



Nasjonalt Senter for Gastroenterologisk Ultrasonografi

National Centre for Ultrasound in Gastroenterology
Haukeland University Hospital, Bergen, Norway

Konsepter ved funksjonelle mage-tarmsykdommer



Professor Odd Helge Gilja, MD, PhD

Dept. of Clinical Medicine

University of Bergen, Norway





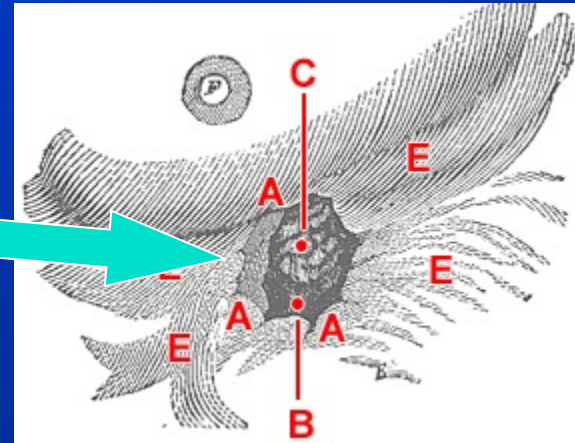
William Beaumont (1785-1853)



Beaumont



Alexis St. Martin



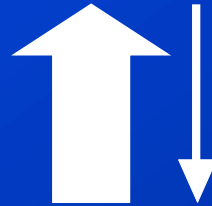
”St. Martin sometimes became irritable doing experiments (it was stressful for him to have food removed from his stomach), and Beaumont observed that being angry can hinder one's digestion”



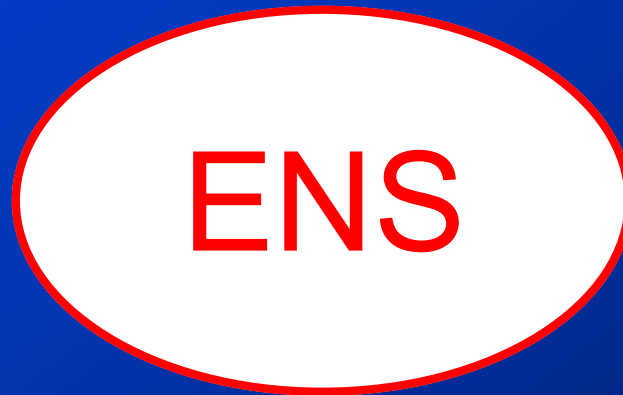
The Brain-Gut Axis



1. Spinal afferents
2. Vagal afferents



1. Sympathics
2. Parasympathetics

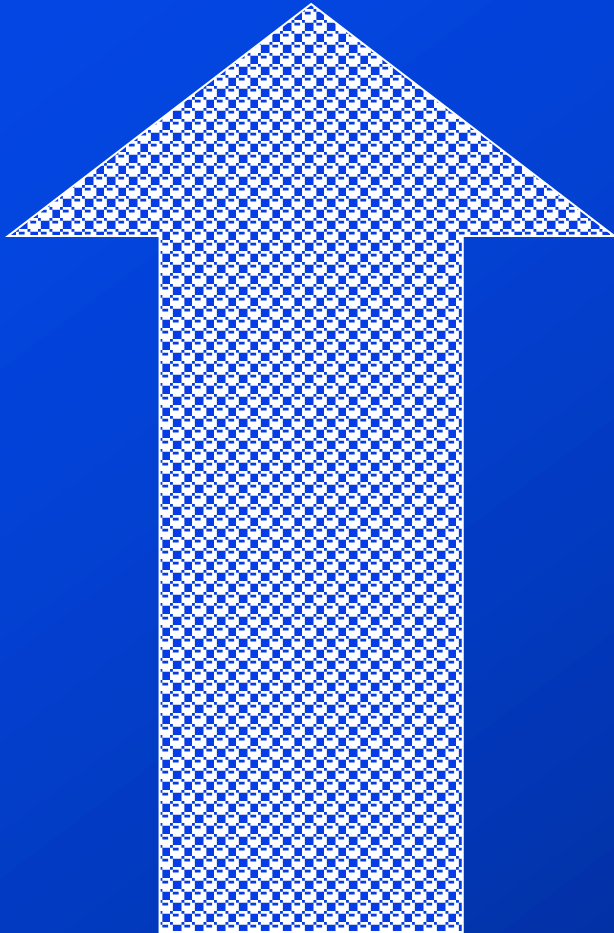


Where does the disease begin?



N. Vagus

90% Afferent



Head



10% efferent



GI-tract



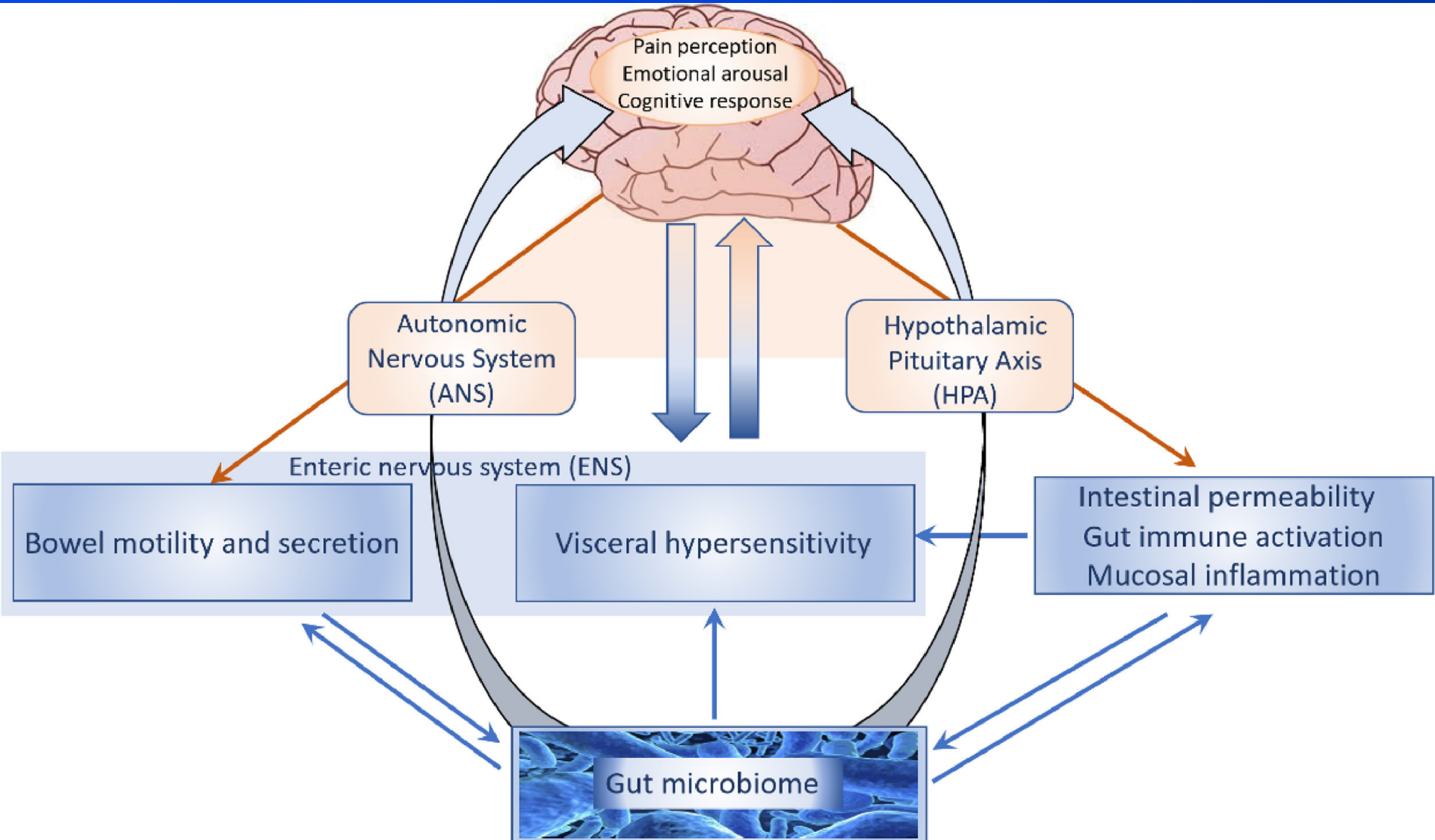
Magefølelsen...

