 1000, during 120 min and again rinsed for 90 min. 14C-labelled PEG 4000 was used as volume marker. Perfusate and aspirates proximal to the segment were recovered. Urine and faeces were collected for 3 days and 5 days, respectively. Urine samples were analyzed with HPLC for PEG 400/1000 and with scintillation counter for 14C-PEG 4000.

Results: Recovery of PEG 4000 (14C-activity) from the segment was 99.6 (97.0–102.4)%. The sum of PEG 4000 found in urine, faeces and aspirates was 0.4 (0.1–1.1)%. Steady state conditions were reached during the second hour of active perfusion. Absorption (% urinary recovery) was size-selective for PEG 414–766, but not for PEG 810–1030.

Conclusion: Segmental perfusion with Loc-i-Gut™ is useful for studying regional jejunal permeability. The findings point to that the jejunal epithelium has a critical pore size corresponding to PEG with mol wt 800.

1743 Evaluation of DNA Viruses in Sporadic Chronic Idiopathic Intestinal Pseudo-Obstruction (CIIP)

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Although hereditary forms of chronic intestinal pseudo-obstruction are well described the aetiology of most patients with sporadic CIIP is unknown. A link between neurotropic DNA viruses and CIIP has been suggested but never studied methodically.

We utilised PCR to look for evidence of herpesvirus DNA in small or large intestinal tissue of patients with CIIP; and in-situ DNA hybridisation (ISH) to localise signal to the muscularis propria or myenteric plexus. 21 tissue specimens from 13 patients (visceral myopathy $n = 8$, visceral neuropathy $n = 3$, undifferentiated $n = 2$) were studied.

DNA was extracted from paraffin embedded blocks utilising a proteinase K and phenol chloroform extraction. Nested PCR was performed for cytomegalovirus (CMV), Epstein Barr virus (EBV), herpes simplex virus type 1 (HSV 1) and varicella zoster virus (VZV). ISH was then performed on formaldehyde fixed paraffin-embedded material from all patients positive by PCR, and patients who were negative but had a clear acute onset of symptoms leading to CIIP.

Initial screening with nested PCR produced 3 patients with positive results. One patient with a visceral neuropathy had EBV detected in the small intestine; one patient with a visceral myopathy had EBV DNA in both the small and large intestine; and one patient with a visceral neuropathy had small intestine positive for CMV DNA. No patients had evidence of HZV or HSV. ISH failed to demonstrate localisation of probe to the myenteric plexus or muscularis propria in these PCR positive subjects. In spite of a negative PCR result we also performed ISH on tissue in 4 other patients who initially presented with an acute illness but as expected there was no localisation of virus using this less sensitive method.

We conclude that in sporadic CIIP there is no evidence of herpesvirus replication to implicate these DNA viruses in pathogenesis, although the role of RNA viruses remains to be explored.

1744 Clinicopathological Characteristics of Adults with Sporadic Chronic Intestinal Pseudo-Obstruction (CIIP)

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Clinical characteristics of adult CIIP are poorly documented with most information derived from paediatric populations. The aim was to determine modes of presentation, clinical associations, need for nutritional support and response to treatment in adult CIIP. We have clinically characterised 19 patients (mean age 41; range 20–63, $M = 10$) with CIIP (visceral myopathy $n = 10$, visceral neuropathy $n = 4$, undifferentiated $n = 5$).

Mean age of presentation was 25 yrs, and in 57% this was acute, 11% subacute, and 32% chronic. Most common presenting symptoms were pain 61%, altered bowel habit 55% and nutritional deficiency 33%. Associations were common (megacystis $n = 3$, hydronephrosis $n = 1$, achalasia $n = 3$, pancreatitis $n = 2$, chronic active hepatitis with Raynaud's $n = 1$, faecal incontinence $n = 1$, caecal volvulus $n = 1$) particularly in the myopathic group. Patients with myopathy had histological muscular atrophy and fibrosis. One had active enteric myositis. Three neuropathic patients had myenteric plexus neural degeneration but one patient had an inflammatory plexitis.

No patient had sustained benefit from promotility drugs including cisapride and erythromycin and most required extensive surgery. 61% achieved long term benefit after extensive surgery either with a (1) gastric drainage procedure, subtotal enterectomy and colectomy or (2) partial enterectomy and colectomy. Most required long term nutritional support (TPN $n = 10$, oral sumps $n = 2$, PEG $n = 1$). Death occurred within 15 months in 2 patients.

In nonfamilial adult CIIP the onset is often acute with pain and nutritional problems as the major symptoms. There are aggressive forms of "fulminant" disease which may be rapidly fatal. Appropriate surgery, but not prokinetic drugs, offers some symptomatic benefit.

1745 Lactulose/Mannitol Permeability Test in the Work Up of Chronic Diarrhea

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Intestinal permeability is a good index of mucosal integrity and, therefore, it is potentially useful in the work up of chronic diarrhea. We administered the lactulose/mannitol (L/M) test to 107 patients with chronic diarrhea (more than 3 stools/day for more than 2 weeks) presenting at the outpatient clinic of our Division of Gastroenterology. Each patient has been followed until diagnosis and sensitivity, specificity and predictive value of the test were evaluated. We found small bowel lesions in 13 patients, colonic disease in 32, chronic

pancreatitis, two alcoholics and three patients with food allergy. All the 13 patients with small bowel lesions (11 celiac disease and two Crohn's disease) had an abnormal test. L/M was altered also in the alcoholic patients and in the patients with food allergy. Four more patients having follicular hyperplasia in the terminal ileum had an abnormal test. Five patients had infectious diarrhea: L/M was abnormal in one patient with *Giardia lamblia* infection and in one with *Blastocystis hominis*. Three of the 32 patients with colonic disease (eleven acute self limiting colitis (ASLC), five Crohn's colitis, four ulcerative colitis (UC), two adenomas, 6 diverticulosis, two collagenous colitis and one eosinophilic colitis) had an abnormal test: one patient with moderate UC, one with ASLC and one with collagenous colitis. No lesions were found in 47 patients: L/M was altered in one child whose father has MC and in two patients with postsurgical.

In the work up of chronic diarrhea L/M test is 41% sensitive, 89% specific, and has a 83% positive predictive value and 54% negative predictive value. L/M test sensitivity is much higher in detecting small bowel lesions (100%). Since it is, furthermore, non-invasive, it can contribute in orienting the diagnostic decision tree of patients with chronic diarrhea.

1746 Hepatic Abnormalities in Coeliac Disease

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Although coeliac disease (CD) is known to cause elevation of serum transaminases and is said to be associated with primary biliary cirrhosis (PBC), there have been few prospective studies of the prevalence of hepatic abnormalities in CD and their nature.

We prospectively measured serum alkaline phosphatase (AP), aspartate and alanine transaminase (AST/ALT) and tested sera for antinuclear antibodies (ANA), smooth muscle (SMA) and antimitochondrial (AMA) antibodies in all patients suspected of having CD.

Of 129 patients (mean age 44, range 17–88, 32% male) who had CD confirmed by small bowel biopsy, AP was elevated in 12 (9%), AST and/or ALT in 17 (13%) and all three in 2 (2%). Of patients with elevated AP only, 6 (50%) had associated hypocalcaemia and levels improved in all cases on a gluten-free diet (GFD). Where AST/ALT were elevated, these improved in 15 patients on GFD and remained high in 2 patients who were non-compliant. Of the 2 patients with raised AP and AST/ALT, one had serum ANA and chronic active hepatitis on liver biopsy; the other had no evidence of autoimmune liver disease histologically or serologically and enzyme levels improved with GFD.

ANA and/or SMA were detected in 14 patients (11%). No patient had AMA. There was no significant association between positive ANA/SMA and elevated liver enzymes.

In conclusion, serum transaminases are often elevated in CD but respond to GFD and do not seem to reflect primary liver disease. Specifically, we have found no evidence of a strong association between CD and PBC.

1747 Coeliac Disease-Related Serum Antibodies and Enteropathy-Related Small Bowel T-Cell Lymphoma

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It is not clear whether serum antibodies of high sensitivity and specificity for coeliac disease (CD) are present in patients with enteropathy-associated T-cell lymphoma; this information might have diagnostic implications.

