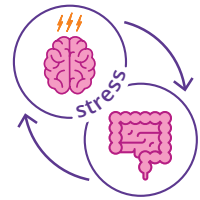


# GUT-BRAIN AXIS: GUT MICROBIOTA AS A MEDIATOR OF STRESS RESPONSE



## WHAT IS STRESS?

Stress is a temporary **state in which an individual's equilibrium is disturbed due to stressors** (physical or perceived).  
*e.g.: exam, money, divorce, moving, job...*

## DID YOU KNOW?

Gut microbiota have a key role in the **bidirectional interaction** with the brain during stress: **either worsening or mitigating**.

## HOW DOES THE BODY REACT TO STRESS?

The stress response activated by the brain results in the **secretions of different hormones**:

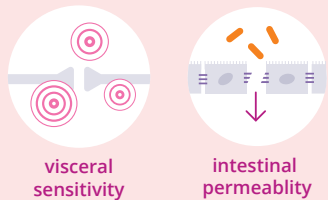


These hormones cause a number of changes that **help the body to deal with stress**:

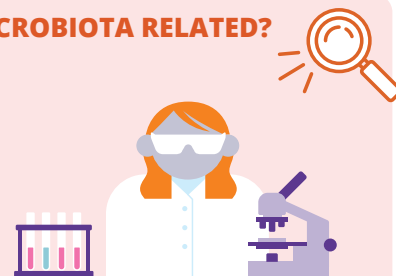
*sweating, heart rate increasing, energy boost, fast breathing...*



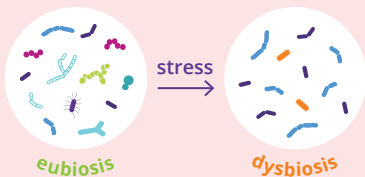
## HOW ARE STRESS AND GUT MICROBIOTA RELATED?



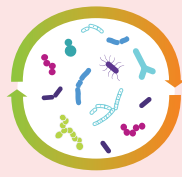
Stress and altered microbiota can affect **gut functions and bowel habits**.



Several laboratory studies have shown that gut microbiota can **alter behavior**.



Stress causes change in the **gut microbiota composition**.



**Manipulations** of the gut microbiota can be helpful in **reducing stress**.

## WHAT'S HAPPENING WHEN THE RETURN TO NORMAL FAILS TO OCCUR?

Chronic stress increases the risk of...



**gastrointestinal disorders**



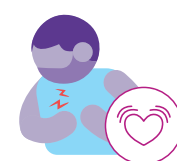
**sleep and cognitive impairment**



**neuropsychiatric diseases**



**metabolic diseases**



**cardiovascular diseases**



**maternity & birth outcomes**

## HOW CAN STRESS BE MANAGED?



**healthy diet**



**physical activity**



**good sleep**



**healthy environment**



**psychotherapeutic interventions**

## WHAT ARE PSYCHOBIOPTICS?

Psychobiotics are probiotics and prebiotics which, when ingested, confer mental health benefits through interactions with gut microbiota.



**probiotics**



**prebiotics**

