

# Capsule Endoscopy

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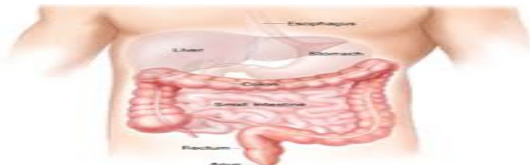
**Abstract—** this paper will inform readers on one of Biomedical Engineering's most helpful inventions of the 21<sup>st</sup> century. Readers will learn the purpose of Capsule Endoscopy, who can use it, and why it is helpful.

## I. INTRODUCTION

The colon plays a crucial role in the process of the human body's digestion. Its function is to reabsorb fluids and process waste in the body and prepare for its elimination. Unfortunately, about 100,000 people are diagnosed with colorectal cancer every year in the United States alone. Over a lifetime, the odds of developing colorectal cancer are about 1 in 20, or 5%. It is the second leading cause of cancer related deaths in America. Common signs and symptoms indicating colorectal cancer include a change in your bowel habits including diarrhea or constipation, rectal bleeding, and persistent abdominal discomfort (such as gas, cramps or pain). These symptoms can be caused from ulcers, polyps, and tumors that are found with in the small intestine. All legitimate signs of abnormal activity with in the stomach area which can become cancerous. Capsule Endoscopy was invented as Biomedical Engineering's most efficient way to analyze the small intestine and colon area to identify any problems before cancerous cells are found.

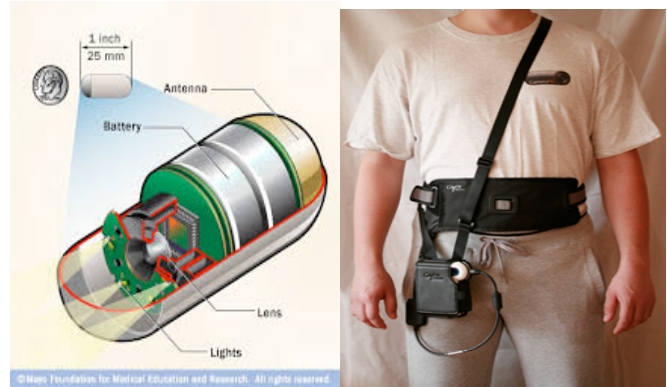
## II. COLONOSCOPY AND ENDOSCOPY

In the early 1800's, a man named Philipp Bozzini invented a tool called the "lichtleiter" or light conductor for the examinations of the canals and cavities of the human body. As technology made further advancements, the process of endoscopy became popular. Even current day, patients can receive upper endoscopy or colonoscopy in order to evaluate their insides for any signs of abnormal activity. Endoscopy is a procedure in which a patient's internal organ is analyzed by using an endoscope; a long thin, rod with a light, telescope and video camera attached to it. During upper endoscopy, the endoscope enters the body through the mouth, down the throat and into the intestine. Colonoscopy is a type of endoscopy that specifies on analyzing the rectum and colon. Unlike an endoscopy, the endoscope enters the body through the rectum during a colonoscopy. Below is a picture of a healthy small intestine



## III. CAPSULE ENDOSCOPY

Unfortunately, even with both upper endoscopies and colonoscopies, a small (yet significant) section cannot be reached with the endoscope. That's where Capsule Endoscopy comes into play. Capsule Endoscopy is the procedure in which a pill sized camera enters the body and captures thousands of images of the small intestine which are later examined by a doctor in order to conclude whether or not the patient is at risk for disease. The capsule contains an antenna, a battery, a lens and lights. The patient must refrain from eating for ten hours. The patient swallows the wireless pill sized capsule. As the capsule goes down the throat and into your (20-25ft), thousands of pictures are taken (2 pictures per second). The patient must wear a wireless receiver and sensors so that the pictures taken by the capsule are transmitted.



Capsule Endoscopy is not open to anyone. It was approved "for use in only patients who had an incomplete optical colonoscopy". With that being said, it is pretty rare for someone to be recommended for this procedure. Only 5% of the estimated 14 million colonoscopies done a year are deemed incomplete. The cost of this procedure is \$500, compared to the price of an ordinary endoscopy which can range anywhere between \$800 and \$4000. Capsule Endoscopy has changed Biomedical Engineering and will only keep doing so.

## REFERENCES

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