We tested sera from 8 patients (aged 37–79, 4 male) with small bowel T-cell lymphoma and villous atrophy for IgA endomysial antibody by indirect immunofluorescence and for IgA anti gliadin antibody by ELISA. Only one patient had been previously known to have CD: none was on a gluten-free diet, steroids or immunosuppression. All had normal total serum IgA levels. We used sera from 16 patients with uncomplicated CD, matched in pairs by age and sex, as controls.

Endomysial antibody was detected in only 2 (25%) sera from patients with lymphoma, compared with 15 (94%) of controls: $p < 0.002$, Fisher's exact test. In contrast, raised levels of anti gliadin antibody were present in 4 (50%) lymphoma and 9 (56%) CD sera. The patient with lymphoma and known previous CD was negative for both endomysial and anti gliadin antibodies.

Differentiation of small bowel T-cell lymphoma with co-existing villous atrophy from uncomplicated CD may be difficult. While detectable endomysial antibody does not exclude lymphoma, this diagnosis should be considered in the patient with villous atrophy yet negative endomysial antibody.

1748 Clinical Significance of Enterotoxigenic Activity of *Yersinia Enterocolitica*

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Diarrhoea induced by *Yersinia enterocolitica* represents 8.7% among acute diarrhoea in children. The aim of this research was to determine the ability of *Y. enterocolitica* to produce three enterotoxins heat-stable (ST), heat-labile (LT), shiga-like (SL) and comparison of these data with clinical picture of the disease.

21 strains of *Y. enterocolitica*, originated from diarrheal cases, were tested. LT and SL detection was made by ELISA on nitrocellulose filters with antisera to LT and SL of *E. coli*. Testing of ST strains was carried out by molecular hybridization with DNA probes.

It was shown that 56% of strains produced heat-labile cholera like enterotoxin, 37%-shiga like enterotoxin, 66%-heat-stable enterotoxin. All ST-positive strains of *Y. enterocolitica* were able to produce this enterotoxin only at room temperature, meanwhile ST biosynthesis in other bacteria was demonstrated at 37.14% strains produced three enterotoxins simultaneously, 25% culture – both LT and ST enterotoxins. 18% of strains were negative in production of above mentioned enterotoxins. Thus it was the ability of *Y. enterocolitica* to produce three types of enterotoxins. The production of these toxins determine the main symptom complex of the diarrhoea and influence the severity of the course of infection. ST enterotoxin induced mild diarrheal illness, LT and SL caused moderate and severe cases of the disease.

So it was demonstrated that these enterotoxins are involved in the development of yersiniosis.

1749 Increased Prevalence of Antigliadin Antibodies and Coeliac Disease in Down Syndrome

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Objectives: To evaluate the suggested link between Coeliac Disease (CD) and Down Syndrome (DS) and the role of gliadin antibodies in the detection of CD.

Method: Subjects were 59 institutionalised DS patients and controls matched for age, gender and ward. It was possible to collect blood from 55 patients (32 M, mean age 34 years) and their controls. Blood was examined for IgA and IgG gliadin antibodies. The DS patients also had extensive haematological and biochemical analyses. The antibody tests were done in two different labs, using different test kits.

Findings: 22 of 55 DS patients (16 M) and two controls had elevated gliadin antibodies. It was possible to do endoscopic biopsies on 17 of these DS patients to produce 16 interpretable biopsies. 2 had unequivocal changes of CD, in 5 the biopsies were abnormal but not diagnostic, 2 had giardiasis and 8 were normal. For 24 DS patients, blood samples were sent to the two laboratories simultaneously. In general, there was good congruence in the overall classification of results into normal/abnormal between the labs. There were no major differences between the various DS subgroups in their anthropomorphic, haematological and biochemical findings.

Conclusion: There is a high prevalence of gliadin antibodies in institutionalised DS patients, not explained by their environment. Of these abnormal antibody results, one half are false positive whilst the others are associated with varying degrees of mucosal abnormality including CD.

1750 Malabsorptive Syndrome After Ulcer Surgery

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Gastric surgery can determine the occurrence of certain conditions favouring the onset of malabsorptive syndrome (MS). The aim of this investigation was to study comparatively the presence of the intestinal morpho-functional alterations and of the MS in patients with gastric resection Billroth I (BI) and II (BII).

For each procedure 50 patients were taken under study following up the intestinal transit, biological signs of malabsorption, mucosal biopsy of the small intestine, intestinal bacterial overgrowth, quantitative indicanuria, bile salt bacterial deconjugation in the proximal small bowel, quantitative fecal fat, xylosumria and pancreolauryl-test. Some of the results are shown in the table below.

Pathologic features	BI (%)	BII (%)
Bacterial overgrowth	22	72
Bile salt deconjugation	16	52
Indicanuria (>36 mg/24 h)	16	40
Histologic changes of intestinal mucosa	24	72
Steatorrhea (>7 g/24 h)	16	44
Xylosumria (<4 g/5 h)	12	32
Pancreolauryl-test	10	44

The results obtained suggest that in the pathogenesis of MS following gastric surgery multiple factors are involved: intestinal bacterial overgrowth, bile salt bacterial deconjugation, morphologic lesions of the intestinal mucosa (cell infiltration in the lamina propria, mild villous flattening), pancreatic exocrine failure. The malabsorptive manifestations are more marked after BII procedure due to the summation of the pathogenetic factors.

1751 Spontaneous Small Bowel Perforation

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Spontaneous non traumatic small bowel perforation is a rare cause of an acute abdomen. Preoperative diagnosis is especially difficult, since the symptoms are extremely nonspecific. In most cases, the acute perforation is only diagnosed at exploratory laparotomy.

In the period from 1974 to 1991 101 patients with jejunal and ileal perforations were treated at the Department of Surgery, University of Graz. 78 patients suffered a total of 81 spontaneous perforations, including the multiple perforations occurred in three cases. This represented 0.4% of admissions for acute abdomen. 23 perforations were due to abdominal trauma. The mean age on presentation was 57 years. The most common causes of spontaneous small bowel perforation in our patients were mechanical, frequently adhesion, formed after abdominal surgery, followed by perforation caused by small intestine infarction or nonspecific inflammation of ileum and jejunum. At the time of operation peritoneal involvement was already well advanced. In 46% of the patients the lesion was oversewn and in 54% resection was required. The difference in mortality between these two methods was statistically not significant.

1752 The Role of Gastric Acidity in the Pathogenesis of Enteric Bacterial Overgrowth: With Concurrent Focus on Intestinal Motility

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In a recent study we found that healthy old people with hypochlorhydria harbour Gram positive bacteria in the foregut without evidence of enteric bacterial overgrowth (Gram negative bacilli) (Gut 1992). To further elucidate the role of gastric acidity in enteric overgrowth we have prospectively examined 41 consecutive female patients with symptoms of late radiation enteropathy, a clinical condition known to predispose to enteric overgrowth.

Methods: All patients had previously been subjected to abdominal radiotherapy for gynecological cancer, and the age was mean 61 years (range 41–81). Fasting gastric juice and duplicate brush samples from duodenum were collected during endoscopy and cultured under aerobic and anaerobic conditions. Identification and quantification were performed, and in vitro gas production in presence of glucose was determined to quantify *Enterobacteriaceae* as indicators of Gram negative bacilli. pH in gastric juice was measured by glass electrode, and intestinal motility was recorded by prolonged ambulant manometry.

Results: Significant Gram negative growth in the stomach and small intestine was found in 9 (22%) and 11 (27%) of 41 patients, respectively. Ten (24%) of 41 patients were hypochlorhydric, and gastric pH was a good predictor of total bacterial counts in the stomach with explained variability amounting to 63% ($p < 0.001$). No consistent relationship, however, was found between gastric pH and Gram negative bacilli at either locations, whereas impaired motility of upper small intestine predicted Gram negative growth reliably in both the stomach ($r = 0.79$, $p < 0.001$) and small intestine ($r = 0.85$, $p < 0.001$).

Conclusions: The role of the gastric acid barrier in control of gut microflora seems to be confined primarily to restriction of bacterial growth in the gastric reservoir. Failure of other defense mechanisms, such as intestinal motility, is required for the development of enteric bacterial overgrowth.

1753 Navette, A Telemetric Capsule for Small Intestinal Investigations

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To study mucosal immunohistochemistry and luminal amine content in healthy volunteers and carcinoma patients, a telemetric capsule with interchangeable function tips, transmitting pylorus-coecum distance and speed was applied. Biopsies for immunohistochemistry and fluid for serotonin measurements were obtained, however, long colonic transit made traditional tissue fixatives unsuitable. A new fixative with a temperature optimum of 22–

40°C (Stretch Tissue Fixative, Omaha, Nebr, USA) was instilled in the capsule before biopsy.