SPRØSTREKT - Tony Lopez





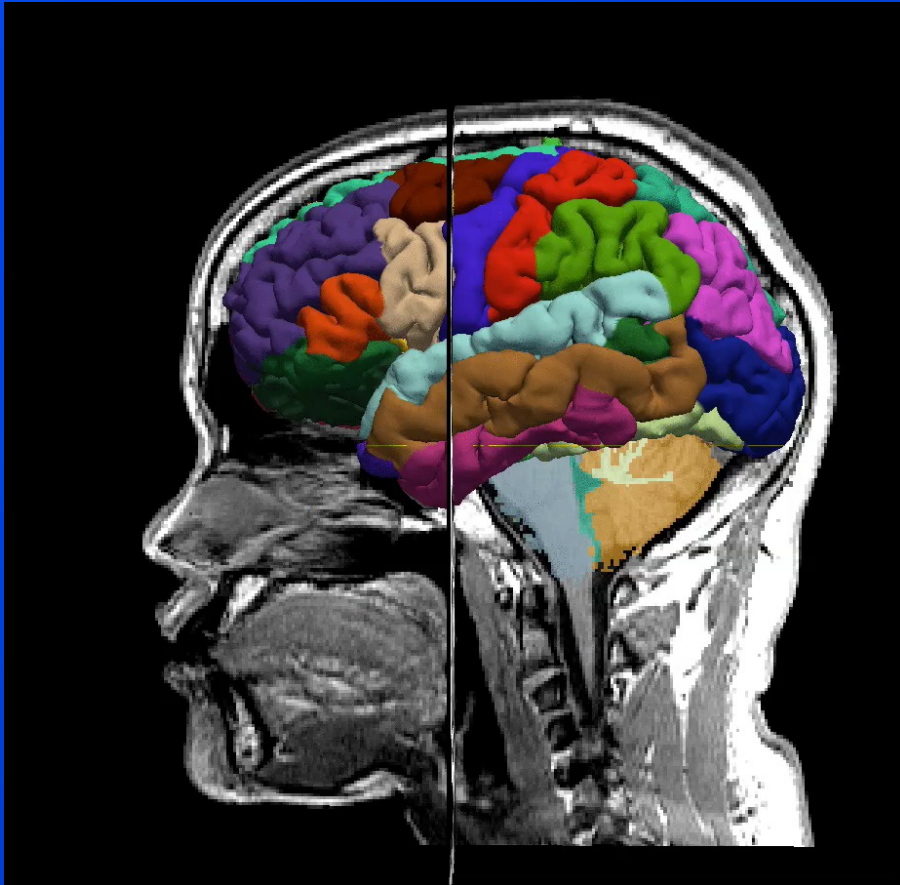
The gut-feeling – How it works



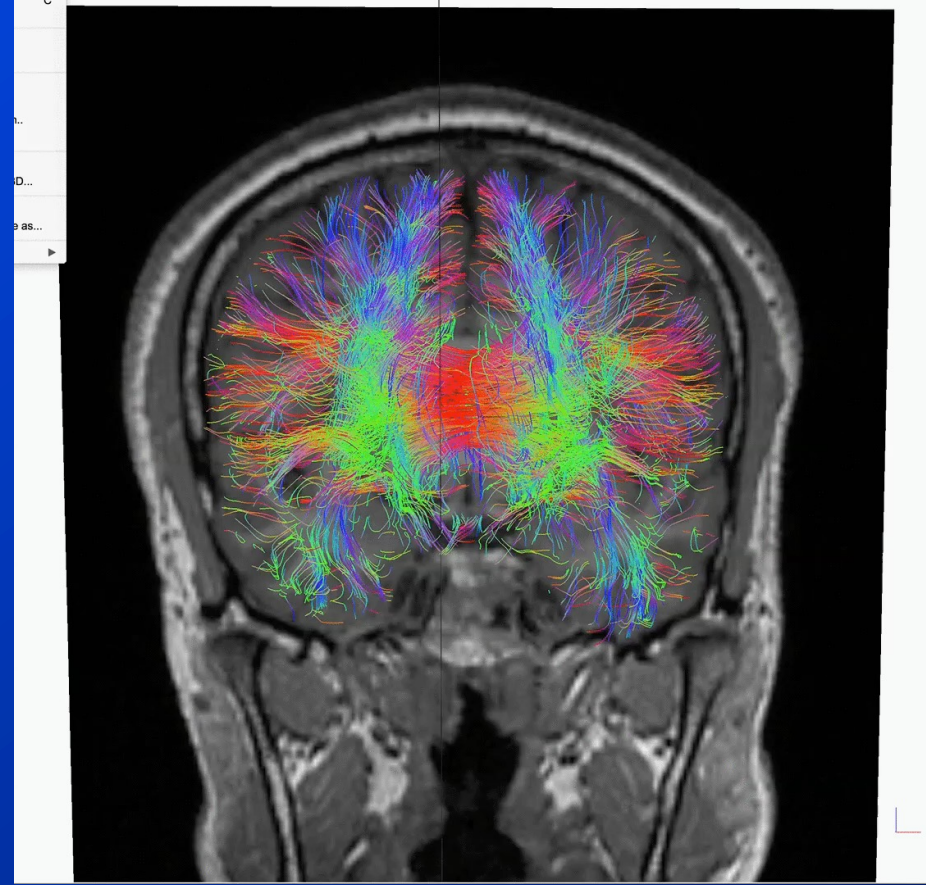


MR imaging

LG_Prisma_20160218_Freesurfer_rendering_360.gif



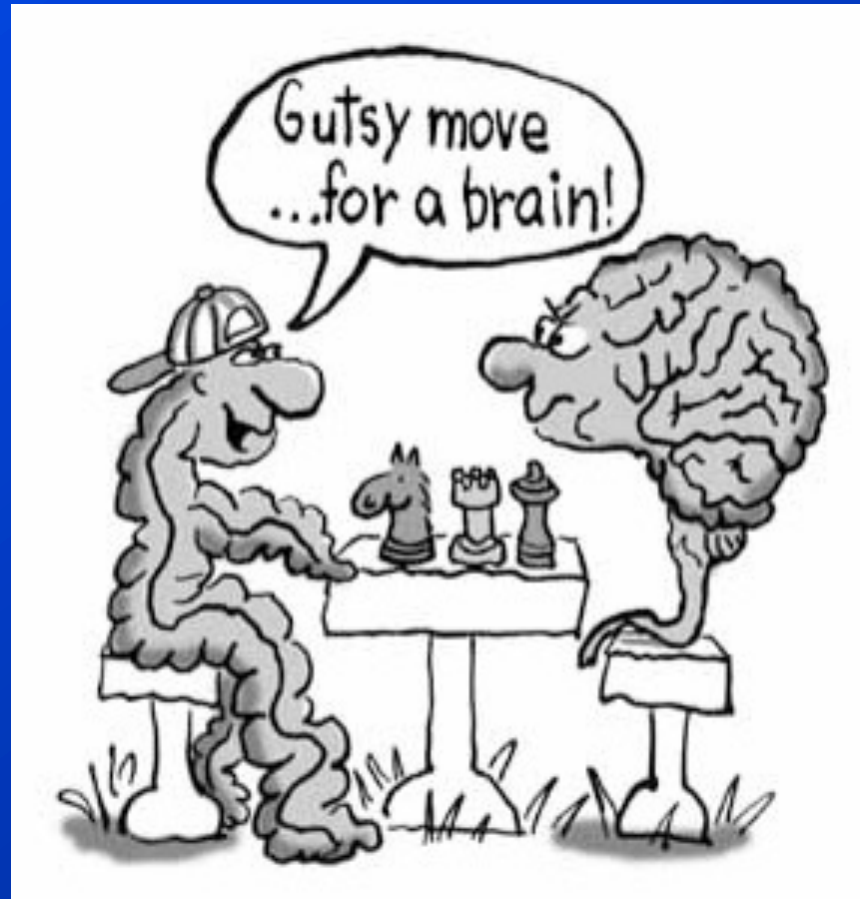
LG_Prisma_20160218_DSI_studio_whole_brain.fy.dti.trk.gif



Courtesy: A. Lundervold

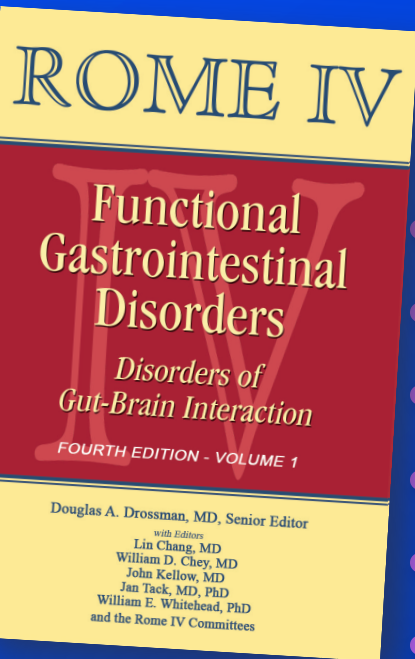


Where does the disease begin?





Classification 8 major groups

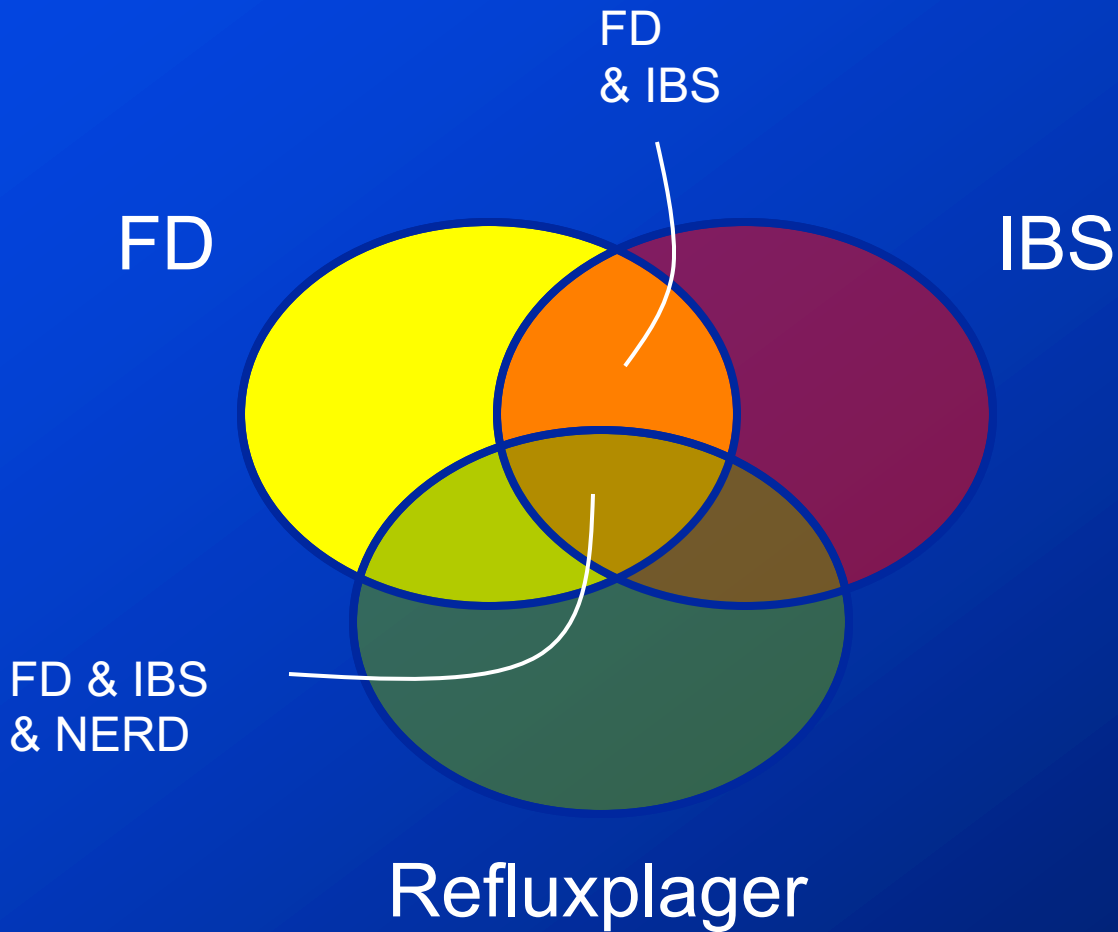


- A. Functional Esophageal Disorders
- B. Functional Gastroduodenal Disorders
- C. Functional Bowel Disorders
- D. Functional Abdominal Pain Syndrome
- E. Functional Gallbladder and Sphincter of Oddi Disorders
- F. Functional Anorectal Disorders
- G. Childhood Functional GI Disorders: Infant/Toddler
- H. Childhood Functional GI Disorders: Child/Adolescent



Funksjonelle mage-tarm tilstander

Diagnostisk overlapping





Dyspepsia



- Dyspepsia is the ruin of most things; empires, expeditions and everything else.
 - Thomas de Quincey, 1822.



