

**IRRITABLE BOWEL SYNDROME: A REVIEW OF RECENT
ADVANCES IN UNDERSTANDING AND TREATMENT****Pratiksha G. Dhoble^{1*}, Prachi Bagde², Kalyanee D. Nirmal³, Kamlesh J. Wadher⁴**

KDK College of Pharmacy & Research Institute Nagpur.

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Corresponding Author*Pratiksha G. Dhoble**KDK College of Pharmacy &
Research Institute Nagpur.

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ABSTRACT

Irritable bowel syndrome (IBS) is a common chronic disorder of the gastrointestinal tract characterized by abdominal pain, bloating, and altered bowel habits, significantly affecting patients' quality of life. Although the exact cause of IBS is not fully understood, growing evidence suggests that disturbances in the brain–gut–microbiota axis play an important role in its pathogenesis. Factors such as stress, altered gut motility, visceral hypersensitivity, immune activation, and dysbiosis contribute to the development and persistence of symptoms. IBS is classified into different subtypes, including constipation-predominant, diarrhea-predominant, mixed, and unclassified forms, and diagnosis is mainly based on the Rome IV criteria after excluding organic diseases. Recent advances in research have highlighted the importance of gut microbiota and

psychosocial factors in disease progression and symptom severity. Management of IBS involves a multidisciplinary approach that includes dietary modifications, lifestyle changes, pharmacological therapy, psychological interventions, and probiotics to improve symptom control and overall quality of life. This review discusses the recent advances in the understanding, pathophysiology, diagnosis, and management of IBS, with particular emphasis on the role of the brain–gut–microbiota axis and individualized treatment strategies.

KEYWORDS: Irritable bowel syndrome, brain–gut–microbiota axis, psychosocial factors, dietary modification, Lifestyle Changes.

INTRODUCTION

Irritable bowel syndrome (IBS) is a long-term disorder affecting the digestive system and is one of the most common conditions seen in clinical practice.^[1] Although IBS is not usually life-threatening, it can cause uncomfortable symptoms and may be linked with higher levels of depression and anxiety, which can reduce the quality of life (QoL).^[1,2] IBS is characterized by symptoms such as abdominal pain, changes in bowel habits, bloating, distention, straining, and urgency.^[2] In most cases, patients experience changes in stool form or frequency along with abdominal pain or discomfort.^[1] Although the exact cause of IBS is not fully understood, it is believed to result from a combination of factors such as problems in gut–brain communication, imbalance in gut bacteria (microbiome), and increased sensitivity of the intestines.^[3,4]

IBS is diagnosed using the Rome IV criteria, which are based on the presence of specific long-term and recurring symptoms without any clear structural or biochemical cause.^[1] The Rome IV criteria, introduced in 2016, redefined IBS as a disorder of gut–brain interaction instead of a functional gastrointestinal disorder, reflecting a better understanding of its causes and helping to reduce stigma.^[5] IBS is further divided into different types based on the main symptoms, including constipation-predominant (IBS-C), diarrhea-predominant (IBS-D), mixed type (IBS-M), and unclassified (IBS-U).^[5,1]

Many studies on quality of life in IBS patients mainly focus on the negative impact of abdominal symptoms.^[6] However, some studies in recent years have used self-rated health (SRH) to assess quality of life and found that psychological and social factors, as well as other health conditions, have a greater influence on how patients perceive their health than the severity of symptoms.

Additionally, many IBS patients report that consultations with gastroenterologists do not always improve their condition.^[6] Overall, these findings highlight the importance of a holistic (biopsychosocial) approach rather than focusing only on symptoms to better understand patients' health perception and their need for healthcare.^[2,6] This review aims to discuss the recent advances in understanding and treatment of IBS.