Biopsies obtained with this new fixative allowed recognition of T-cell markers and macrophage HLA-DQ by immunohistochemistry, as well as extraction of m-RNA in spite of more than 20 h colon transit time.

Navette telemetric capsule offers a convenient, reliable method for biopsies from any part of the small intestine with minimal patients discomfort. Important cell surface properties are preserved and demonstrable by immunohistochemistry.

1754 Increasing Occurrence of Coeliac Disease in the Netherlands

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Several epidemiological studies have delivered different prevalence rates of coeliac disease, correlating with geographical factors. We updated the national data by analyzing the membership records of the Dutch Coeliac Disease Society.

At January 1st 1993 3,347 unselected members were counted. Of these 2,178 (65%) were patient memberships with at least a single biopsy. Presentation of coeliac disease was in 33% during the first decennium, but 62% presented during adulthood (20+ years). The diagnosis of coeliac disease was made with a female/male ratio of 2. The prevalence of coeliac disease was estimated with a mean calculated overall prevalence rate (per 100,000 inhabitants) in the Netherlands of 14.1. An interesting variation of the estimated prevalence rate was observed between different geographical areas; prevalence rates were less in the 16 greater cities (>100,000 inhabitants) than in a selected group of 12 wellfaring smaller cities (<60,000 inhabitants): (mean \pm SD) 13.4 \pm 3.6 and 26.4 \pm 12.3 ($p < 0.05$). The incidence of coeliac disease, which was estimated by calculation of new cases per year over a population, increased from incidence rate (per 100,000 inhabitants) of +0.13 in 1975, +0.22 in 1980, +0.45 in 1985 and +0.89 in 1989 to +1.21 in 1992. The increase of the estimated incidence rate of coeliac disease outranged the average increase of the Dutch population over the last decade (+0.7 \pm 0.2 %/yr).

We conclude that coeliac disease is a diagnosis of adulthood, presenting in females primarily. An increasing overall prevalence and incidence rates combined with geographically varying prevalence rates suggest that other than population factors are etiologic to this increase. A factor correlating with the diagnosis is prosperity. Further analysis is warranted to unravel possible causal factors.

1755 Secondary Osteopenia in Gastrointestinal Diseases

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From 850 patients with secondary osteopenia due to gastrointestinal diseases were in last 17 years found 640 cases of osteoporosis and 210 patients with osteomalacia.

High ratio in osteoporoses has lactose intolerance – 260 cases (40.62%). The lowest values of bone mineralization were found in women with partial gastrectomy of both types (B I and B II), followed by men with the same operation, in insufficiency of external pancreatic secretion women also have a lower mineralization than men, in resections of the small intestine the degree of mineralization is influenced more by the functional state of the preserved gut than its length. The smallest affection of bone is found in patients with disorders of gallbladder and biliary ducts. Malabsorption alone was found in 74 patients (11.71%), there was sprue, M. Crohn, diabetic enteropathy, scleroderma, diverticulosis of the small intestine. In secondary osteomalacia the leading cause was hepatic damage recorded in 167 patients (79.52%) and malabsorption in 43 patients (20.47%).

The total absorbed amount of calcium, calculated from dietary intake of Ca and percentage of ⁴⁷Ca absorption measured with use of whole-body counter, correlates highly with bone density ($r = 0.9468$) and therefore plays decisive role in origin of secondary bone demineralization in gastrointestinal diseases.

1756 Influence of Simultaneous Use of Endomysium-Antibody Assay on Interlaken Diagnostic Procedure of Coeliac Disease – Practical Experiences of a Pediatric Gastroenterology Unit

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Results of 727 jejunal biopsies (JB) taken in the years 1982–1987 (period I)

were compared with those of 651 JB of years 1988–1993 (period II, when selection of patients for JB, monitoring of diet (GFD) and gluten challenge (GCD) were prospectively assisted by the routine use of serum anti-endomysium antibody test (EmA). A total of 6100 serum EmA assays was performed. Interlaken criteria for diagnosis of coeliac disease (CD) have been not abandoned. EmA results have been found 100% specific for active CD.

In period II 169 new cases of severe jejunal villous atrophy (SJVA) consistent with gluten-sensitive enteropathy (GSE) have been detected out of 336 first JB (49.1%) versus 73/423 (17.8%) new SJVA in period I. As dermatitis herpetiformis (DH) patients were investigated only during period II, even excluding 43 GSE associated with DH, the difference (126 SJVA/289 first JB, i.e. 45%) is still highly ($p < 0.001$) significant. In 33% (43/126) of the patients with SJVA (23 with atypical clinical picture and 20 symptom-free family members) EmA-positivity (EmA+) consisted the major indication of the JB. In 7 atypical DH cases also EmA+ prompted invasive investigations.

In period II versus period I: remission on GFD was in average achieved 14.3 vs 17.7 months ($p < 0.001$). Proving of CD by GCD required 3.17 vs 3.3 JB (n.s), and 22.1 vs 26.0 months ($p < 0.05$); exclusion of CD required 3.2 vs 3.8 JB ($p < 0.001$) and 48.1 vs 61.8 month ($p < 0.05$). During GCD procedures 12/110 (10.9%) vs. 47/133 (35.3%) JB were not decisive ("superfluous JB") for the confirmation or exclusion of CD ($p < 0.001$). 2/153 vs 18/129 JB on GFD did not yield the expected remission ($p < 0.001$). EmA obtained on the day of JB correlated with histology, but changes in titers revealed unknown modification of gluten consumption.

Conclusions: retaining of traditional diagnostic criteria have become more tolerable due to the routine use of EmA and this is the only way to collect sufficiently valuable data for a future judge about changing in favour of EmA.

1757 BA Transport in Proximal and Distal Small Intestine: Effect of Intestinal Mucosal Permeability

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Active bile acid (BA) transport occurs in the ileal tract, while the remaining intestine seems to account for passive diffusion only. Little is known about the actual diffusion rates for BA in different intestinal segments. In the present investigation, jejunal and ileal tracts of rabbit intestine (30 cm) were separately perfused with different BA and the blood was collected from the mesenteric vessels draining from the perfused intestine. Taurocholic (TCA), tauroursodeoxycholic (TUDCA), glycooursodeoxycholic (GUDCA) and ursodeoxycholic (UDCA) acid were separately infused at various doses (0.25–10 mM) and a dose-response curve was thus obtained for each BA in the jejunum and ileum. UDCA perfusions were carried out at different flow rates in order to evaluate the effect of luminal stirring in both the intestinal tracts.

Results: TCA and TUDCA showed active transport rates in the ileum, and actually no transport in the jejunum; GUDCA showed both active transport and passive diffusion in the ileum; the latter component of the transport was present in the jejunum. UDCA absorption was passive in both the intestinal tracts. Passive diffusion was in the following order: UDCA ileum > UDCA jejunum > GUDCA ileum > GUDCA jejunum.

Conclusions: Active transport occurs only in the ileal tract, while passive diffusion of both free and glycine-conjugated BA is present in both intestinal segments. Since the liquid resistance to BA luminal diffusion is similar in ileum and jejunum, the higher passive diffusion for UDCA and GUDCA in the ileum is due to its higher mucosal permeability.

1758 Glucose-Galactose-Fructose Malabsorption Associated to Hydrocephalus: A New Syndrome?

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We describe a case report of an infant suffering from a monosaccharide - glucose, galactose and fructose- malabsorption syndrome. The patient had been hospitalized since birth for intractable diarrhea and lack of weight gain. Initially a Rotavirus in the feces was isolated as a possible cause, but diarrhea and severe metabolic acidosis persisted even after the infection had cleared. On histological examination, intestinal mucosa and disaccharidase levels were normal. Diarrhea with watery feces, acid pH and strongly positive clintest continued with all the various types of milk feeding introduced. Oral challenges with glucose or galactose or fructose gave the same fecal examination results in each case (acid pH, clintest positive ++++) and the blood concentration curves of these monosaccharides, after challenge, were flat. The patient's survival and moderate growth was assured by the uninterrupted intravenous infusion of glucosate solution, while per os the patient was given only a paste feed of ground veal, vegetable oil and MCT. At 6

months hydrocephalus was observed. The breath hydrogen tests, performed when the patient was 36 months old, using the 3 monosaccharides, were strongly positive. This is the first case described of malabsorption of all the 3 main monosaccharides.