Functional Bowel Disorders

Impact in Life

- **Compared to patients with duodenal ulcer; in patients with functional dyspepsia the disorder had a greater negative impact on their quality of life**
- **Furthermore:**
 - higher scores of depression, trait anxiety, general psychopathology and different somatic complaints (somatization)
 - They were also less satisfied with the health care system
 - Their global assessment of own health was poorer

Wilhelmsen et al., : Dig Dis Sci. 1995;40:1105-11



The Gastro- Intestinal Landscape

-

a great
challenge
for diagnostic work-up
of dyspepsia





Alarm-symptomer

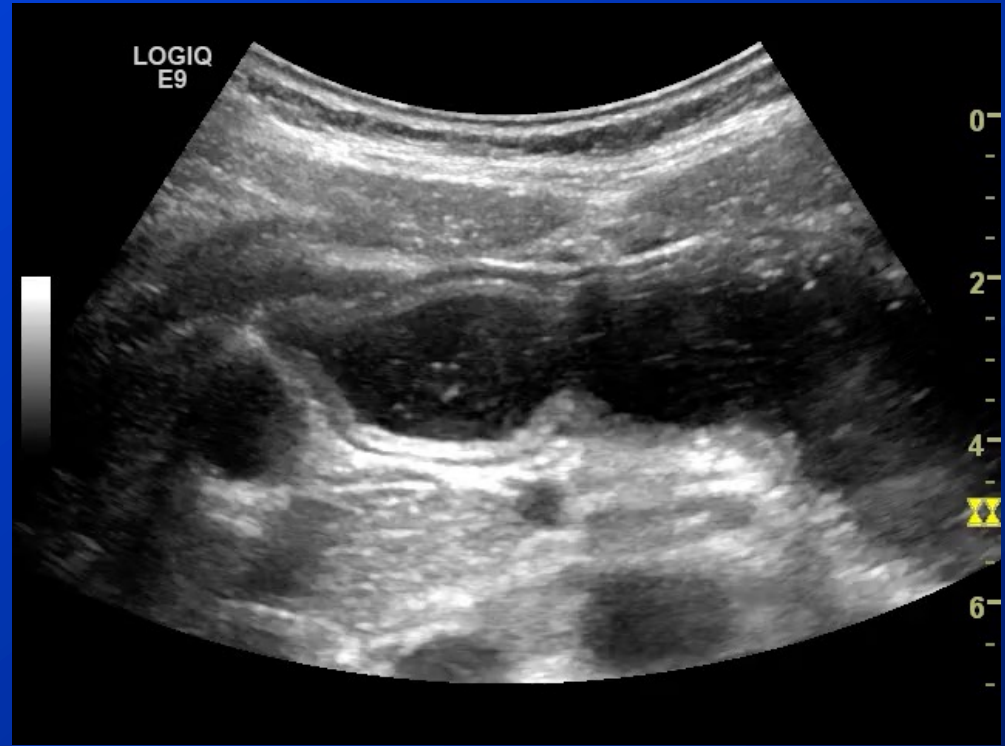
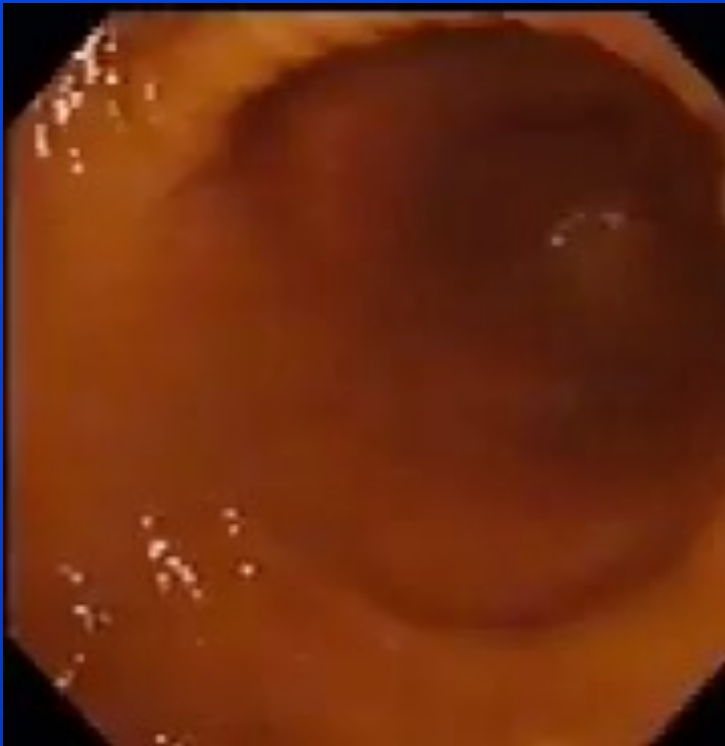
- Fall i Hb
- Pos hemofec
- Synlig blod i avføringen
- Vekttap
- Dehydrering

- Alder > 50





The 2 eyes of the Gastroenterologist: Endoscopy and Ultrasonography

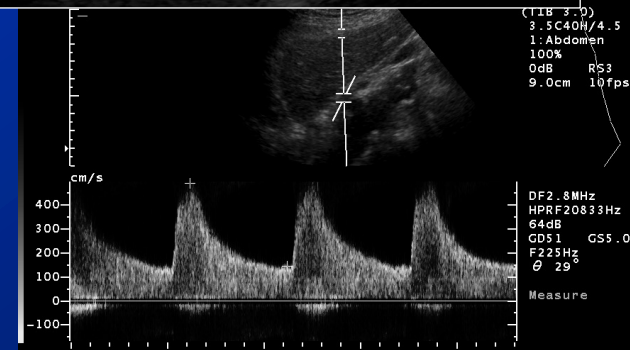
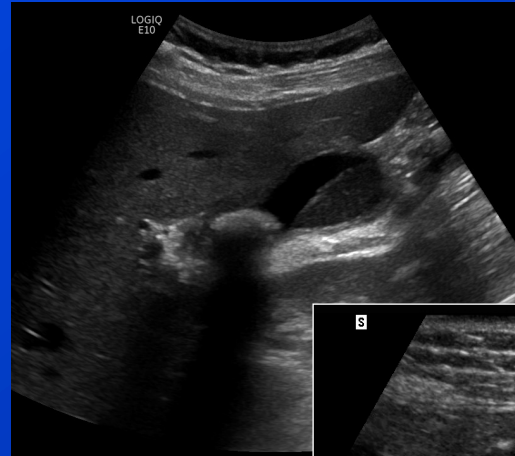


«Seeing is believing»



The Role of Ultrasound in FGID

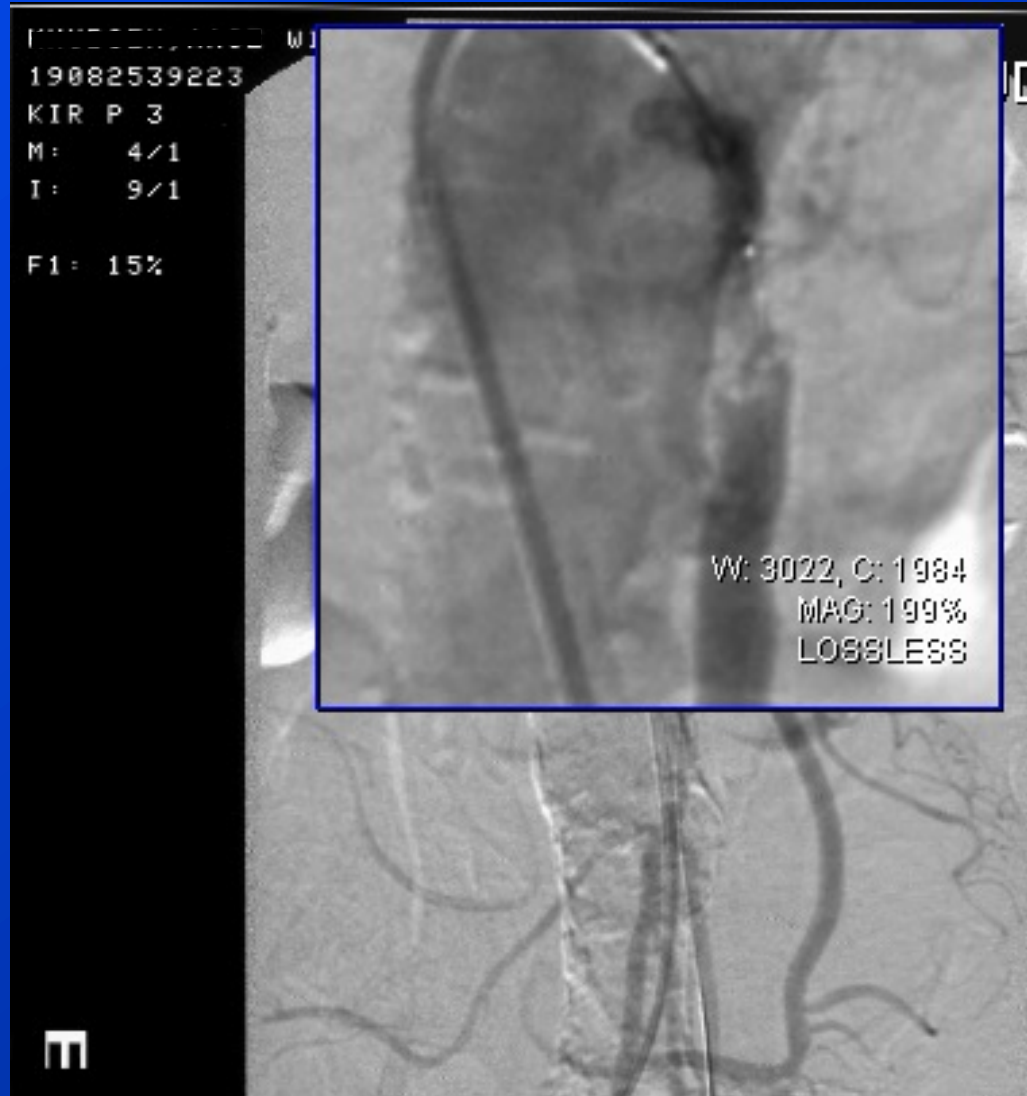
- Rule out organic diseases
- Detect disturbances in motility
- Disclose pathophysiological abnormalities
- Guide further work-up
- Provide hints for therapy



PS= 488.7cm/s ED= 144.3cm/s RI= 0.70 S/D= 3.39

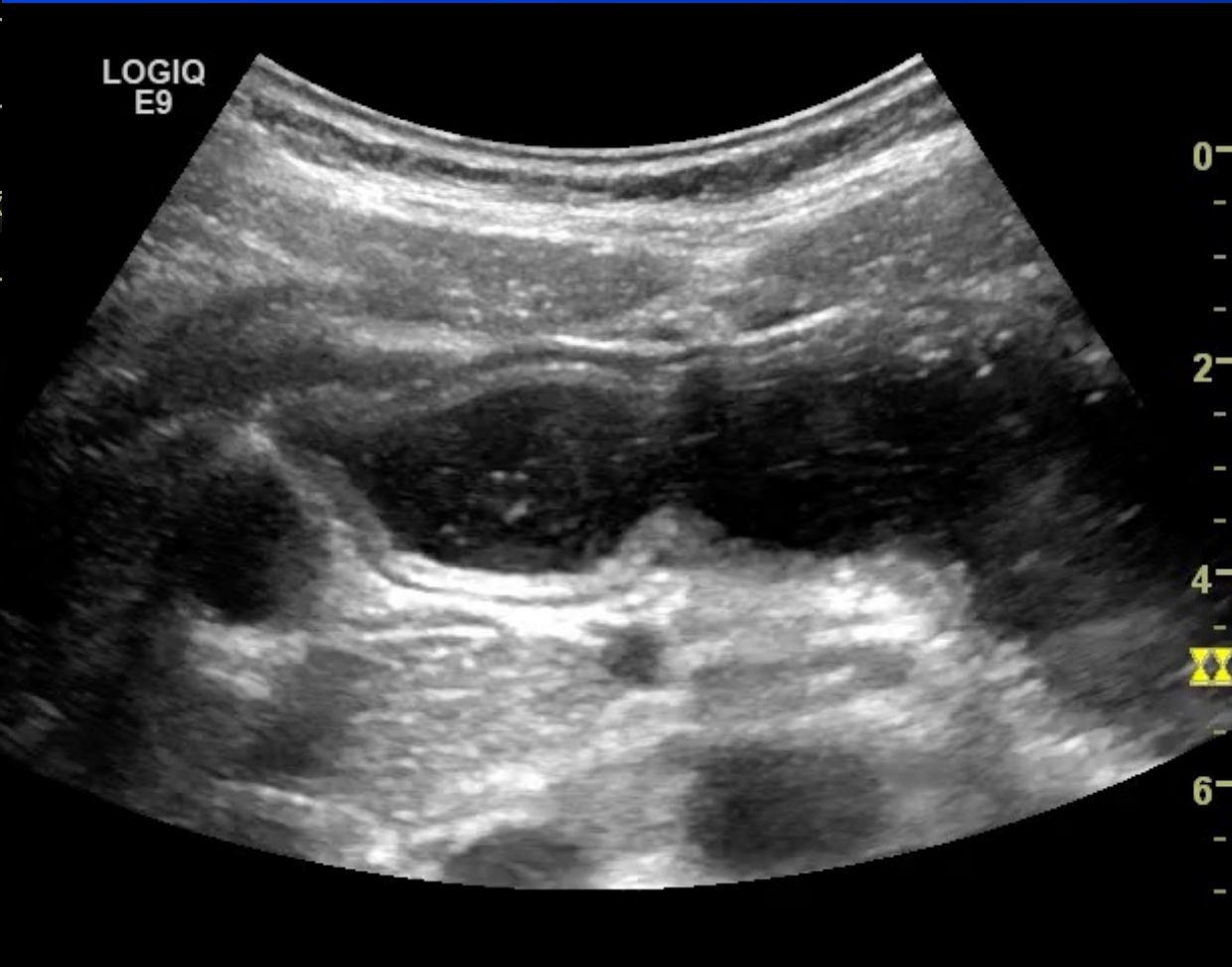
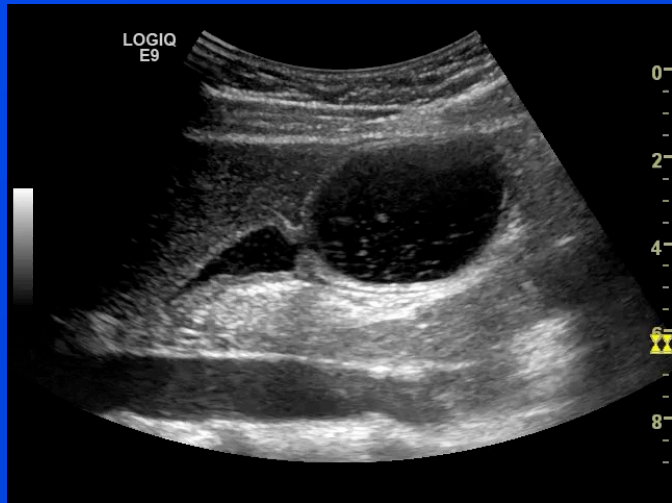


