

bexinfo-Gastroenterology

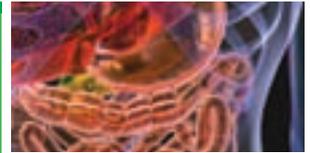
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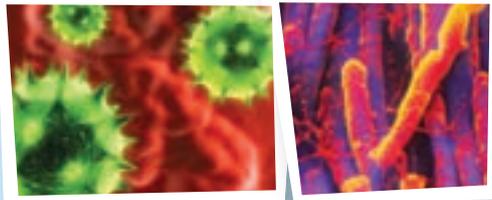
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Stomach Flu : The Leading Causes of Doubling of Deaths from Gastroenteritis

The number of deaths from gastroenteritis more than doubled recently. By knowing the causes of gastroenteritis-associated deaths and who's at risk, better treatments and prevention strategies can be offered. Over the eight-year study period, gastroenteritis-associated deaths have increased from nearly 7,000 to more than 17,000 per year. Adults over 65 years old accounted for 83% of deaths. *Clostridium difficile* and Norovirus were the most common infectious causes of gastroenteritis-associated deaths. While *C. difficile* continues to be the leading contributor to gastroenteritis-associated deaths, this study shows for the



first time that Norovirus is likely the second leading infectious cause. The findings highlight the need for effective measures to prevent, diagnose, and manage gastroenteritis, especially for *C. difficile* and Norovirus

among the elderly. Noroviruses are believed to make up half of all food-borne disease outbreaks, causing incapacitating and often violent stomach flu. They are extremely contagious, readily passing from person to person, particularly among those living in the closed quarters of dormitories, nursing homes, child care centers, military bases, and cruise ships. Further, even vigorous hand washing or the use of alcohol wipes or gels may be ineffective in combating Norovirus transmission.

New Insight into *E. coli* Outbreaks by Whole-Genome Sequencing

Using whole-genome sequencing, researchers from Harvard School of Public Health (HSPH) and the Broad Institute have traced the path of the *E. coli* outbreak that sickened thousands and killed over 50 people in Europe in 2011 affecting the population of Germany and France. It



is one of the first uses of genome sequencing to study the dynamics of a food-borne outbreak and provides further evidence that genomic tools can be used to investigate future outbreaks and provide greater insight into the emergence and spread of infectious diseases. The outbreak was caused by the strain *E. coli* O104:H4, led to around 4,000 cases of bloody diarrhea, 850 cases of hemolytic uremic syndrome, which can lead to kidney failure. By harnessing the whole-genome sequencing and analysis, the researchers were able to determine that there were small, but measurable, differences among the isolates from Germany and France. They made two surprising findings: all the strains connected to the larger German outbreak were found to be nearly identical, while the strains in France showed greater diversity; and the German isolates appeared to be a subset of the diversity seen in the French isolates. As costs for genomic sequencing decline, these tools, combined with traditional epidemiological techniques, can provide greater insight into the emergence and spread of infectious diseases and will help guide preventive public health measures in the future.

Sections Inside

- Clinical Knowledge
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Salmonella Avoids the Body's Immune Response : How ?

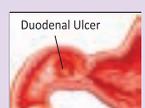
Pathogens like Salmonella flourish and cause disease in humans through a process by which they acquire metal ions, such as zinc, from the body. One of the body's key immune responses is to flood the infected area with antimicrobial proteins that include calprotectin (neutrophil protein), which removes zinc. Without enough of this vital element, most pathogens eventually die. Salmonella overcome this immune response by expressing specialized transporter proteins that enable the bacteria to acquire zinc in spite of calprotectin reducing the amount available in the digestive tract. This distinctive mechanism lets salmonella continue proliferating. At the same time, calprotectin inadvertently promotes Salmonella growth by killing the microbes that normally reside within the intestines and help the immune system battle pathogenic bacteria. If devise therapies can be made to block the acquisition of zinc and other metals by Salmonella specifically, then this infection can be tackled successfully.



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Diabetes : In the Intestine !

Research Suggests that Diabetes may Start in the Intestines: Research suggests that problems controlling blood sugar - the hallmark of diabetes - may begin in the intestines. The findings are reported in the journal *Cell Host & Microbe*. The researchers studied mice that are unable to make fatty acid synthase (FAS) in the intestine. Fatty acid synthase, an enzyme crucial for the production of lipids, are regulated by insulin, and people with diabetes have defects in FAS. Without the enzyme the intestines develop chronic inflammation in the gut, a powerful predictor of diabetes. Inflammatory substances can cause insulin resistance and inhibit the production of insulin, both of which interfere with the regulation of blood sugar. In the new research, the first striking thing seen was that the mice began losing weight. Without fatty acid synthase the protective lining of mucus in the intestines that separates the microbes from direct exposure to cells are lost. This allowed bacteria to penetrate otherwise healthy cells in the gut. The ability to build the thin, but important, layer of mucosal cells was hindered by faulty FAS- a key component of the intestinal mucosa called Muc2 may be potential targets for diabetes therapy.