1759 Patients with a Short Bowel Start with a Short Normal Bowel

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The normal human small intestinal length measured surgically, radiologically or at autopsy (from the duodeno-jejunal flexure to the ileocaecal valve) ranges from 300 to 850 cm. The length is shorter in women than men. Patients with a short bowel often have had relatively little bowel resected and the majority of patients are women. We aimed to determine if patients with a short bowel started with a short yet "normal" small intestinal length.

In 11 patients (6 men) with Crohn's disease and less than 200 cm residual small intestine, both the residual length of small intestine and the length resected had been measured. The patients had had a median of 4 resections (range 1-5).

	Small intestinal length (cm)	
	median	range
resected:	120	60-165
remaining:	125	90-185
calculated original length:	240	205-315

Although there may have been some bowel shortening due to Crohn's disease the above data shows that the original small intestinal length, before any resections, was short. Some patients, who develop the short bowel syndrome, start with a short but "normal" small intestinal length.

1760 Intestinal Absorption in Patients with Food Allergy and Chronic Enteritis

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AIM of the work was to study the permeability of small intestine of patients with food allergy, chronic enteritis and in control groups to protein-ovalbumin.

Methods. Healthy volunteers and patients with different pathology received food load (3 damp eggs) for an empty stomach. Before and in 4 hours after the load it was studied the concentration of ovalbumin (OA), IgG-immune complex (IC) and antibodies to ovalbumin (O-AB) in blood serum by radioimmune methods (R. Paganelli, 1980). Diagnosis of illness was based on clinical, endoscopic, biopsy and allergologic (skin, serologic etc) tests.

Results. It was investigated 103 patients with food allergy, 40 - enteritis, 16 - bronchial asthma and 20 healthy. It was established that in control the concentration of OA was 11 ± 7 ng/ml, IC - 1700 ± 600 unit, O-AB - 3000 ± 500 ng/ml; in chronic enteritis accordingly 25 ± 7 , 3100 ± 500 , 4100 ± 400 ; in food allergy - 59 ± 22 , 5600 ± 1200 , 4400 ± 600 . The frequency of discover of OA was in control 16%, in enteritis - 44%, in food allergy - 67%. It shows that in chronic enteritis and especially in food allergy the level of OA, IC and O-AB is much higher than in control. It means that the permeability of intestinal barrier and the speed of absorption of antigen in food allergy is increased. There is correlation between the increasing of level OA in serum and skin tests with it. In bronchial asthma the permeability of intestine was normal.

Conclusion. The increase of concentration of OA after the load can be the test on permeability of intestine. The increase of absorption can have important role in pathogenesis of food allergy.

1761 Inhibition of Gastric Acid Secretion due to Omeprazole Reduced Zinc Absorption in Man

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Reduced gastric acid secretion and elevated gastric pH is relatively common in humans due to the widespread use of ulcer healing drugs and other causes. Hypochlorhydria has been reported to decrease mineral absorption in man. The effects of reduced gastric acidity on zinc absorption in humans is sparse. The aim of this study was to determine the effect of omeprazole-induced hypochlorhydria on the absorption of zinc in man. Zinc absorption levels were determined in 14 healthy volunteers (6 males, 8 females, ages 19-34 years) using a zinc tolerance test (ZTT). Fifty milligrams of elemental zinc (ZnSO₄, 220 mg) were orally administered. The test was repeated in the same experimental conditions after a 5-day treatment with omeprazole (each subject received 60 mg/day p.o.). The serum zinc levels ($\mu\text{g/dl}$) were measured at baseline and 1, 2, 3 and 4 hour after the administration of the metal. Gastric acidity was

measured during the ZTT, via nasogastric tube. Serum zinc was assayed using inductively coupled plasma spectrometry (Clinica Chimica Acta. 206: 155, 1992).

	0	1 hr	2 hr	3 hr	4 hr
No treatment	106 \pm 5	171 \pm 10	178 \pm 12	178 \pm 11	165 \pm 13
Omeprazole	103 \pm 6	146 \pm 10	135 \pm 10	152 \pm 12	128 \pm 12

Values are means \pm SEM of 14 subjects. Areas under serum concentration curves (AUCs) were calculated during 4-hour period. The mean value of the AUC₄ with no treatment was 245 ± 35 and this value ($\mu\text{g.h./dl}$) decreased significantly (paired t test) after treatment (141 ± 34) with omeprazole ($p < 0.05$). Omeprazole treatment significantly increased gastric pH during the ZTT ($p < 0.001$). We conclude that gastric acid secretion plays an important role in the regulation of zinc absorption in man.

1762 Adenosine as Modulator of Reactive Hyperemia in the Rat Gut

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Reactive hyperemia in the gut is a well recognized, local, vascular response following arterial occlusion, although little investigation has addressed the mechanism of the hyperemia. Metabolic, myogenic and neurogenic mediators of this response have been proposed. The present study was conducted to evaluate a possible modulatory role of adenosine in reactive hyperemia. In anesthetized rats, mesenteric blood flow was measured with a pulsed Doppler flowmeter. We also determined: duration of RH, excess volume of blood flow above preocclusion control value during RH, and maximal increase in conductance during RH. Data were collected following release from occlusions lasting 30, 60, and 120 sec. In three groups of fasted rats and in three groups with a bile-oleate solution in the jejunum (fed rats), RH parameters were obtained before and after adenosine deaminase (ADA) and two adenosine receptor antagonists: 8-phenyltheophylline (8-PT) and 1,3-dipropyl-7-methyl-xanthine (DPMX). In fasted rats ADA reduced the duration of RH after each period of occlusion, 8-PT showed less consistent inhibitory activity, and DPMX was ineffective in reducing any parameter of RH. In fed rats control blood flow was increased. Duration and volume of RH were increased after each occlusion compared with fasted rats. ADA, 8-PT, and DPMX were more effective and consistent inhibitors of RH in fed gut than in the fasted gut. Sizeable attenuations of duration and volume was observed with ADA and 8-PT in fed gut. Our findings support the hypothesis that adenosine is a vasodilator metabolite in RH acting on A-1 subtype receptors. This role of endogenous adenosine is more apparent in fed gut with enhanced metabolic activity than in quiescent gut.

1763 Does Push Type Enteroscopy Improve the Diagnostic Yield in Small Bowel Tumours? A Comparison of Radiographic and Endoscopic Findings

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Primary and secondary small bowel tumours are rare and seldom suspected on a clinical basis. Barium enema studies, though improved by the double contrast method, occasionally give false positive results due to ileal tract overlap or air bubbles. Push-type enteroscopy unlike sonde-type enteroscopy is quick, has interventional capability and could be useful to prove or rule out the radiographic finding of a neoplasm and for histological typing. **Patients and Methods:** We used two new push-type enteroscopes (Olympus SIF 10 LY fiberscope or a SIF 100 videenteroscope) fitted with tip deflection and biopsy/therapeutic channel in 14 patients with a radiographic evidence of distal duodenal or jejunal tumour. The enteroscope was passed orally and advanced with a push-pull technique, using external hand abdominal pressure and manipulation of patient position to maximize insertion and reduce looping. The mean duration of the procedure was 15-20 minutes. Third and fourth duodenal portion were considered as distal duodenum. **Results:** The depth of insertion beyond the ligament of Treitz was 30-150 cm (median 80). The radiographic finding of a polyp located in the distal duodenum or in the proximal jejunum (20-30 beyond the ligament of Treitz) was not confirmed in 4 out of 5 patients. In the remaining patient enteroscopy and snare polypectomy demonstrated a tubular adenoma (8 mm in diameter). A small bowel stenosis was ruled out in 5 out of 8 patients. Neoplastic stenosis was confirmed in 3 patients, due to primary adenocarcinoma [2] or secondary involvement by a paraganglioma [1]. In one patient with melanoma and a radiographic evidence of jejunal metastasis, endoscopy showed an extrinsic compression (non specific inflammation at histology). **Conclusions:** Push type enteroscopy can be useful in the work up of patients with suspected small bowel neo-

plasms. It consents histological characterization and can reasonably rule out false positive radiographic findings especially for small lesions. Caution is obviously required in distal lesions as it is difficult to evaluate the extent of the segment explored.