Treatment of stenosis in the coeliac trunc: Angiographic balloon dilatation





Gastric contractility



Haukeland US - NSGU
03/12/14 22:24:14 ADM

MI 1.2 Tib 1.9 C1-5
Abdomen

FR 26

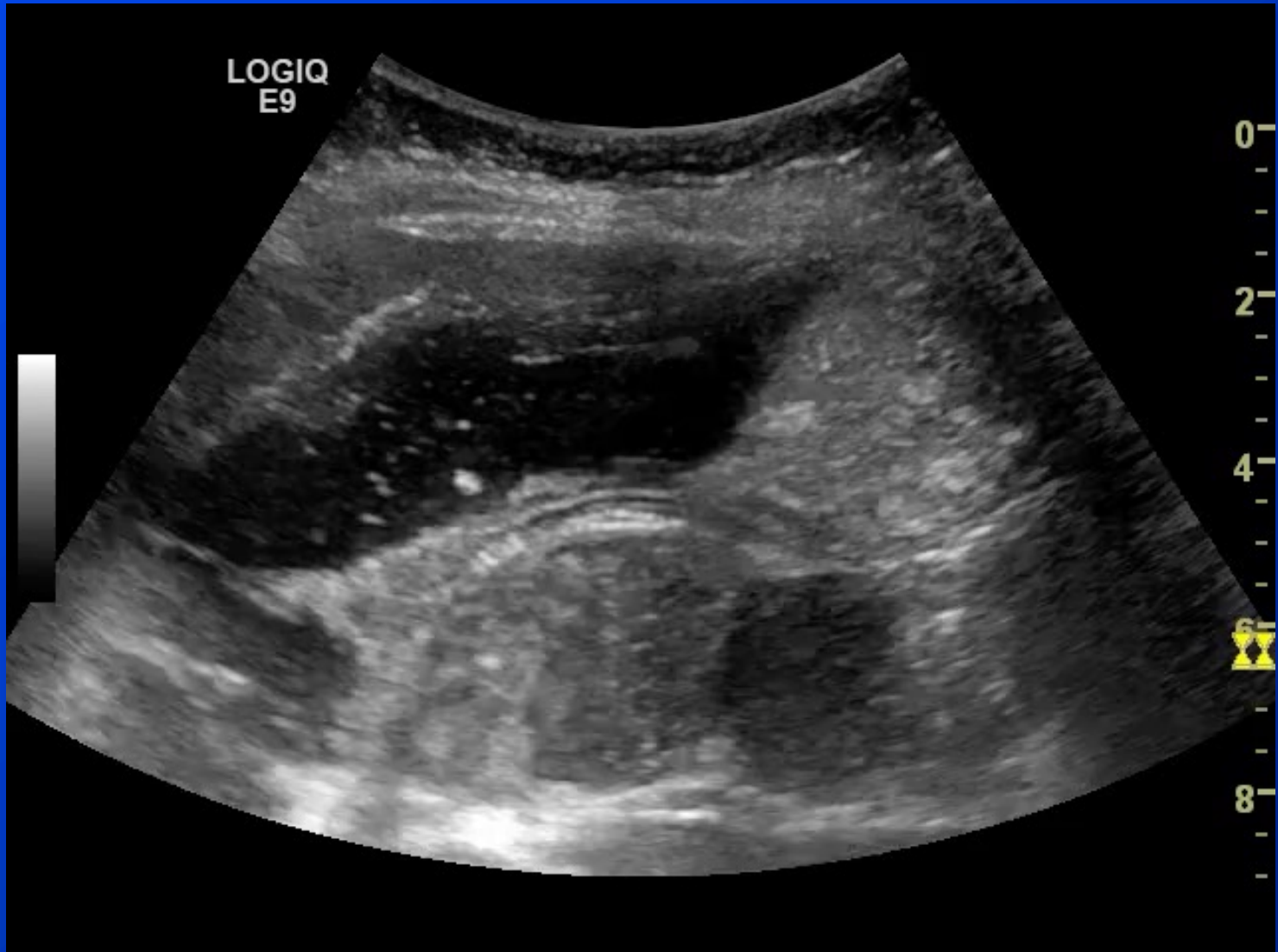
CHI

0-Frq	4.0
Gn	65
S/A	1/1
Map	F/0
D	10.0
DR	66
AC%	100

Stomach



Solid vs. Liquid Gastric Content





Transpyloric flow





"Waschmaschinen-phenomenen"



Typically seen in
Coeliac disease



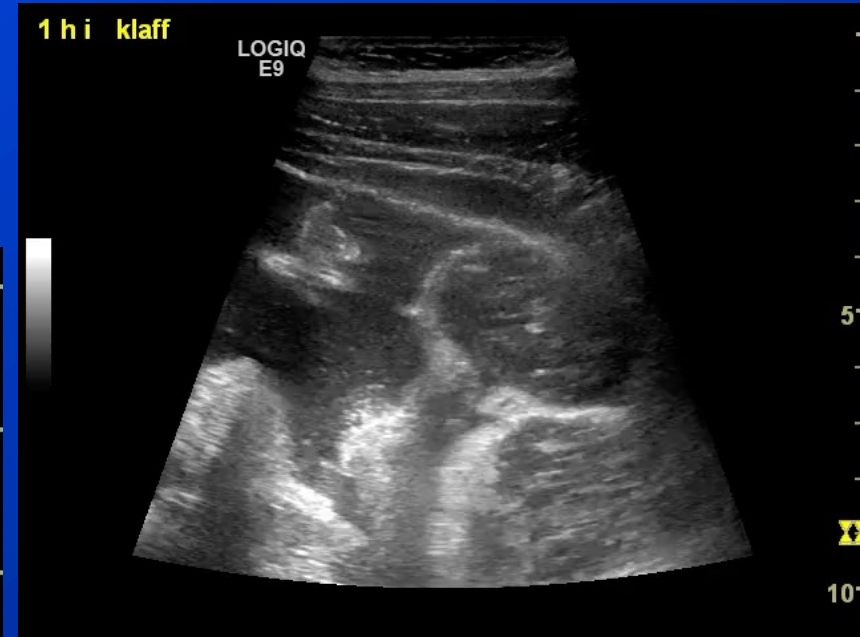
Familial GUCY2C diarrhoea syndrome (FGDS)

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Familial Diarrhea Syndrome Caused by an Activating *GUCY2C* Mutation

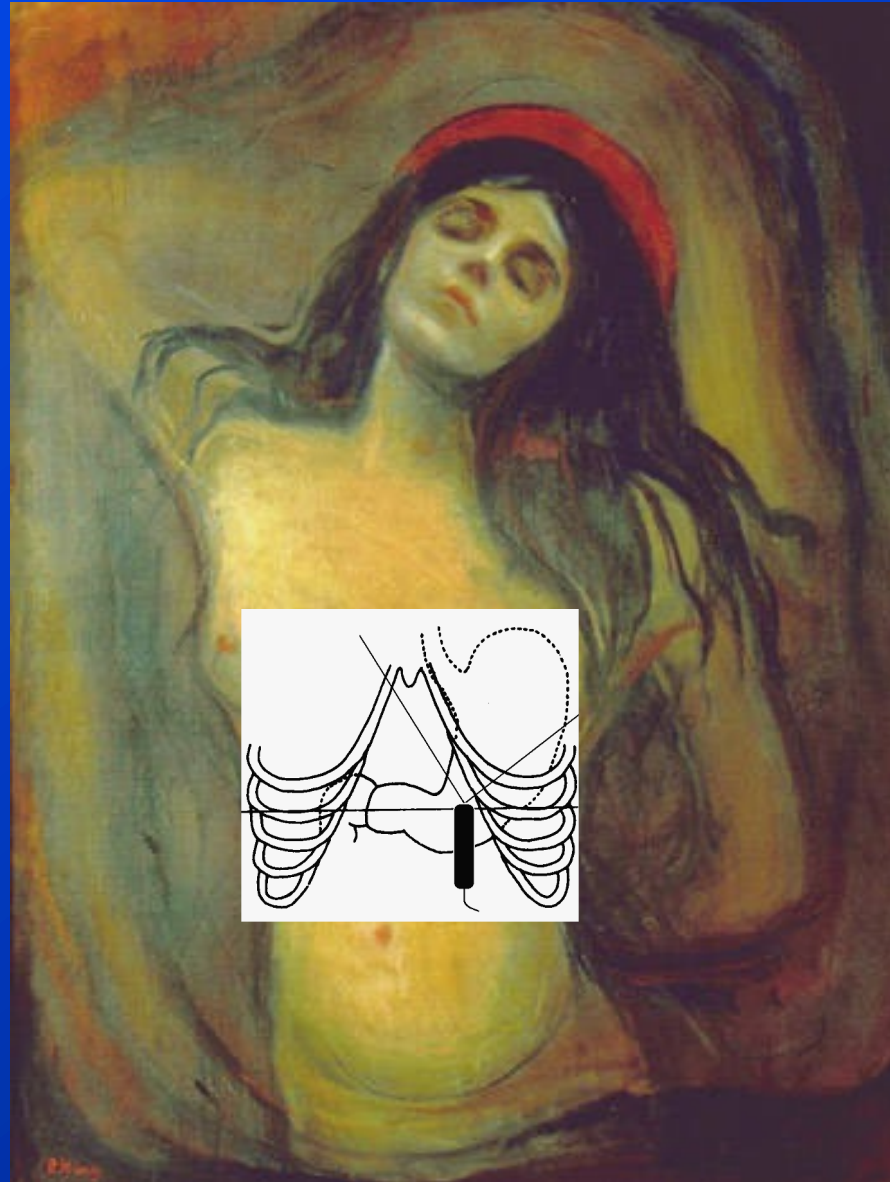
N Engl J Med 2012;366:1586-95



Snow globe phenomenon
Lots of fluid in fasting condition causing distension of loops and turbulence