Potential Link between *H. pylori* and Adult Type 2 Diabetes: A recent study shows that the presence of *H. pylori* bacteria is associated with elevated levels of glycosylated hemoglobin (HbA1c), an important biomarker for blood glucose levels and diabetes. The results, which suggest the bacteria may play a role in the development of diabetes in adults, are published in *The Journal of Infectious Diseases*. To better understand the relationship between *H. pylori* and the disease, the researchers assessed the association between *H. pylori* and levels of HbA1c. *H. pylori* was consistently positively related to HbA1c level in adults, a valid and reliable biomarker for long-term blood glucose levels. In addition, this association was stronger in individuals with a high BMI compared to those with a lower value. The researchers hypothesized that *H. pylori* may affect the levels of two stomach hormones that help regulate blood glucose, and they suggest that eradicating *H. pylori* using antibiotics in some older obese individuals could be beneficial. More research will be needed to evaluate the health effects of *H. pylori* and its eradication among different age groups and in relation to obesity status, the authors noted.

Meet the Major 'Bad Bugs' of Gastro-Intestinal Tract



◀ ***Vibrio cholerae*** causes cholera which can be endemic, epidemic, or pandemic. Despite of all the major advances in research, the condition still remains a challenge to the modern medical world.



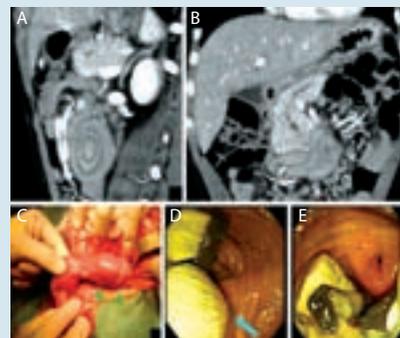
◀ ***Shigella*** cause an intestinal disease called shigellosis where the main sign is bloody diarrhea. Children between the ages of 2 and 4 are most likely to get *Shigella* infection. A mild case usually clears up on its own within a week.



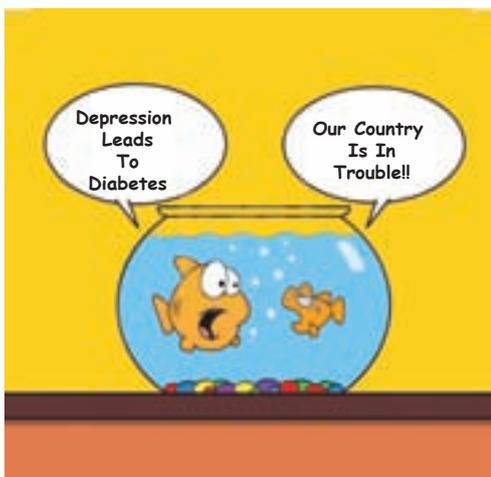
◀ Some strains of ***E. coli*** such as *E. coli* O157:H7, can cause severe abdominal cramps, bloody diarrhea and vomiting. *E. coli* are found in contaminated water or food especially raw vegetables and undercooked ground beef.

An Unusual Presentation in a 6-Year-Old Boy

A 6-year-old boy presented with periumbilical abdominal pain, nausea, and hematemesis. On physical examination, the abdomen was soft and mildly distended in the epigastric region, with local tenderness. He had undergone cyst excision and Roux-en-Y hepaticojejunostomy for choledochal cyst the previous year. Laboratory tests revealed an amylase level of 1043 U/L and lipase level of 1089 U/L, resulting in a diagnosis of acute pancreatitis. Enhanced computed tomography revealed a large target lesion at the distal duodenum and proximal jejunum, and dilatation of the pancreatic duct (Figure A, B). Emergent laparotomy was performed, followed by upper gastroduodenal endoscopy.

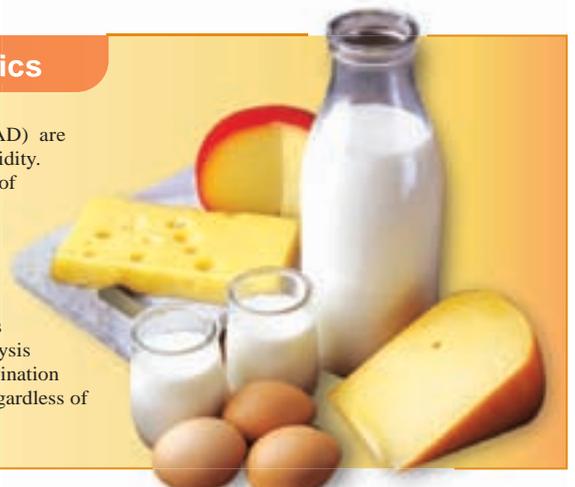


What is your diagnosis?