1764 Push Type Enteroscopy in Patients with Diarrhoea and Malabsorption of Non Obvious Origin

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Endoscopic examination with instruments specifically designed for investigation of the small intestine could be a useful tool in patients with diarrhoea and malabsorption of non obvious origin.

Patients and Methods: Push type enteroscopy using either an Olympus SIF 10 LY fiberscope or a SIF-100 videoenteroscope was performed in 27 patients with diarrhoea and/or malabsorption (13 males, 14 females, age ranging from 28 years to 76). **Results:** Insertion 40–100 cm (median 65) beyond the ligament of Treitz was accomplished. A normal jejunal picture was found in 15. In 10 out of 15 the histological finding was normal and diarrhoea was due to other causes. Correct diagnostic classification was obtained in the remaining 5 (villopathy with jejunal pseudosarcoidotic granulomas in one patient with common acquired agammaglobulinemia, lymphangiectasis in one patient, presence in the jejunal mucosa of elements compatible with *Microsporidium* infection in three AIDS patients). This last finding was subsequently confirmed by electron microscopy and by the observation of large number of protozoan spores in the jejunal juice aspirate. Endoscopic and histological alterations correlated with the clinical picture were observed in the other 12 patients [Crohn's disease (1), villopathy and benign lymphoid hyperplasia (1), villopathy (8), lymphangiectasis (2)]. Specific endoscopic pictures indicative of lymphangiectasis (tall Kerckring's folds with whitish protusions, "glacé icing" like appearance) and villopathy (mosaic mucous pattern, scattered, low Kerckring's folds-indigo carmine staining emphasising the mucous pattern), were identified. **Conclusions:** The method is useful as a step towards the diagnosis of diarrhoea and malabsorption, both through the presence of endoscopic pictures indicative of certain disorders, and through the possibility of performing specific-purpose biopsies on the more significant areas. Though jejunal endoscopic pictures indicative of villopathy and lymphangiectasis are identifiable, a normal endoscopic picture is not always accompanied by a normal histological finding and therefore does not exclude a jejunal disease.

1765 Effects on Intestinal Absorption and Permeability of Pelvic Radiotherapy in Patients with Uterine Cancer

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Injuries to the small and large intestine are important dose limiting side effects in clinical radiation therapy. The morphological characteristics of radiation enteropathy are well characterized, but less is known about possible pathogenetic mechanisms, including the effects on mucosal barrier function and absorptive capacity. These parameters were evaluated using a combined absorption-permeability test where the urinary excretion of five orally ingested marker molecules not metabolized in the body was analyzed at different time intervals. Small intestinal absorptive capacity was assessed from 5 hour urine excretion of 3-0-methyl-D-glucose and D-xylose, small intestinal permeability from the ratio between lactulose and L-rhamnose excretion in 5 hour urine samples and large intestinal permeability from the 24 hour urinary excretion difference of 51 CrEDTA and lactulose.

Fifteen patients with uterine cancer receiving postoperative fractionated pelvic radiotherapy up to a total dose of 50 Gy were followed with repeated tests before start of radiotherapy, after each 10 Gy dose and 1 and 3 months after completion of the radiotherapy.

There was no significant changes in the urinary excretion of intestinal absorptive markers during the study period, but the 5 hour lactulose/L-rhamnose excretion ratio and 24 hour excretion difference of 51 CrEDTA and lactulose increased significantly from the first and second radiation dose, respectively, and onwards, but with complete recovery 3 months after treatment.

The findings indicate a leaky gut which may be a primary effect of the radiation and predispose to the radiation enteritis and/or be secondary and contribute to maintaining a chronic inflammation.

1766 Utility of the SeHCAT-Test in the Investigation of Different Types of Bile Acid Malabsorption

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Aim: To evaluate the applicability of the SeHCAT-test in routine investigation of different types of suspected bile acid malabsorption (BAM).

Methods: 243 patients examined by the SeHCAT-test from 1987 to 1992 were evaluated retrospectively. The SeHCAT-scan was performed by abdominal gamma-counting of the 7 day retention of a standard oral dose of 75-se-homocholeic acid taurine. A diagnosis BAM was considered in cases of SeHCAT-values $\leq 15\%$. According to indication for testing, patients were grouped in BAM type 1 (ileal disease, ileal resection), BAM type 2 (ideopathic BAM) and BAM type 3 (BAM associated with other concomitant disease).

Results: Of 92 patients with suspected BAM type 1 32 had non-operated ileal disease. 20 of these had BAM and cholestyramine treatment were successful in 76% of treated cases. All 60 patients with previous ileal resection (irrespective of cause and resection length) had low SeHCAT-values (median 0.6; range 0–13%).

Among 128 patients with chronic diarrhoea investigated for BAM type 2, SeHCAT-values $\leq 15\%$ were found in 56 cases. In 21 of these, other diagnoses than BAM were made on basis of anamnesis and complementary investigations together with relatively high SeHCAT-values (median 12.7; range 7–15%). A diagnosis of BAM type 2 was established in the remaining 35 patients (median SeHCAT-value 5.4; range 1–11%). Of 30 treated patients, 24 (80%) had benefit of cholestyramine treatment.

BAM type 3 was suspected in 23 patients. 11 of these had SeHCAT-values below 15% suggestive of BAM.

Conclusions: In patients with diarrhoea and previous ileal resection, low SeHCAT-values are customary, and a treatment trial with cholestyramine should precede any investigation. In non-operated ileal disease however, the SeHCAT-test proves valuable as a differential diagnostic tool.

In our patients, ideopathic BAM, as assessed by the SeHCAT-test and treatment results, is present in more than one quarter of patients with chronic unexplained diarrhoea, a fact that emphasizes the importance of the SeHCAT-test in the investigation of patients with chronic diarrhoea.

1767 Protein C and S Deficiency as Underlying Process in Patients with Splanchnic Venous Thrombosis

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Venous thrombotic events in the splanchnic root is associated with a high morbidity and mortality rate. Standard diagnostic evaluation is frequently frustrating with a low diagnostic yield so that a number of patients could be underdiagnosed. The frequency of inherited or acquired disorders causing thrombosis in the adult population is probably of about 10%. We present our experience with Protein C in 3 and Protein S in 1 patients who suffered from mesenteric superior vein (2 patients) and portal vein thrombosis (2 patients) respectively. Patients were admitted to the hospital with acute abdominal pain. Diagnosis was revealed by Duplexsonography in 2 patients, by angiography in 1 patient and in the last case explorative laparotomy led to diagnosis. None of the patients had a previous history of venous thrombosis. Resection of bowel segments was necessary in two patients, in 1 patient intraoperative selective lysis with streptokinase through the superior mesenteric artery branches was successful without resection of bowel segments and in the remaining one patient lysis treatment subsequent to angiography was successful without operation. Postoperative anticoagulation therapy was started immediately after treatment in 3 patients. In the 4th patient with delayed onset of anticoagulation rethrombosis occurred. 3 out of them had functional Protein C deficiency of about 40% and one had Protein S deficiency of 43%.

These experiences suggest that 1.) splanchnic venous thrombosis of "unknown origin" might be often due to Protein C/S deficiency. 2.) Duplexsonography could be useful in diagnostic exploration of splanchnic venous thrombosis. 3.) Intraoperative and/or preoperative selective lysis through the arterial tree (superior mesenteric artery) might be of beneficial effect in bowel salvage. 4.) Intraoperative anticoagulation start is mandatory to prevent rethrombosis.

1768 Small Bowel Reperfusion Injury in the Rat is Ameliorated by Multivitamin Pretreatment

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The objective of that study was to evaluate the scavenging effect of a multivitamin cocktail (Omnibionta®), containing the vitamins E, C, A and the B-complex in an ischemia-reperfusion model in the rat small bowel. Sprague

Dawley rats were underwent total superior mesenteric artery (SMA) occlusion over 40 minutes followed by reperfusion of 60 minutes. Mucosal damage was assessed histologically according to Chiud's method using a 0 to 4 scoring scale. Relating to the several components of the vitamin cocktail 6 groups containing 12 animals each were randomized. The vitamin cocktail was infused in a two fold manner: half of the dosis was given before occlusion of the SMA and again immediately before reperfusion start. For statistical analysis the non-parametric Kruskal Wallis-test was used. A p-value of $p < 0.05$ was regarded as significant. Ischemia over 40 minutes (ischemic-group) without reperfusion lead to a significant increase of the mucosal damage compared to the sham-group. Reperfusion of the ischemic gut without treatment lead to a significant increase of the epithelial damage compared to the ischemic group. Reperfusion with vitamin E, C and A treatment didn't increase the mucosal damage compared to the ischemic group. That study suggests that vitamin pretreatment could have clinical implications in preventing ischemia-reperfusion damage in the small bowel.