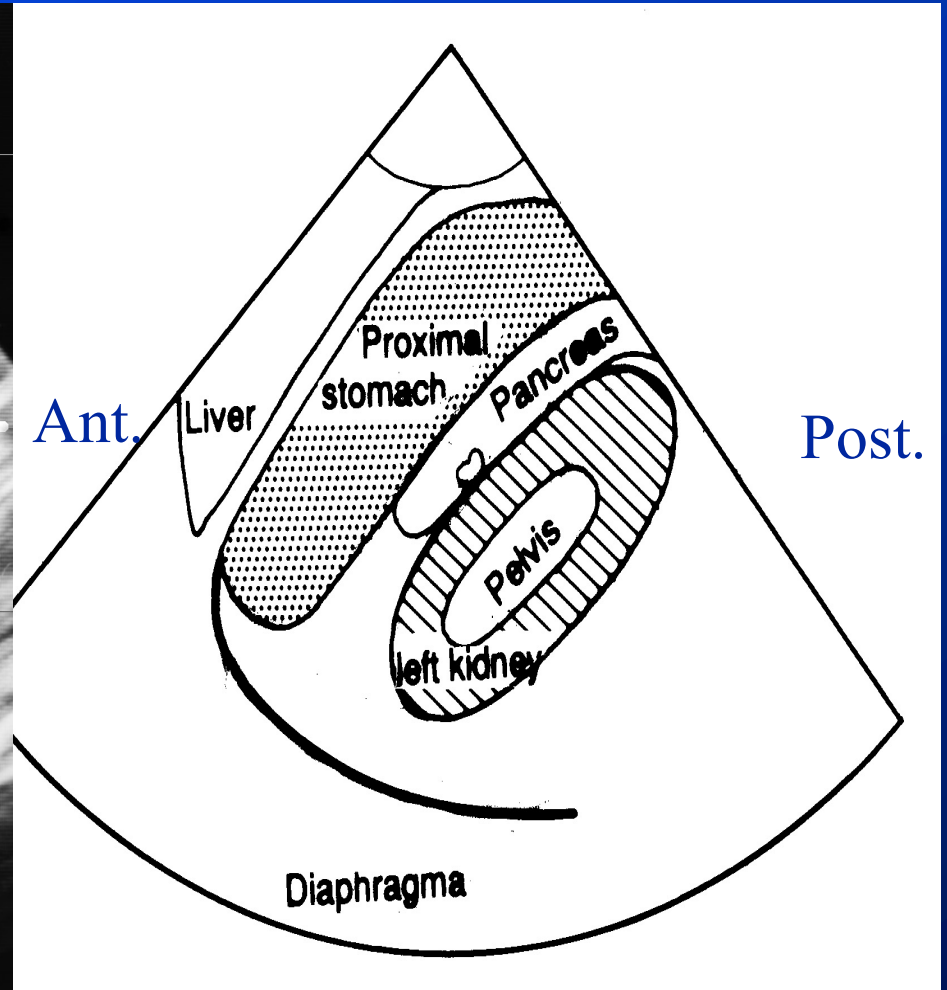
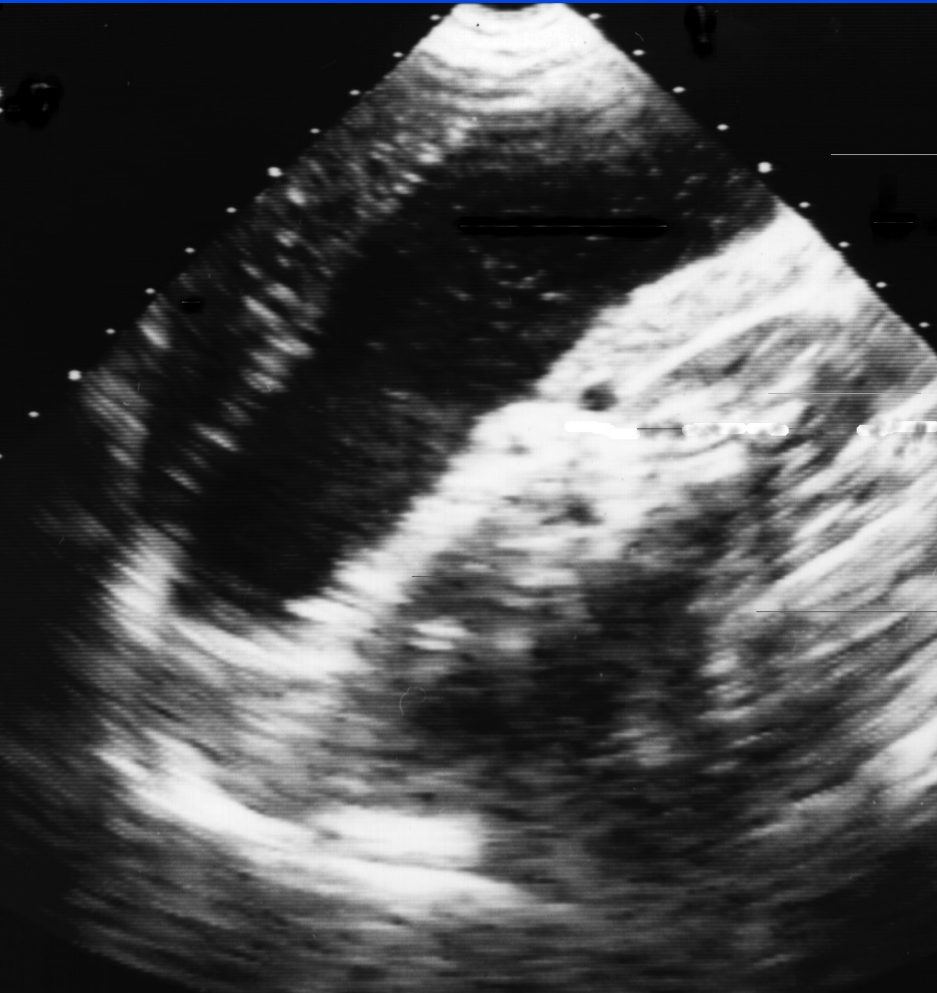