Antibiotic-Associated Diarrhea Responds To Probiotics

Antibiotic-associated diarrhea (AAD) and *Clostridium difficile*- associated diarrhea (CDAD) are complications of long-term antibiotic use and are associated with significant cost and morbidity. Twenty-two studies were identified and a total of 3096 patients were included, 63 percent of whom were adults and all treated with various species of probiotics. Four studies (35% of the population of the study) used *S. boulardii* as the probiotic of choice. The average treatment period with probiotics was 1.5 weeks, with the shortest period being five days and the longest period being three weeks. Probiotic prophylaxis significantly reduced the odds ratio of developing AAD by approximately 60%. This analysis clearly demonstrates that probiotics offer protective benefit in the prevention of these diseases. Another meta-analysis confirmed earlier results suggesting the preventative effects of probiotics in AAD. The analysis included 28 randomized controlled trials with 3,338 total patients receiving single or combination antibiotics for various indications. The preventative effect of probiotic use remained significant regardless of species used, adult versus child populations, study quality score and antibiotic administered.



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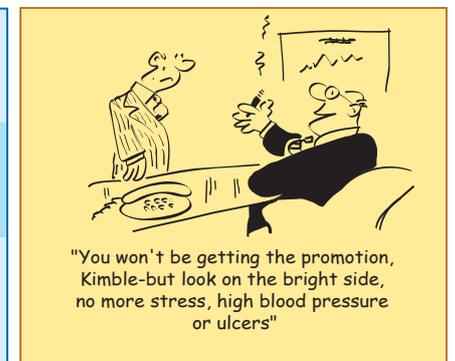
Tackling the Deadly GI Bleeding: Is Parenteral Proton Pump Inhibitors the Ultimate Novel Respond ?

A patient with short bowel syndrome who had recurrent life-threatening upper gastrointestinal bleeding from severe gastric and esophageal ulcerations has been described here. The patient had failed long-term, maximal-dose intravenous H₂ blocker therapy but was successfully treated and maintained on long-term therapy with an intravenous PPI.



Recent evidence suggests that parenteral proton pump inhibitors (PPI) can effectively control gastric acid hypersecretion. Intravenous PPI such as omeprazole can substantially reduce the risk of recurrent bleeding in patients with peptic ulcer disease and may be considered as the first line of treatment of erosive esophagitis and peptic ulcer disease in patients with short bowel syndrome and in patients who fail H₂-receptor antagonist treatment. Furthermore, the above mentioned case is the first case report describing the novel use of intravenous PPI to treat erosive esophagitis in a patient with short bowel syndrome, suggesting that intravenous PPI may also be useful for the treatment of ulcer prophylaxis in patients undergoing intestinal transplantation. Peptic ulcer bleeding is a common and recurrent bleeding is an independent risk factor of mortality. Infusion with PPI prevents recurrent bleeding after successful endoscopic therapy. A gastric acidic environment of less than pH 5.4 alters coagulation function and activates pepsin to disaggregate platelet plugs. An intravenous omeprazole bolus followed by high-dose continuous infusion for 72 hour after successful endoscopic therapy can prevent the recurrent bleeding. Irrespective of the infusion dosage of PPIs, rates of recurrent bleeding remain high in patients with co-morbidities. Because recurrent peptic ulcer bleeding may be prolonged in those

with co-morbidities, a lowdose infusion of Intravenous PPI for up to 7-day may result in better control of recurrent bleeding of peptic ulcers. Due to the inter-patient variability in CYP2C19 genotypes, the infusion form of new generation PPI, should be promising for the prevention of recurrent bleeding.



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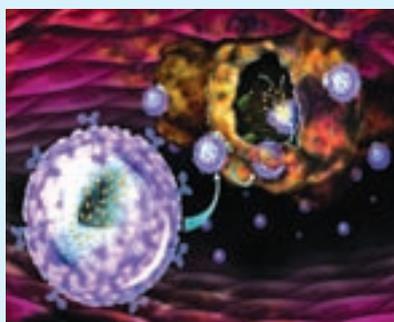
Serious Food-borne Illness May One Day be Prevented by A Pill



The scientists found that the same *Listeria* protein that allows the bacteria to pass through intestinal cells and into bloodstreams can help block those same paths when added to a probiotics. Earlier studies showed that *Listeria* triggers intestinal cells to express heat shock protein 60 on their surfaces that allows *Listeria* to bind to the intestinal cells using an adhesion protein and pass into them, acting as a sort of gateway to the bloodstream and causing symptoms. Probiotics alone

were ineffective in combating *Listeria*, but by adding the *Listeria* adhesion protein to the probiotics *Lactobacillus paracasei*, they were able to decrease the number of *Listeria* cells that passed through intestinal cells by 46%, a significant decrease in the amount of the bacteria that could infect a susceptible person. The researchers foresees that one day there will be a pill or probiotics drink that could be given to at-risk patients to minimize the risk of *Listeria* infection.