1769 Effect of Selenium Supplementation on Muscle Biopsies in Selenium Depleted Patients on Home Parenteral Nutrition

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Several case reports of muscular weakness or muscular pain which respond to selenium (Se) substitution have been published in patients on total parenteral nutrition. Extremely low blood Se values have been found in patients with no obvious clinical symptoms, and the clinical significance of Se deficiency is therefore not well established.

Material: A biopsy of the quadriceps muscle was taken before and after intravenous substitution for 4 months with 200 µg Se per day as natrium-selenite (Selenase®) in 9 patients on home parenteral nutrition.

The patients had been on home parenteral nutrition for 21–168, median 58 months. Prior to Se substitution all patients had low plasma Se (median 0.21 µmol/l). After Se supplementation all patients had Se levels within normal range.

Results:

Fibre	Before Se median (range)	After Se median (range)	p
1 Mean diameter	57 (47–70)	59 (50–83)	p = 0.01
1 Atrophy factor	20 (0–39)	9 (3–21)	p = 0.11
1 Hypertrophy factor	12 (1–60)	12 (0–112)	p = 0.06
2 Mean diameter	50 (38–77)	64 (34–72)	p = 0.08
2 Atrophy factor	35 (9–87)	16 (2–116)	p = 0.37
2 Hypertrophy factor	9 (0–90)	29 (0–51)	p = 0.29

Conclusion: The study demonstrated a significant increase of the diameter of type 1 muscle fibre following Se supplementation in Se depleted patients. This supports the suggestions of a skeletal myopathy related to Se deficiency.

1770 Improvement of Liver Function Tests After Selenium Substitution in Patients on Home Parenteral Nutrition

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The essentiality of selenium (Se) for animals was first established by Schwartz and Folz (1957), who demonstrated that the element could prevent necrotic liver degeneration in rats. Liver enzymes are abnormal in approximately 20% of patients on home parenteral nutrition, but hepatic pathology has not been reported in the fatal cases of acquired human Se deficiency nor in Keshan disease.

The aim of the present study was to investigate the change of plasma alkaline phosphatase and aspartate aminotransferase (ASAT) after substitution with 200 µg/d Se as natrium-selenite (Selenase®).

Material: Ten patients on parenteral nutrition from 21 to 168, median 60 months were studied. Prior to Se substitution all patients had low plasma Se: 0–0.51, median 0.22 µmol/l (control group 0.75–1.86, median 1.11 µmol/l). After supplementation for 1 month, Se levels increased significantly to 1.17–1.89, median 1.34 µmol/l, and no further increase in plasma Se was observed hereafter.

Results: A significant fall in ASAT was found after 1 month ($p = 0.03$) and after 4 months ($p = 0.01$) of selenium substitution. (Normal range: 0–40 U/L)

Patient no.	1	2	3	4	5	6	7	8	9	10
Before	37	113	160	22	190	38	90	55	17	142
1 month	24	62	122	20	150	27	78	64	15	86
4 months	19	72	74	15	76	23	124	51	20	41

No change was found in plasma alkaline phosphatase activity.

Conclusion: This study suggests that Se supplementation may improve liver function in selenium-depleted patients.

1771 Salivary IgA Antigliadin Antibodies in Children with Coeliac Disease

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The definitive diagnosis of coeliac disease [CD] still requires a small intestinal biopsy [ESGAN criteria-1990]. The finding of circulating antibodies [IgA anti gliadin, antiendomysium, antireticulin] at the time of diagnosis and their disappearance on gluten-free diet add the weight to diagnosis and may be very useful, non-invasive screening test. Some authors suggested that measurement of salivary IgA AGA may be a very good marker for coeliac disease.

The aim this study was to determine the usefulness of the measurement of salivary IgA AGA in children with CD.

Whole saliva and serum samples were collected simultaneously from 55 children divided into four groups. In group I were 13 children [age ranged 1 7/12 – 10 years] who had CD proved by biopsy (III°/IV°). In this group 4 children were on normal diet [a] and 9 children were on gluten challenge [b]. In group II were 15 children (age ranged 2 11/12 – 7 4/12 years) who had CD established and were clinically well on gluten free-diet. In III group were 14 children age ranged 4–17 years undergoing biopsy which subsequently excluded CD [control group]. IgA AGA, EmA, ARA were measured in all serum and saliva samples.

IgA AGA in saliva were found in all children with untreated CD [titer ¼ – 1/256] and in 6 out of 9 children provoked with gluten [group I]. This antibodies were not found in children on gluten free diet and also in control group.

1772 Screening for Coeliac Disease in an Adult Population with Insulin Dependent Diabetes Mellitus

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Coeliac disease (CD) associated with insulin dependent diabetes mellitus (IDDM) has been well described among children. The few studies carried out in adult population with IDDM report a variable prevalence between 3 and 15%, according to screening criteria.

The aim of this study was to screen adults affected by IDDM for CD, using measurements of anti gliadin (AGA-IgA, AGA-IgG) and antiendomysium antibodies (EMA). Nutritional status based on clinical and laboratoristic data and 1h-xylose test were evaluated in all positive patients; perendoscopic jejunal biopsy was performed only in AGA-IgA and/or EMA positive subjects. Abnormal concentrations of one or more antibodies were found in 7 of the 160 (79 males, 81 females, age 18–66 ys) patients studied (4.4%): 2 AGA-IgA+, 3 AGA-IgG+, 1 AGA-IgA and IgG+, 1 AGA-IgA and EMA+. All patients were asymptomatic and had negative 1h-xylose test. Bioptic specimens of jejunal mucosa showed subtotal villous atrophy only in one 60 ys-old male patients who had abnormal AGA-IgA and EMA values, biochemical signs of malabsorption (low serum iron, ferritin and folic acid) and a positive history of autoimmune tireopathy.

Our results suggest a significant association between CD and IDDM even in adult patients, although the prevalence we have found is lower than in previous reports. They confirm that all diabetic subjects should be screened for CD, using assay of AGA antibodies and, above all, EMA which resulted the more specific test. The screening could allow to treat asymptomatic coeliac and follow up patients with abnormal AGA but no mucosal damage as carriers of latent CD.

1773 Determination of Anti Jejenum Antibodies (JAB) Using Various Animal Substrates: Is There a Species-Specificity?

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Although the Anti-Endomysium Antibodies (EmA) are, presently, the most reliable serological test in the diagnosis of Coeliac Disease (CD), the search for new serological markers is still in progress. Particularly encouraging seems the determination of IgA-JAB, an antibody related to the target organ, recently described.

Aim: To evaluate the use of jejunum of various animals as substrate in the determination of IgA-JAB.

Methods: JAB detection was performed by indirect immunofluorescence on frozen sections of jejunum from white rat, domestic rabbit, pig, chicken and monkey. The sera from a biopsy proven CD patient (EmA positive) and of a healthy control were used as true positive and true negative.

Results: The sections of jejunum from white rat, domestic rabbit and monkey showed the characteristic pattern of elongated villous fluorescence underlying the epithelial and cryptal basement membrane and/or a ring like fluorescence around the crypt. No immunofluorescent reaction was observed on chicken and pig jejunum sections.

Substrate	Rat	Rabbit	Chicken	Pig	Monkey
CD patient	+	+	-	-	+
Control	-	-	-	-	-

Conclusion: Sections of jejunum from white rat, domestic rabbit and monkey can be successfully used in the determination of JAB. The availability and the lower costs make suitable the choice of tissues from white rat and domestic rabbit as antigens.