Pathophysiology of IBS

Stress affects the brain–gut–microbiota axis, which plays a key role in the development of IBS.^[3,4] There is a bidirectional communication between the brain, gut, and gut microbiota.^[3]

Stress activates the hypothalamic–pituitary–adrenal (HPA) axis through corticotropin-releasing factor (CRF), leading to the release of cortisol.^[4]

This results in increased intestinal permeability, altered gut motility, inflammation, and visceral hypersensitivity.^[3,4] Stress also changes the composition of gut microbiota, which further influences immune responses and gut function.^[3] These interactions between stress, the nervous system, immune system, and microbiota contribute to the development and persistence of IBS symptoms.^[3,4] These interactions between stress, the nervous system, immune system, and microbiota contribute to the development and persistence of IBS symptoms.^[3,4,5]

Figure 1 illustrates the bidirectional communication between the central nervous system, enteric nervous system, and gut microbiota, which contributes to altered motility, inflammation, and visceral hypersensitivity. These interactions between stress, the nervous system, immune system, and microbiota contribute to the development and persistence of IBS symptoms.^[4,5]

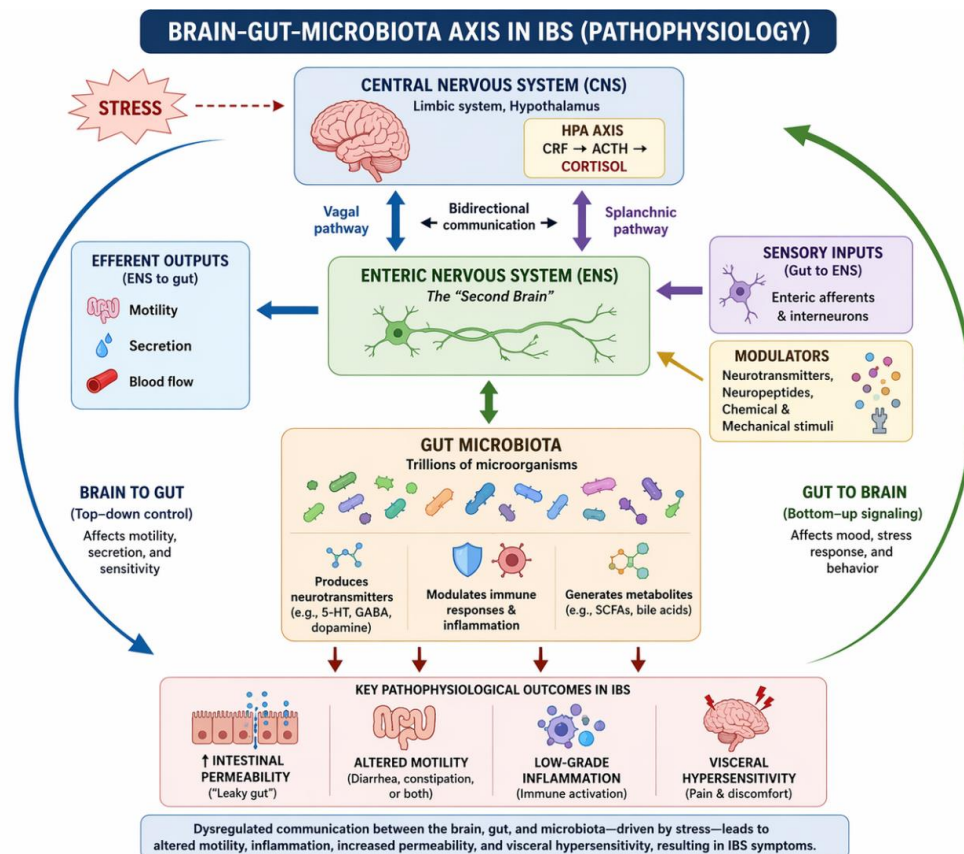


Figure 1: Brain–gut–microbiota axis in IBS showing bidirectional communication and its effects on gastrointestinal function.

Role of Gut Microbiota: Gut microbiota has an important role in the development of irritable bowel syndrome (IBS).^[5,6] It helps regulate normal intestinal functions such as motility, sensitivity, and communication between the gut and the nervous system.^[5] In IBS, an imbalance in gut microbiota (dysbiosis) is commonly observed, where beneficial bacteria decrease and harmful bacteria may increase. This imbalance can disturb normal gut function and contribute to symptoms.^[5,6]

- Changes in microbiota can also affect the intestinal barrier and activate the immune system, leading to mild inflammation.^[4,5] In addition, interactions between gut microbiota and stress-related pathways, such as the HPA axis, may further influence disease progression.^[3,5] In some cases, IBS develops after an episode of gastrointestinal infection, indicating that disturbances in gut microbiota can trigger the onset of symptoms.^[7]
- Figure 1 illustrates the interaction between the brain, gut, and microbiota in IBS, highlighting the role of stress, immune activation, and dysbiosis in symptom development.^[4,5]