Nanoparticles Affect Nutrient Absorption-Study Suggests



Researchers in a recent paper published in the journal *Nature Nanotechnology* says that even in low doses of nanoparticles could have a big impact on long-term health. The best way to measure the more subtle effects of this kind of intake was to monitor the reaction of intestinal cells and this was done in two ways: *in vitro*, through human intestinal-lining cells that had been cultured in the lab; and *in vivo*, through the intestinal linings of live chickens. Both sets of results pointed to the same thing -- that exposure to nanoparticles influences the absorption of nutrients into the bloodstream. The uptake of iron, an essential nutrient, was of particular

interest due to the way it is absorbed and processed through the intestines. Polystyrene nanoparticles was used because of its easily traceable fluorescent properties. The findings for this brief exposures, iron absorption dropped by about 50 % but when the period of time was extended, absorption actually increased by about 200 %. It was very clear that nanoparticles definitely affects iron uptake and transport. While acute oral exposure caused disruptions to intestinal iron transport, chronic exposure caused a remodeling of the intestinal villi making them larger and broader, thus allowing iron to enter the bloodstream much faster. Also on the research agenda is the reaction of other nutrients such as fat-soluble vitamins A, D, E and K. And chickens and their intestines will definitely be part of this next phase of the study.

Diagnosis with Patient Outcome of Case Report

The patient was diagnosed with Antegrade Pancreaticoduodenojejunal Intussusception owing to impaction of food into the orifice of the Ampulla of Vater, causing acute pancreatitis. Emergent laparotomy was performed, and antegrade pancreaticoduodenojejunal intussusception was confirmed (Figure C). Manual reduction of the intussusception was successful. Upper gastroduodenal endoscopy was subsequently performed to detect the leading point causing the intussusception, revealing that the Chinese food "Menma" occluded the orifice of the ampulla of Vater (Figure D, arrow). The "Menma" was extirpated from the orifice of the ampulla of Vater endoscopically. The ampulla of Vater was markedly enlarged, considered as the leading point contributing to the development of the pancreaticoduodenojejunal intussusception (Figure E). Tight impaction of the food "Menma" into the orifice was sufficient to obstruct the main pancreatic duct, causing acute pancreatitis. The postoperative course was uneventful, and acute pancreatitis immediately improved.

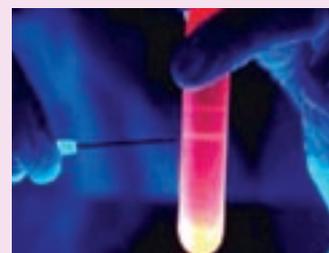
Just One Drink of Alcohol per Day May Cause GI Symptoms

Just one drink per day for women- two for men -could lead to small intestinal bacterial overgrowth (SIBO) and subsequently cause gastrointestinal symptoms like bloating, gas, abdominal pain, constipation and diarrhea, according to the results of a new study. In patients with SIBO, the abnormally large numbers of bacteria in the small intestine use for their growth many of the nutrients that would otherwise be absorbed. As a result, a person with small bowel bacterial overgrowth may not absorb enough nutrients and become malnourished. In addition, the breakdown of nutrients by the bacteria in the small intestines can produce gas as well as lead to a change in bowel habits. So consumption of even the slightest amount of alcohol could have an impact on gut health.



Discovery of High Risk Esophageal Cancer Gene

New research has uncovered a gene which plays a key role in the development of esophageal cancer. Initial studies suggest that the gene could play a role in the more common, non-inherited form of the disease, revealing a new target for treating this aggressive type of cancer. The research concentrated on three families with a hereditary condition called tylosis with esophageal cancer. This condition affects the skin and mouth and sufferers have a 95% chance of developing esophageal cancer by the age of 65. The research revealed that all three families carried a faulty version of a gene called RHBDF2. Experiments showed that this gene plays an important role in how cells that line the esophagus, and cells in the skin, respond to injury. When the gene is functioning normally it ensures that cells grow and divide in a controlled fashion to help heal a wound.



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