

## **He has the stomach for it - Health & Science**

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10-12 minutes

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It's amazing when in medicine, ideas that had seemed ridiculous – such as a chronic infection instead of an annoying boss causing ulcers – eventually become accepted truisms. Even though stools are considered dirty and something to get rid of, gastroenterologists have discovered that they can transplant feces from healthy donors into patients and very often relieve their chronic bacterial infections, irritable bowel disease (IBD), colitis, constipation and even some neurological conditions.

Prof. Thomas Borody, the founder and current medical director of the Center for Digestive Diseases (CDD) in Sydney, Australia, is a major innovator in these surprising treatments.

The CDD is considered a unique medical institution offering novel approaches in researching, diagnosing and treating gastrointestinal conditions. CDD offers a range of services in the day-procedure unit and houses a research and innovation department for conducting clinical trials in collaboration with universities, pharmaceutical companies and medical societies – all focusing on gastroenterology.

HE RECENTLY visited Israel and gave an interview to The Jerusalem Post about new treatments in the field. “This is my first visit to Israel,” said the world-renowned gastroenterologist.

“I’ve given a gastroenterology lecture to professionals at the Dan Hotel in Tel Aviv. I’ve also done some touring in Jerusalem, the Dead Sea and elsewhere – and I’ve already decided to come back.”

Borody was born in Krakow in 1950. My father was a Seventh-Day Adventist minister of religion,” said Borody. When he was 10, his parents decided to move to Australia, and his mother even wrote a book about their immigration experiences.

Inculcated to learn something that would “help mankind,” he and his siblings studied medicine. “I had thought of becoming a nuclear physicist, but it wasn’t to be,” he recalled. His sister is a general practitioner, his brother is an obstetrician/gynecologist and Thomas decided after getting his MD to specialize in the stomach, intestines and other internal organs.

He was inspired to pick his specialty largely because he worked under Dr. David burns, who was “a nice guy and did gastroscopes, which just came into being, in color.

Gastroenterologists spend much of their time performing colonoscopies (using endoscopes with tiny cameras in them to examine the large intestine for polyps or tumors and other irregularities) and gastroscopies (an endoscope is inserted into the mouth and through the esophagus to the stomach to get a view of the upper part of the gastro system). Since they have to fast and clean out their tubes, the gastro practice usually begins early in the morning.

AS FOR ulcers, it was two Australians who discovered in 1979 that they were not the result of stomach acid, spicy food and stress but a bacterium – *Helicobacter pylori* (H.

pylori) – that caused a chronic stomach infection. Dr. Barry James Marshall and pathologist Dr. John Robin Warren received the Nobel Prize in Medicine in 2005 for their breakthrough in discovering what causes ulcers.

It had been thought by the medical establishment for many years that no bacteria could survive in stomach acid, so that the painful condition must be caused by something else. But the two Australians found it is a very “clever” pathogen that can hide in the mucous lining protected from the acid, so they could remain alive even for decades.

Borody reasoned that if it was due to an infection, something could be done to cure it. So he and his colleagues developed in 1984 a triple “cocktail” of drugs – bismuth, tetracycline and flagyl – to treat and eliminate stomach ulcers. “We went through about 36 different combinations of drugs, and the best were these three.” When ulcer patients come to thank him that their ulcers have disappeared, he said, he feels “great satisfaction.” But despite proof that this healed the stomach lining, it took many years until the doctors were persuaded and accepted the triple therapy. The bacteria return only very rarely, and if it’s caught early, a recurrence can also be treated.

Today, one of the companies that manufactures the cocktail is RedHill Biopharma, an Israeli company. During his visit here, he met with officials of the company, which is based in Tel Aviv. Borody is an unpaid member of the RedHill’s advisory board.

There are other gastroenterological conditions, he continued, that is through to result from lifestyle that in fact result from chronic inflammation – among them ulcerative colitis and Crohn’s disease, which cause much suffering to many people around the world.

“After practicing for a while, I fell into research and spent year in the Solomon Islands [in Oceania lying to the east of Papua New Guinea] doing tropical med. I was more involved in leprosy and tuberculosis, which also involve bacteria that need a cocktail of drugs to treat it. This led to my getting interested in Crohn’s disease and irritable bowel disease.”

Borody spent three years researching at the Mayo Clinic.

