DESCRIPTION FOR THE GENERAL PUBLIC

Barrett's esophagus (BE) is a disease of esophageal mucosa developed as a result of reversing the acidic contents of the stomach and duodenal alkaline due to a failure of the lower esophageal sphincter called gastroesophageal reflux disease (GERD). It has been estimated that 20% of the developed countries population is affected by symptoms of GERD. In Barrett's esophagus, normal stratified squamous epithelium lining is replaced by simple columnar epithelium with goblet cells characteristic for lower part of gastrointestinal tract (GI). This metaplasia is considered as an adaptation to chronic GERD. BE greatly increases the risk of espohageal adenocarcinoma, it is therefore classified as a premalignant condition.

Previous studies have shown that carbon monoxide (CO), endogenous gaseous mediator plays a key role in the physiology of the gastric mucosa and lower GI tract. It has been reported that this molecule exerts anti-inflammatory and anti-oxidative action and is involved in the mechanism of gastroprotection against the damage induced by the application of non-steroidal anti-inflammatory drugs (NSAIDs) such as aspirin or naproxen, application of ethanol or drugs used to treat osteoporosis- bisphosphonates. It has been shown that this molecule reduce inflammation in the course of colitis. These results were the inspiration for the development of new H_2S-relesing derivatives of drugs.

However, the role of CO, produced endogenously and released from its pharmacological donors in the mechanism of esophageal mucosa protection and treatment against the inflammation and metaplasia caused by GERD and involvement of CO in the development of BE still remains unknown.

Therefore, this study aims to determine whether CO produced endogenously or released from its donors is an important protective factor in the pathophysiology and progression of metaplasia of esophageal mucosa towards BE. Moreover, the aim of the project is to determine the mechanisms involved in CO activity within esophageal mucsa using specialized *in vitro* and *in vivo* laboratory techniques and clinical samples from patients with BE to obtain highly translational results related to clinical picture of the disease observed in humans.