1774 Polyamines in the Diet, but not in Bile, Contribute to Intestinal Luminal Concentrations

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Background: The polyamines (PAs), putrescine, spermidine and spermine, play an important role in normal, adaptive and neoplastic growth in the intestine. Small bowel mucosal PA concentrations may be regulated, not only by enzymes controlling their synthesis and degradation, but also by PA absorption from the gut lumen. In the rat, PAs may be (i) ingested with food, (ii) synthesized by intestinal bacteria and (iii) present in bile, since polyamines allegedly undergo an enterohepatic circulation (EHC). However, there is little information about acetylated and non-acetylated PA levels (bound and unbound) in the human diet, intestinal lumen or bile. **Methods:** PA concentrations were therefore measured in perchloric acid extracts of different foods, gallbladder bile and intestinal contents, using HPLC (Seiler and Knödgen, *J Chromatogr* 1980; 221: 227-35). **Results:** In hamburgers, cheeseburgers, fish fillets, boiled prawns and citrus fruit juices, the most abundant PAs were putrescine (<760 μ M), acetylated putrescine (291 μ M), spermine (51 μ M), spermidine (33 μ M), and the bacterially derived PA, cadaverine (36 μ M). In pure orange juice, the concentrations of putrescine and spermidine were 682 μ M and spermidine 19 μ M respectively while the recovery rates were 99 and 88%. Moreover, >99% of the PAs were in the unbound form and, therefore, potentially bioavailable. Both spermine (2.4 \pm SD 2.4 μ M) and spermidine (1.5 \pm 6 μ M) were found in all 12 samples of gallbladder bile (obtained by ultrasound-guided fine-needle aspiration) but low concentrations (<2.0 μ M) of putrescine and cadaverine were detected in only 3 of the samples - despite the fact that all 12 biles were highly concentrated (bile acid concentration 119 \pm 23.4 mM). **Conclusions:** Dietary PAs may well make a significant contribution to intestinal luminal PA concentrations. However, our results in bile suggest that there is no appreciable EHC of PAs in man.

1775 The 14C-D-Xylose Breath Test in HIV+ Patients with Chronic Diarrhoea

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Introduction: Chronic diarrhoea and weightloss are severe problems in AIDS. The usual diagnostic tools for malabsorption, including a small intestinal biopsy (SIB) and conventional xylose tests, have insufficient sensitivity.

Aim: To investigate the role of the 14C-d-xylose breath test in HIV+ patients with non-infectious diarrhoea.

Materials and methods: 227 patients with possible malabsorption, including 20 HIV+ patients with non-infectious diarrhoea, were examined clinically, with breath test, SIB, and routine blood tests. No disease of the small intestine was found in 140 patients (controls), 23 patients had primary lactase deficit and 44 patients celiac disease. The breath test was done after an overnight fast. One gram D-xylose and 5 μ Ci ¹⁴C-d-xylose dissolved in 250 ml tap water were given perorally. The percentage of the given dose passed in the urine in 3 hours (U%) as well as an index describing the form of the breath curve (B-index) were calculated. B-index above the 90 percentile and U% below the 10 percentile of controls were considered abnormal.

Results: (Except for frequencies presented as median, 10 and 90 percentiles)

Diagnosis	Control	Celiac	HIV+	Lactase def.
Sex (f/m)	104/36	33/11	1/19	8/15
Age (years)	42 (23-72)	40 (24-67)	35 (25-50)	41 (31-62)
U%	34 (16-46)	20 (10-36)	19 (4-38)	35(23-48)
B index	1.9 (1.3-3.1)	8.1 (3.3-31.9)	4.9 (2.0-24.9)	2.0 (1.4-3.1)
Hb (g%)	14.1 (12.1-15.5)	13.0 (10.6-14.7)	12.3 (8.7-14.7)	14.4 (13.6-16.7)
B12(pmol/l)	330 (180-492)	170 (92-410)	370 (188-712)	280 (174-647)
Fol.a.(nmol/l)	405 (210-739)	155 (72-427)	237 (174-636)	477 (354-1064)

75% of the HIV+ patients had B index above the 90 percentile of controls whereas only 47% had U% below the 10 percentile of control patients. In celiac patients the figures were 93% and 31%, respectively.

Conclusion: The carbon-14 xylose breath test is useful in the diagnosis of malabsorption which seems to be an important pathogenetic factor in non-infectious diarrhoea in HIV+ patients, and it is a more sensitive method than the conventional xylose test.

1776 Bone Mineral Content in Patients Receiving Home Parenteral Nutrition

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Patients receiving home parenteral nutrition (HPN) carry a high risk of developing metabolic complications including bone disease, which may result in osteomalacia, bone pain and fractures. This condition may be caused by a deficiency or excess of nutrients or could also be related to the underlying intestinal disease. The aim of the present study was to monitor the bone mineral content (BMC) in patients with short bowel syndrome receiving HPN.

Patients: Fourteen patients with Crohn's disease and 1 patient with ulcerative colitis (median age 32 years, range 23-69 years) received HPN for median 48 month, range 20-106 month.

BMC: BMC of the lumbar spine and femoral neck was measured at intervals of 24 month by dual photon absorptiometry.

Results: At the time of inclusion, BMC of lumbar spine and femoral neck was significantly reduced compared to normal individuals (mean 77%, range 45-106%). The median BMC of the lumbar spine declined from 27.83 to 25.52 g hydroxyapatit (HA) (p = 0.07) and BMC of the femoral neck decreased from 1.97 to 1.64 g HA/cm (p = 0.02). Thus, during the course of the study bone mass decreased by a mean value of 2%, which is higher than the expected yearly decrease of 0.5-1% in normal elderly women. There was no correlation between the decline in BMC and the length period the patients were on HPN.

Conclusion: Patients with short bowel syndrome on home parenteral nutrition have a significantly reduced BMC. Since the bone mass decreases with a rather low rate of about 2% per year in patients on HPN, we conclude that the reduction in bone mass probably is related to the chronic malabsorption syndrome.

1777 Complaints After Lactose Load (LL) in Different Families of Lactose Malabsorbers

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Subjects with lactose malabsorption (LM) have after LL different complaints: diarrhoea (D), colicky pain, flatulence, abdominal distention-meteorism (M), some of lactose malabsorbers have no symptoms after LL. We have studied complaints after LL in subjects with LM in different families of Estonians.

95 first-degree relatives of 25 probands with LM underwent the lactose tolerance test with 50 g of lactose. 36 were children in age 5-15, 59 - adults in age 20-72.

25 probands with LM suffered after LL the following complaints: D - 16, M - 6, without complaints - 3.

16 probands with LM and D after LL: 69 first-degree relatives, 36 LM. After LL: D - 28/36 (12 children), M - 3/36 (1 child), without complaints - 5/36 (3 children).

6 probands with LM and M after LL: 17 first-degree relatives, 8 LM. After LL: M - 4/8 (2 children), D - 2 adults, without complaints - 2 adults.

3 probands with LM and without complaints after LL: 9 first-degree relatives, 6 LM. After LL: without complaints - 3 children and 2 adults, M - 1 child.

First-degree relatives of probands with D had Dafter LL in 78% of cases. First-degree relatives of probands without D had after LL D only in 14%. The difference is highly significant (p < 0.01).

There is some reason to conclude, that complaints after LL is connected with inheritance, may be on the basis of large-intestinal microflora.

1778 Alteration of Teeth Enamel in Celiac PatientsC. Trabucchi. *Paediatric. Gastroent. Depart., Verona, Italy*

In 1986 Finnish authors described teeth enamel lesions in celiac patients. Alterations are classified in 4 levels, from change of colour to complete enamel destruction.

We studied 24 celiac patients: 8 had always followed strict gluten free diet since diagnosis within 24 months of age, 12 followed a 4–12 months provocation gluten diet in pre-teen age, and were since then on strict gluten free diet, 4 were on liberal diet. Age varied from 13 to 18.

All received accurate teeth cleaning and drying before examination at incident light.

AGA and AEM were dosed in all patients.

Results: Patients following strict gluten free diet presented no lesions of enamel and normal AGA and AEM values. Of the 16 patients which had followed for a period diet including gluten, only 5 presented significant lesions (2°–3° Aine degree).

Only patients following a gluten diet presented pathological values of AEM and AGA antibodies.

From our preliminary studies, to be confirmed by investigation on larger number of patients, it seems that teeth enamel lesions on patients not strictly on a gluten free diet are rather less frequent than described by the Finnish authors, and not useful as a screening test for celiac disease, as proposed.