Ultrasound Scanning of the Proximal Stomach





Sagittal section

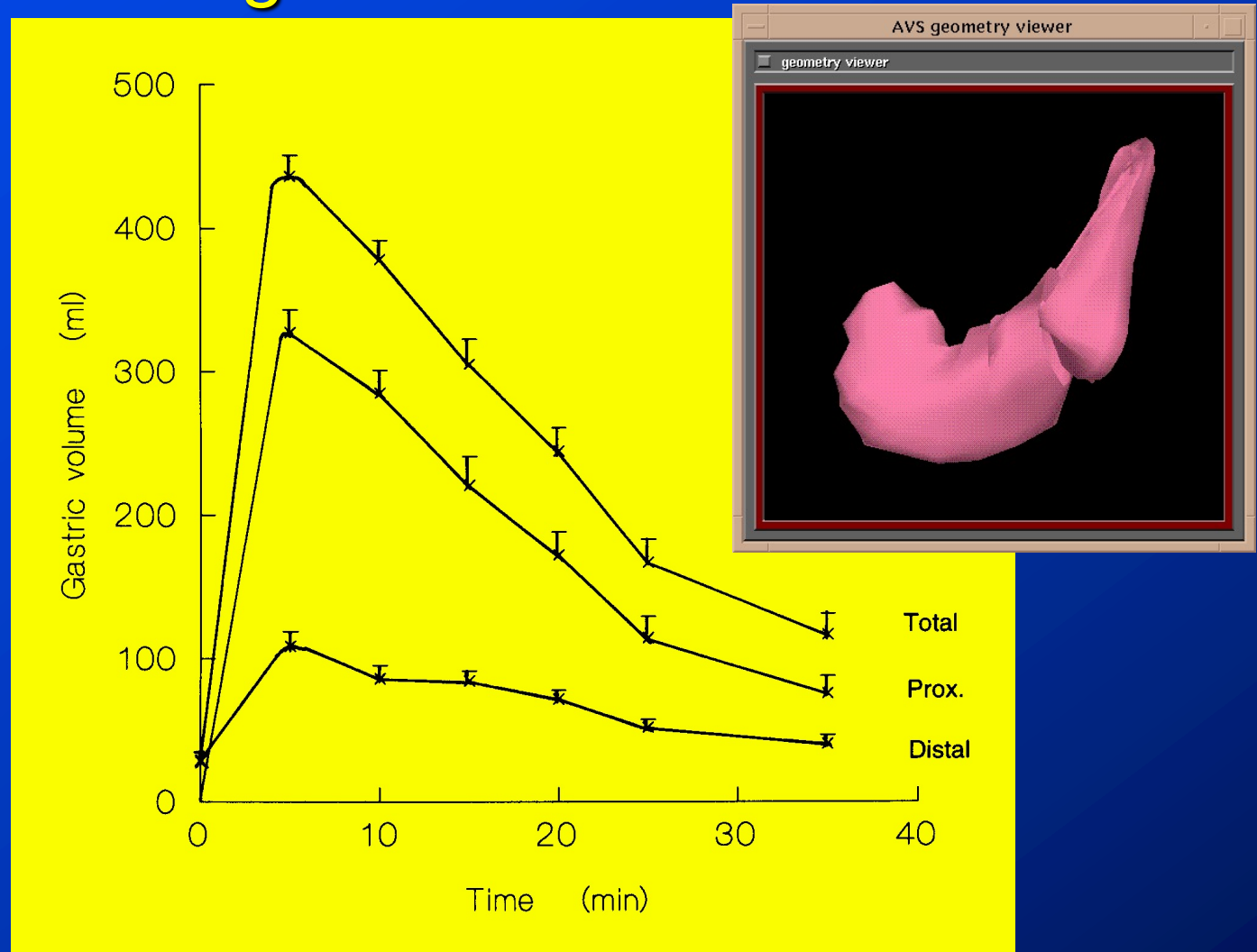


Gilja et al., J Ultrasound Med 1995;14(2):81-89



3D-US – Accommodation and Intra-gastric Distribution

- 16 healthy subjects
- T-50=22.1 min
SD=3.8 min



SEM bars are denoted

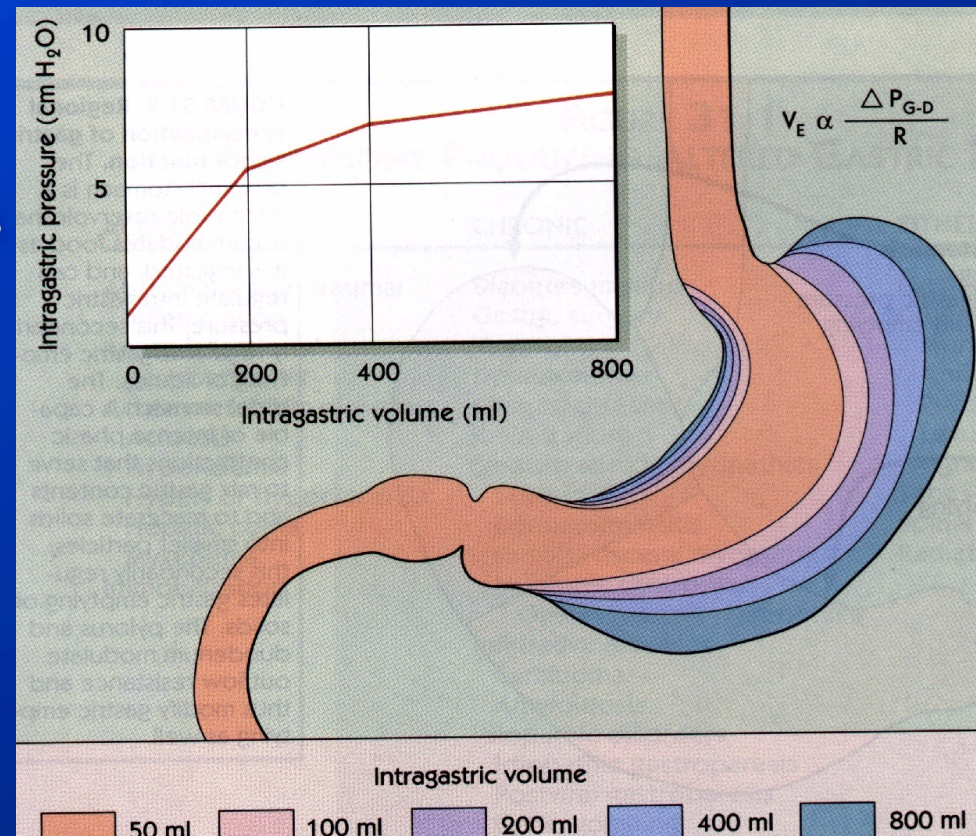
Gilja OH et al., *Gastroenterology* 1997;113:38-49



Gastric Accommodation

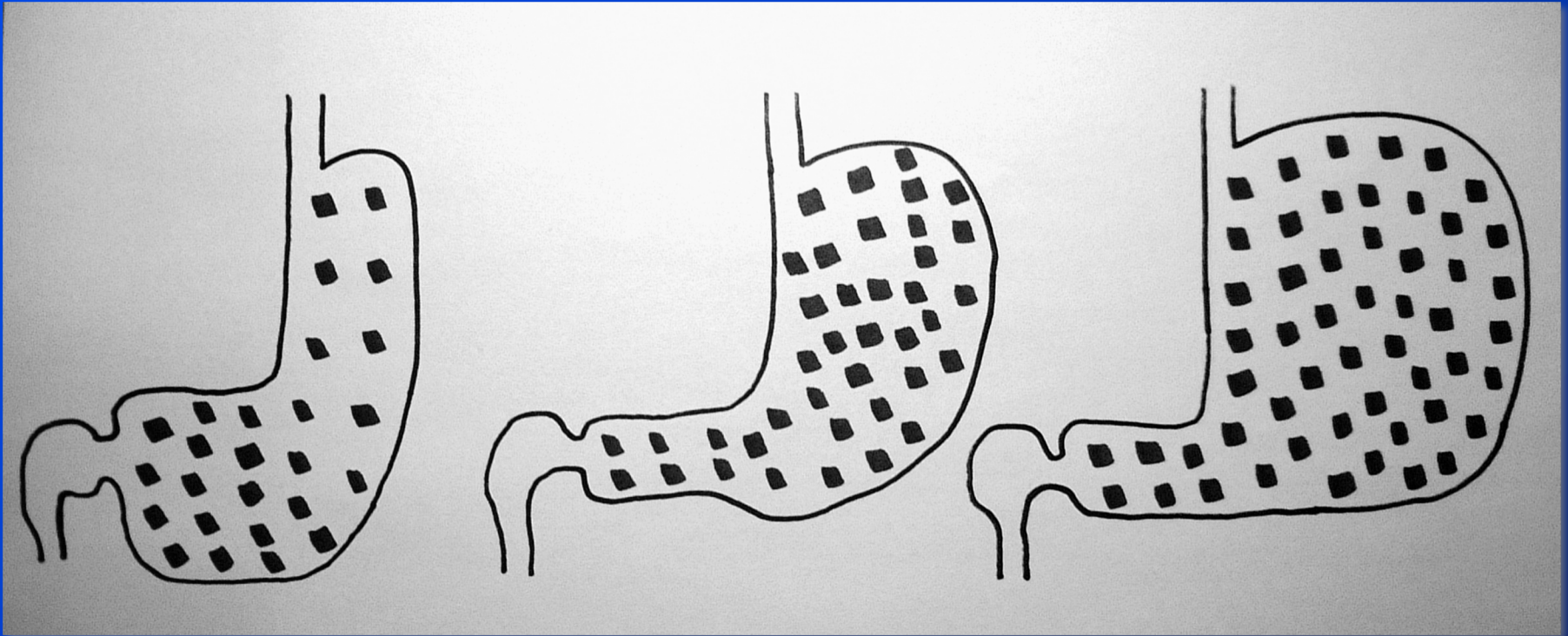
Definition

- Gastric accommodation is a complex process that describes how the size of the gastric compartment changes in response to a meal
- Extragastric reflexes:
 - Receptive relaxation
 - Intestino-gastric reflexes
 - Colo-gastric reflexes
- Intra-gastric reflexes:
 - Adaptive relaxation
 - Antro-fundic reflexes





Gastric Accommodation in Health and Disease



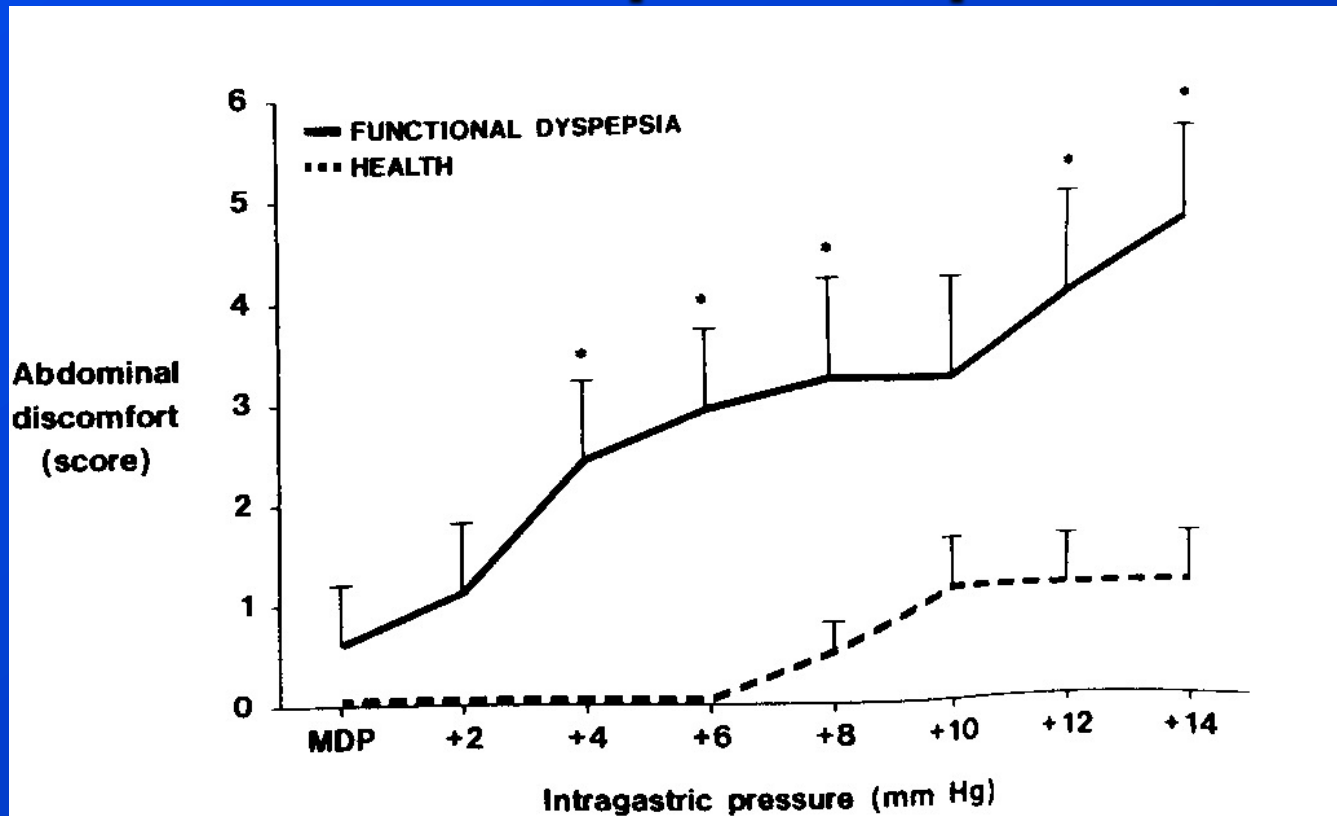
*Functional
dyspepsia*

*Normal
stomach*

*Reflux
esophagitis*



Gastric perception

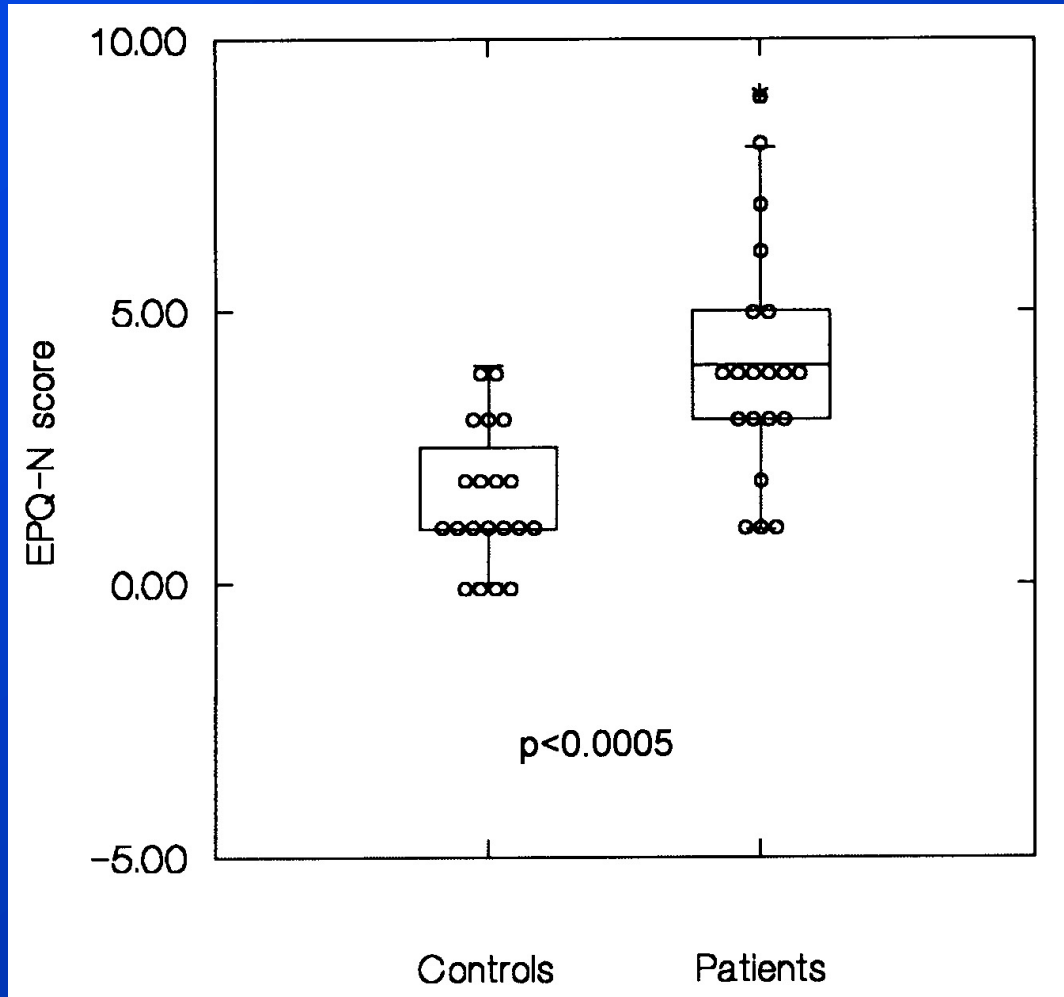


Abdominal discomfort elicited by gastric distention in patients with functional dyspepsia and healthy controls. MDP, minimal distending pressure. * $P < 0.05$ vs. controls.