NAMED AFTER Dr. Burrill Crohn, who first described the disease 80 years ago, Crohn’s disease is a chronic inflammatory condition of the gastrointestinal tract. It belongs to a group of conditions known as inflammatory bowel diseases (but is not the same as ulcerative colitis, which is another type of IBD. The symptoms of these two conditions are quite similar, but they affect different areas of the gastrointestinal tract. Crohn’s most often affects the end of the small bowel and the beginning of the colon, but it may affect any part of the gastrointestinal tract, from the mouth to the anus. Ulcerative colitis is restricted to the colon, also called the large intestine.

Among the symptoms of Crohn’s, which can be very debilitating and limiting, are persistent diarrhea; rectal bleeding; the urgent need to move bowels; abdominal cramps and pain; constipation; and the sensation of incomplete. It can be accompanied by loss of appetite; weight loss; fatigue; night sweats; and the loss of a normal menstrual cycle in women. It is not a genetic condition, although some used to think so because of cross-infection in the family. It was also thought to be an autoimmune disease in which the autoimmune system, which is supposed to protect the body against infections, becomes aggressive and uncontrollable and attacks the body itself.

“Crohn’s is a more difficult disease to treat,” noted Borody. Because the bacterial infection develops very slowly. The bacteria involved are the most slowly dividing bacteria known to man. “This process can take 15 months, so medications have to be taken for a long time. It’s a difficult bug to destroy until the inflammatory condition calms down.”

Twenty years ago, Borody was reading The Lancet medical journal. “There as a published reader’s letter I came across that mentioned that a person was treated for tuberculosis, and his Crohn’s also improved. In Crohn’s, you see granulomas in the chest that are surrounded by epithelial cells. It looks like TB, but it’s Crohn’s. So I thought it could be treated with a new type of anti-tuberculosis agents.

We started 12 Crohn's on these drugs and it takes many weeks to get better. The longest time a patient has been on these drugs is 19 years."

Now, a new, experimental drug for Crohn's developed and patented by Red-Hill Biopharma now undergoing Phase III studies is called RHB-104. "Just as tuberculosis and HIV requires taken a drug cocktail to fight them, Crohn's does too. If you give too-few medications, resistance to them can develop.

RHB-104 is a proprietary and potentially groundbreaking combination antibiotic therapy in oral pill form, with potent intracellular, antimycobacterial and anti-inflammatory properties, RedHill explains.

"The drug is based on increasing evidence supporting the hypothesis that Crohn's disease is caused by an infection of the *Mycobacterium avium* subspecies named paratuberculosis in susceptible patients rather than being an autoimmune disease.

Borody notes that the triple drug combination that he invented for Crohn's have been on the market for years, but the combination he suggested is new. "There are now clinical trials in 40 countries around the world. There are an estimated two or three million Crohn's patients globally.

The phenomenon is growing in places like China, Hongkong and Japan."

When the US Food and Drug Administration approves the drug cocktail, "it will explode on the market. There is much need for such a treatment. It is legal to combine separate prescription drugs, but this will be a single capsule."

The food supply around the world is tainted because of cattle and sheep getting it, both their meat and their milk. So if such animals are infected, some of it can get to people if not properly prepared, said Borody. The milk has to be pasteurized at very high temperatures but that changes the quality.

It is difficult to detect the bacteria in meat. About 60% of America herds catch it, and they have gotten to poultry as well.

AS FOR stool transplants – known scientifically as fecal microbiota transplantation (FMT), Borody is very enthusiastic. "I read a scientific paper from way back in 1958 about a patient being given feces for mild colitis caused by the *Clostridium difficile* bacteria. But it didn't go further." The bacteria produce anything from diarrhea to Pseudomembranous colitis. More virulent strains have been developing in the last 15 years because the overuse of antibiotics caused resistance to them. In the U.S alone, there are some three million new cases of such infections each year; some of them can even be fatal.

In FMT, a donor with healthy and beneficial bacteria (probiotics) in his gastrointestinal system gives some 150 cc. of feces that are purified and introduced by enema into the recipient. A healthy growth of bacteria in the gastroenterological system is restored. A randomized study on FMT published in the *New England Journal of Medicine* last January showed a 94% cure rate of pseudomembranous colitis caused by *Clostridium difficile*, compared to just 31% with the antibiotic vancomycin. The study was stopped prematurely as it was considered unethical not to offer the FMT to all participants of the study due to the outstanding results.