1779 Effect of Glutenfree Diet on Intestinal Permeability Measured by the Sugar Absorption Test in Patients with Coeliac DiseaseJ.J. Uil¹, R.M. van Elburg², F.M. van Overbeek², C.J.J. Mulder¹, H.S.A. Heymans². ³*Dpt of Gastroenterology, Rijnstate Hospital, Arnhem, The Netherlands;* ²*Beatrix Children's Hospital, University of Groningen, The Netherlands*

Permeability probes are used to reflect the functional integrity of the intestinal epithelial layer in coeliac disease [CD]. To evaluate the effect of a glutenfree diet on the functional integrity of the small bowel -which is impaired in CD- the sugar absorption test [SAT] was performed in coeliacs at the moment of diagnosis and in the follow up during glutenfree diet. In the SAT a solution of lactulose [L] and mannitol [M] was given simultaneously to the fasting patient after which the L/M ratio was measured in 5 hours' urine. A ratio ≥ 0.100 was considered abnormal. The L/M ratio (median, range) was significant higher at the moment of diagnosing CD (0.234, 0.062–0.804, $n = 22$) compared to the ratio in the group of 0–2 years glutenfree (0.128, 0.037–0.255, $n = 13$, $p < 0.05$) and ≥ 2 years glutenfree (0.143, 0.030–0.322, $n = 17$, $p < 0.05$). There was a significant correlation between the SAT and the degree of villous atrophy. The L/M ratio (median, range) was significant higher in case of biopsies with total villous atrophy (0.362, 0.062–0.804, $n = 11$, $p < 0.005$), subtotal villous atrophy (0.210, 0.062–0.343, $n = 15$, $p < 0.005$) and villous irregularity (0.150, 0.078–0.366, $n = 16$, $p < 0.01$) compared to the L/M ratio in case of biopsies with normalized histology after glutenfree diet (0.078, 0.030–0.180, $n = 10$). In the majority of patients without improvement of the SAT and villous abnormalities, dietary errors seemed to be responsible. We conclude that glutenfree diet improves intestinal permeability in CD. The SAT is useful in the follow up of coeliacs to evaluate the effect of glutenfree diet on the permeability of the small bowel.

1780 Antiendomysium Antibodies in the Diagnosis of Adult Coeliac DiseaseT. Valdimarsson, L. Franzén, E. Grodzinsky, T. Skogh, M. Ström. *Department of Internal Medicine, Faculty of Health Sciences, University Hospital of Linköping, Sweden; Department of Pathology 2, Faculty of Health Sciences, University Hospital of Linköping, Sweden*

Purpose: To evaluate IgA anti-endomysium antibodies (EmA) in the diagnosis of adult coeliac disease.

Methods: 146 consecutive adult patients (aged 17–84 years) with suspected malabsorption or dyspepsia who underwent small bowel biopsy were included. No patient had concomitant dermatitis herpetiformis or IgA deficiency. IgA anti-gliadin antibodies (AGA) and EmA were analysed.

Results: Nineteen patients (13%) were found to suffer from coeliac disease. The sensitivity of EmA for coeliac disease was 74% and the specificity was 100%. The positive and negative predictive values of EmA was 100% and 96% respectively and the diagnostic efficiency was 97%. The sensitivity of AGA for coeliac disease was 79%, but the specificity was only 70%. The positive and negative predictive values of AGA was 28% and 96% respectively and the diagnostic efficiency was 71%. Three of the 19 patients with coeliac disease had neither detectable AGA nor EmA. Two patients had AGA but not EmA and one had EmA but not AGA.

Conclusions: When EmA are found in adults, small bowel biopsy is not necessary. As the sensitivity of the EmA test for coeliac disease is rather low, a small bowel biopsy must be performed in patients without EmA if there

still is clinical suspicion of coeliac disease. Furthermore, we suggest that IgA anti-endomysium antibodies could replace IgA anti-gliadin antibodies as a diagnostic test for adult coeliac disease due to the higher diagnostic efficiency.

1781 Analysis of HLA DPB Gene in Susceptibility to Coeliac DiseaseE. Roschmann, T. Wienker¹, B.A. Volk. *Department of Medicine, University of Freiburg, Germany;* ¹*Institute of Human Genetics, University of Freiburg, Germany*

The association of coeliac disease with particular HLA class II genes led to the suggestion that a gene or genes encoded within the HLA class II region contribute to disease susceptibility. In order to further substantiate the possible contribution of HLA DPB genes in susceptibility to coeliac disease we investigated the segregation of HLA DPB alleles in 24 coeliac disease families (including 41 affected patients and 131 normal relatives) and performed an explorative linkage analysis. **Methods:** The family members were typed for HLA DPB alleles by conventional RFLP analysis using Rsa I as restriction enzyme. Linkage analysis was performed under the genetic model with a disease allele frequency of 0.0005 and penetrance of 0.90 which enabled us to calculate the LOD scores of coeliac disease versus marker gene. **Results:** Two alleles were distinguished at HLA DPB designated allele A1 (4.0 kb fragment) and A2 (2.1 kb fragment). 13 pedigrees were informative for segregation of the two HLA DPB alleles resulting in a LOD score of -1.361 at a recombination fraction of zero. **Conclusions:** No significant linkage relation (LOD score $+3$) or exclusion of linkage (LOD score -2) was observed for the marker gene tested but generally, positive LOD scores indicate evidence for linkage and negative LOD scores indicate exclusion for linkage. The resulted LOD score might be attributed to the limited sample size or to the limited information of the polymorphic marker used in this study.

1782 Non Invasive Measurement of Gastric Acid Secretion by Electrical Impedance TomographyA.D. Christ, U. Hasse, P. Bauerfeind, N.H. Alam, K. Gyr. *Med. Polyclinic, University of Basle, Switzerland*

The standard method for measuring gastric acid secretion in man uses gastric intubation and stimulation by pentagastrin. A reliable tubeless test is lacking. Electrical impedance tomography (EIT) measures changes in the electrical impedance in the human body and calculates a tomographic image similar to a computer scan image. We attempted to investigate, if EIT can distinguish between acid and neutral fluids in the stomach and if EIT can detect acid after weak to moderate physiological stimulation of the stomach.

Method: (a) 5 fasting volunteers were examined by EIT on 2 days during 60 min.: with and without acid inhibition by omeprazole (80 mg 24 hours and 40 mg 12 hours before the test). After collecting baseline images, shamfeeding was performed. (b) 4 fasting volunteers with acid suppression by omeprazole (as above) were examined twice. On one day increasing volumes of artificial gastric juice (0.075 N HCl with NaCl and Pepsin, pH = 1.3) were instilled into the stomach. On the other day a isotone fluid without acid (pH = 5.3) was used. At the end of each experiment, the stomach was marked by a salty soup (region of interest). In this region the impedance was measured and the area under the curve (AUC) was calculated.

Results: (a) The median pH of a long-term pH-metry, performed for control purposes, with and without omeprazole was 3.9 and 0.8 resp. The AUC of the impedance with and without omeprazole was 23.7 ± 7.9 (mean \pm SD) and 37.5 ± 19.1 resp. (paired t-test, $p = 0.09$). (b) Perfusion of 10 ml, 20 ml and 50 ml did not yield a significant difference in the AUC between fluid with and without acid. The difference in the AUC after instillation of 100 ml (7.5 mmol HCl) was 18.6 ($p = 0.04$), after 200 ml (15 mmol HCl) 39.2 ($p < 0.001$).

Conclusion: EIT detects physiological amounts of acid (7.5 mmol acid and more) in the stomach and distinguishes it from neutral fluid. It does not detect acid secretion after low physiological stimulation by shamfeeding. Further studies with stronger acid stimulation by pentagastrin are needed to prove, that EIT can distinguish hypo- and achlorhydric patients from normal or high secretors.

1783 Prostaglandin E₂ and I₂ are the Major Arachidonic Acid Metabolites Secreted by Esophageal Mucosal Cells in RabbitsF. Esteva, P. Jimenez, E. Piazuelo, M.A. Garcia, A. Lanas. *Services of Biochemistry and Gastroenterology, Hospital Clinico, Zaragoza, Spain*

Little is known about the pathways of arachidonic acid (AA) metabolism and the role of eicosanoids in the esophagus. Because each tissue forms a unique profile of eicosanoids and a given eicosanoid may have widely different effect in different organs, this study has determined the profile of AA metabolites of rabbit esophageal mucosal cell and their response to regulatory compounds. **Methods:** Primary cell culture of mucosal cells were prepared from