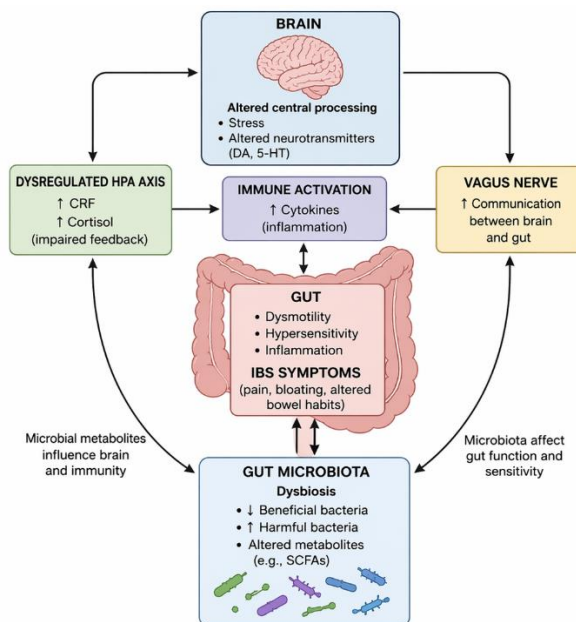


Figure 1: Simplified representation of the brain–gut–microbiota axis in IBS showing the interaction between the central nervous system, gut, and microbiota, leading to altered gut function and IBS symptoms.

Clinical Features of IBS

Irritable bowel syndrome is characterized by recurrent abdominal pain associated with altered bowel habits.^[2,7] Common clinical features include bloating, urgency, and straining during

defecation.^[7,9] Additionally, extraintestinal symptoms such as myalgias and a general feeling of illness may be reported.^[7]

DIAGNOSIS

Irritable bowel syndrome is diagnosed mainly on the basis of clinical symptoms using the Rome IV criteria.^[1,7] Since similar symptoms can be seen in other gastrointestinal disorders, certain laboratory investigations such as blood tests and stool examination are carried out to exclude organic causes.^[7] Additional tests, including celiac serology, thyroid function assessment, and fecal markers, may be considered.^[7] In selected patients, procedures like colonoscopy are performed to rule out other conditions.^[7]

Management

The management of irritable bowel syndrome involves a combination of dietary, pharmacological, and lifestyle approaches aimed at relieving symptoms and improving quality of life.^[8,9] Dietary modification is considered a primary intervention, as food intolerances and certain dietary components such as high-fat foods, fermentable carbohydrates (FODMAPs), and sugar alcohols may aggravate symptoms.^[8] Elimination diets and increased intake of soluble fiber may help reduce symptoms, particularly in patients with constipation-predominant IBS.^[8] Regular physical activity and exercise, including yoga, have been shown to improve gastrointestinal function and reduce stress, thereby alleviating symptoms.^[9]

Pharmacological treatment mainly focuses on symptom relief, including the use of laxatives for constipation, antidiarrheal agents for diarrhea, and antispasmodics for abdominal pain.^[8] Newer therapies target underlying mechanisms, such as serotonin pathways, chloride channels, and guanylate cyclase-C receptors.^[8] However, due to the heterogeneous nature of IBS, no single treatment is effective for all patients, and therapy should be individualized.^[8,9]

In addition, psychological factors play an important role in IBS, and therapies such as cognitive behavioral therapy, hypnotherapy, and relaxation techniques may improve symptoms.^[8,9] Probiotics and alternative therapies such as acupuncture may also provide benefit in some patients.^[8] Overall, a multidisciplinary and personalized approach is essential for effective management of IBS.^[10]

CONCLUSION

Irritable bowel syndrome is a common disorder of the digestive system which leads to abdominal pain and changes in bowel habits.^[7] The exact cause is not fully understood, but it is associated with disturbances in the gut–brain axis. Diagnosis is mainly based on the Rome IV Criteria.^[3,5] Management includes dietary changes, medications, and lifestyle modifications to control symptoms and improve quality of life.^[8,9]

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