Mearin et al., Gastroenterology 1991;101:999-1006



Neurotisisism in FD



Gilja et al. 1996

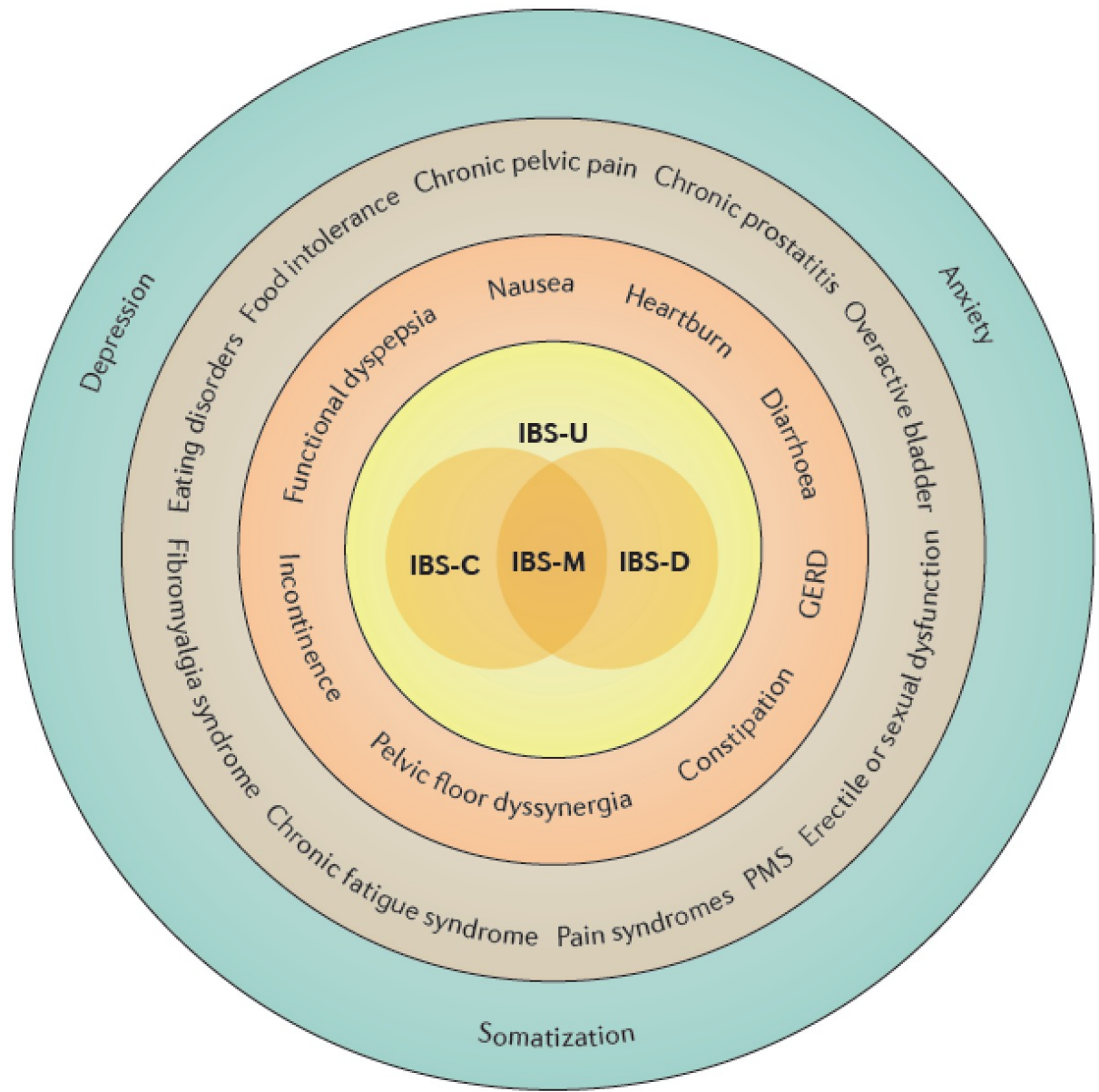


IBS – Irritabel Bowel Syndrome





IBS Related Disorders



- Psychiatric disorders
- Functional gastrointestinal disorders
- Functional non-gastrointestinal disorders
- IBS



2004

Researchers describe the first evidence of a specific molecular defect that may be a cause of IBS. The guts of people with IBS, as well as those with ulcerative colitis, contain relatively low amounts of both serotonin and an enzyme that synthesizes it, as well as a transporter that brings serotonin into cells (M. D. Coates *et al. Gastroenterology* **126**, 1657–1664; 2004). Although this result is initially controversial, later studies confirm it.

BACTERIAL BOUNTY

2008

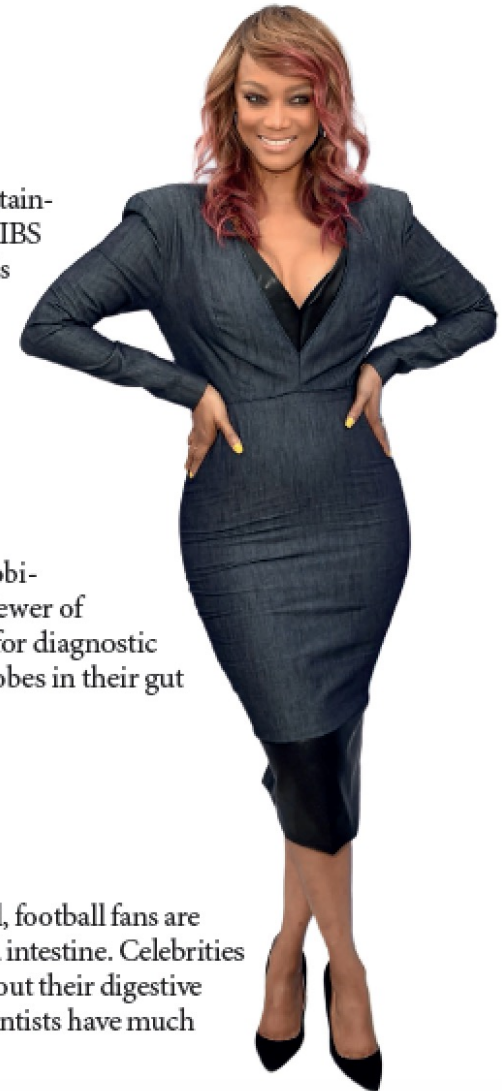
Evidence emerges that the low-FODMAP diet, which omits foods containing short-chain carbohydrates, can improve symptoms in people with IBS (S. J. Shepherd *et al. Clin. Gastroenterol. Hepatol.* **6**, 765–771; 2008). It is a very restrictive diet, but, because it seems to help up to two-thirds of people, it is increasingly adopted, often without medical advice (see page S108).

2011

Faecal analysis reveals that people with IBS have an altered gut microbiome, including more representatives of the phylum Firmicutes and fewer of Bacteroidetes (see page S104). This discovery opens up possibilities for diagnostic tests and treatments. Later, children with IBS who have certain microbes in their gut are found to be more likely to benefit from the low-FODMAP diet.

2016

The stigma surrounding IBS continues to fade. During the Super Bowl, football fans are shown an advertisement for the drug rifaximin, featuring an animated intestine. Celebrities such as supermodel Tyra Banks (pictured) have previously spoken about their digestive symptoms. But despite the recent approval of several medications, scientists have much more to do to untangle the disparate causes of IBS.





Type 1



Type 2



Type 3



Type 4



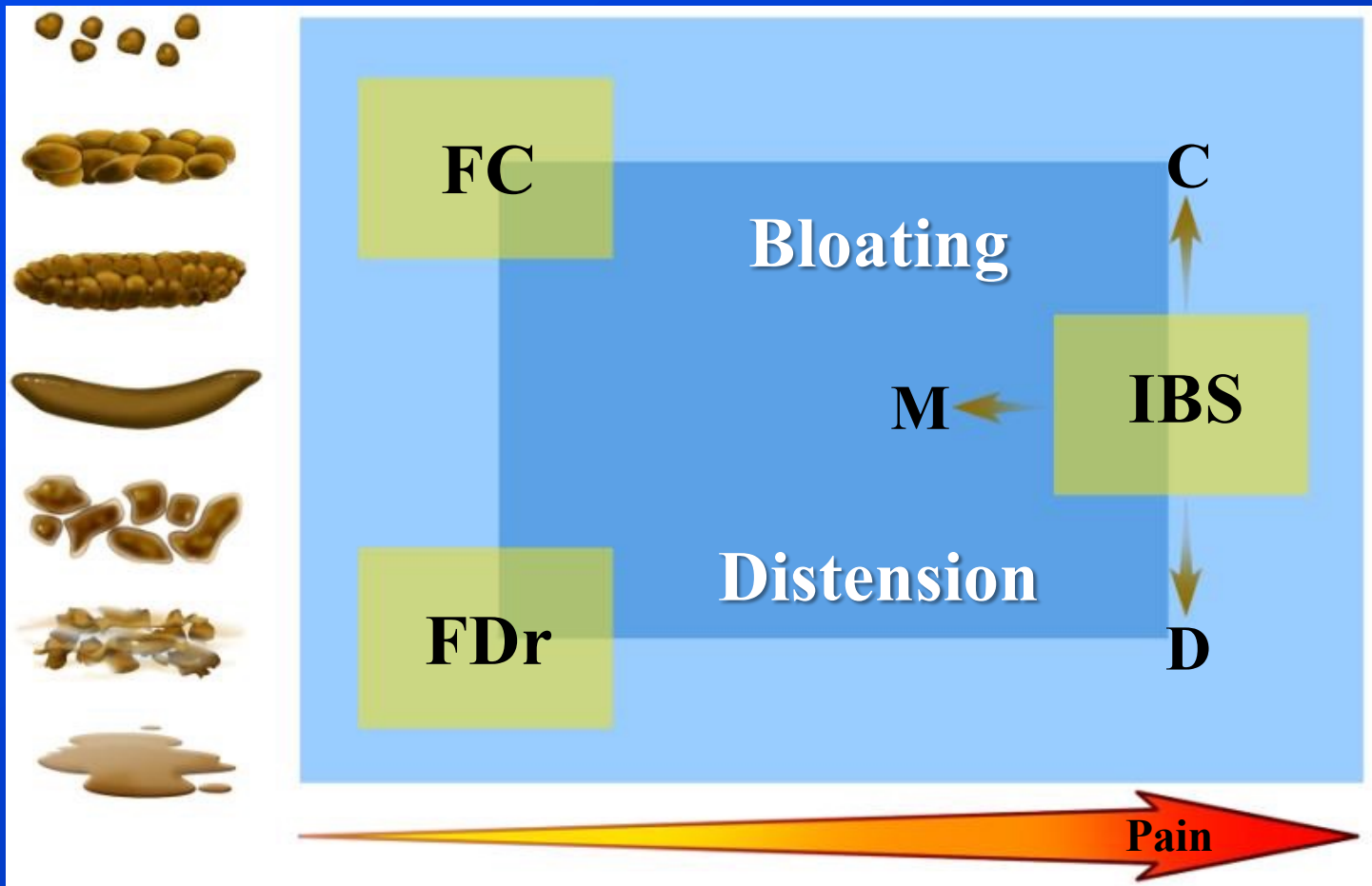
Type 5



Type 6



Type 7



FC: Functional constipation

FDr: Functional diarrhea

IBS-C: Irritable bowel syndrome with predominant constipation

IBS-D: Irritable bowel syndrome with predominant diarrhea

IBS-M: Irritable bowel syndrome with mixed bowel habits (D and C)



Hvem skal til kolonoskopi?

- Retningslinjene:
 - Alarmsymptomer
 - Pasienter over 50 år hvis ingen røde flagg
 - Familiehistorie CRC
 - Vedvarende diaré uten effekt av behandling

Giardia-sjøen og IBS



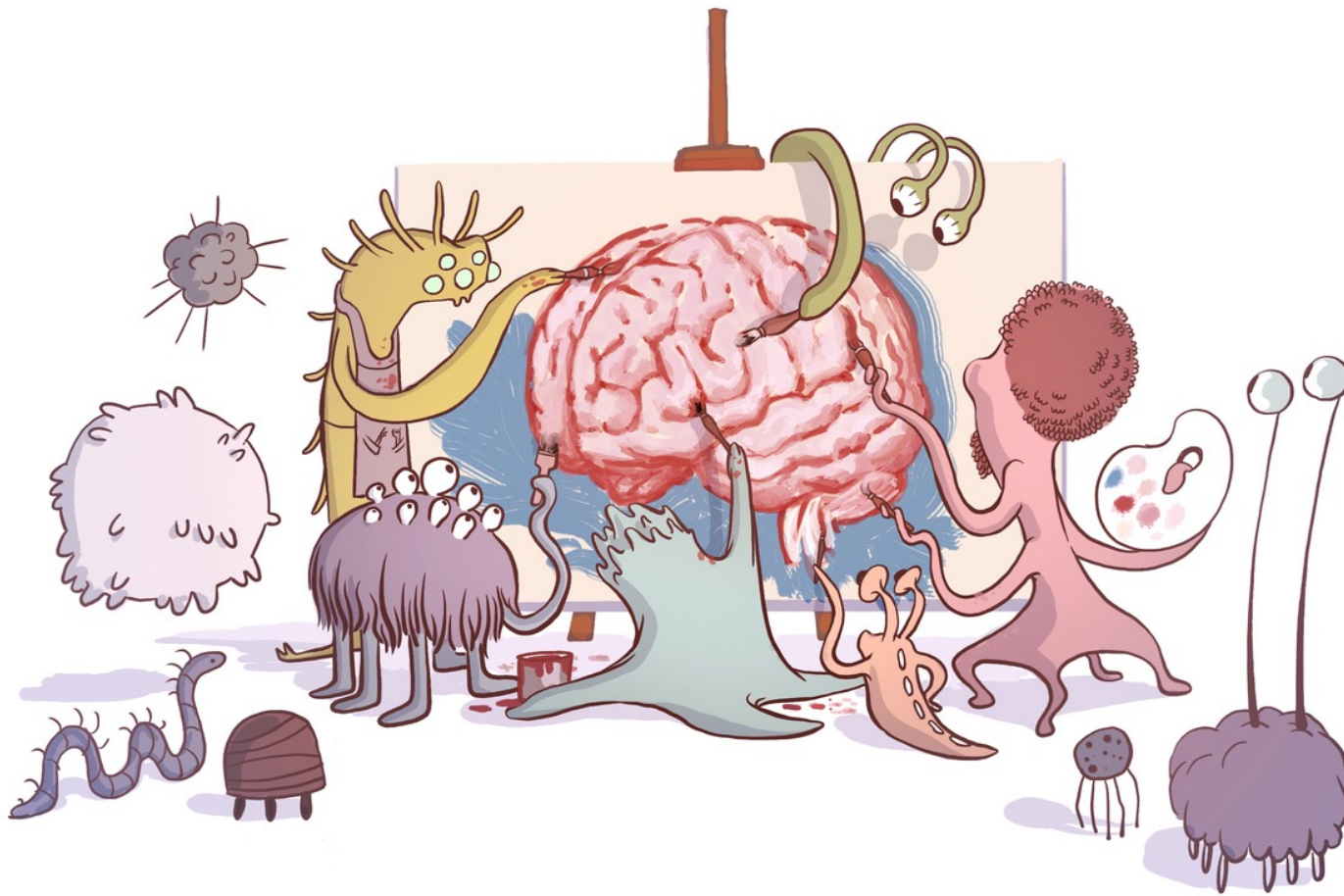


20-30% av IBS-pasientene har Postinfeksiøs-IBS

- IBS starter i forbindelse med tarminfeksjon
- 10% har fortsatt symptomer 3 mnd etter tarm infeksjon (etter negativ dyrkning)
- *Campylobacter jejuni*
- *Shigella*
- *Salmonella*
- Virus
- *Giardia lamblia*



Samspill tarmflora og hjerne





The good and the bad guys

Good and Bad Bacterial Flora

BIFIDOBACTERIA
The various strains help to regulate levels of other bacteria in the gut, modulate immune responses to invading pathogens, prevent tumour formation and produce vitamins.

ESCHERICHIA COLI
Several types inhabit the human gut. They are involved in the production of vitamin K2 (essential for blood clotting) and help to keep bad bacteria in check. But some strains can lead to illness.

LACTOBACILLI
Beneficial varieties produce vitamins and nutrients, boost immunity and protect against carcinogens.

CAMPYLOBACTER
C jejuni and C coli are the strains most commonly associated with human disease. Infection usually occurs through the ingestion of contaminated food.

ENTEROCOCCUS FAECALIS
A common cause of post-surgical infections.

CLOSTRIDIUM DIFFICILE
Most harmful following a course of antibiotics when it is able to proliferate.



OPEN ACCESS

ORIGINAL RESEARCH

Efficacy of faecal microbiota transplantation for patients with irritable bowel syndrome in a randomised, double-blind, placebo-controlled study

Magdy El-Salhy ,^{1,2} Jan Gunnar Hatlebakk,² Odd Helge Gilja,²
Anja Bråthen Kristoffersen,³ Trygve Hausken²

Gut, 2019



Effect of FMT on IBS-SSS

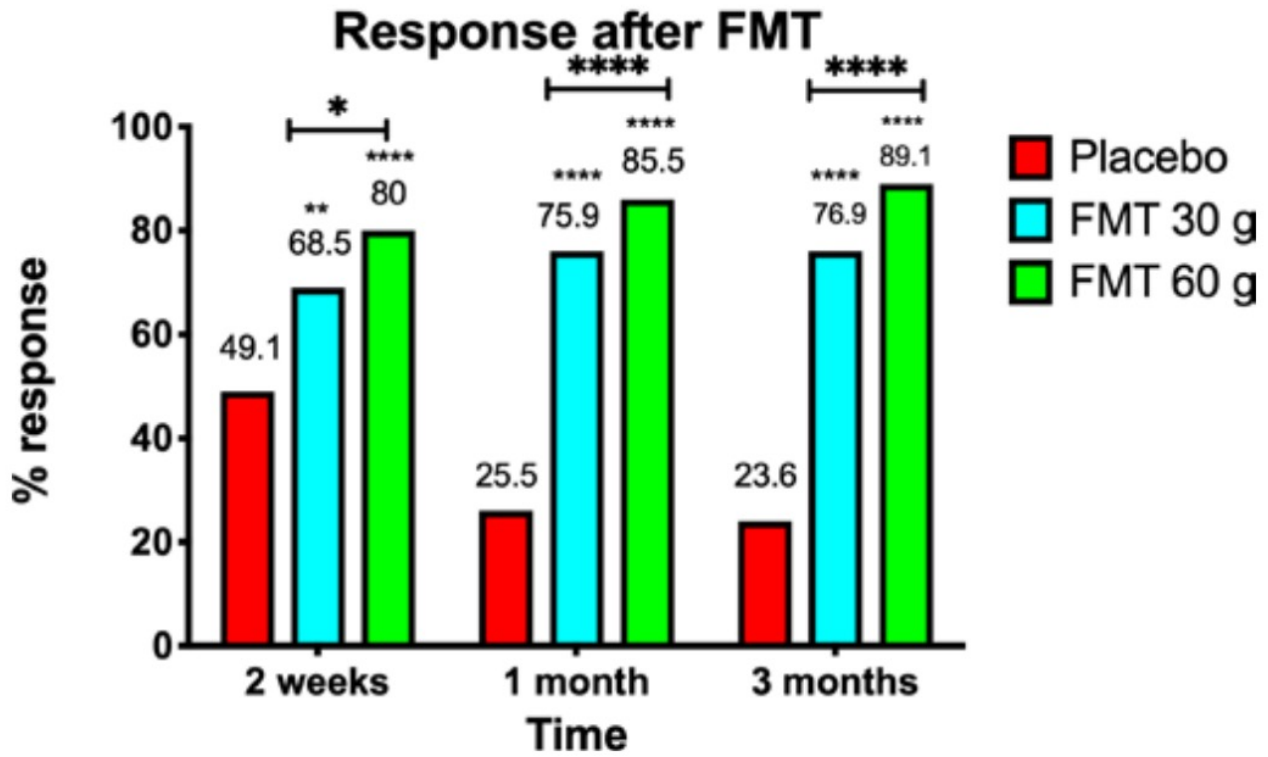


Figure 4 Responses of patients with IBS to placebo, 30 g FMT and 60 g FMT at different intervals after transplantation. **, $p < 0.001$; ****, $p < 0.0001$ compared with placebo. *, $p < 0.001$; ***, $p < 0.0001$ for 30 g FMT compared with 60 g FMT. IBS, irritable bowel syndrome; FMT, faecal microbiota transplantation.



Oppsummering

- FGID – en stor del av GE´ s arbeid
- Roma III -6 hovedgrupper for voksne
- Alarmsymptomer viktig mhp prioritering
- Dyspepsi – Ultralyd og suppetest (ULFU)
- Svekket akkommodasjon av magesekken er et kjennetegn ved FD
- Ugunstig tarmflora ser ut til å spille en viktig rolle ved FGID
- FMT har symptomatisk effekt mot IBS