WHAT IS THE SMALL INTESTINE?
The small intestine is part of the digestive system that consists of three sections. The function of the small intestine is to break down food and nutrients before they are absorbed into the body. The small intestine connects the stomach to the large intestine (colon). The three sections of the small intestine are the duodenum (the part closest to the stomach), jejunum (middle section) and ileum (bottom section that connects to the large intestine).

LABORATORY TESTS RELATED TO SMALL INTESTINAL CANCER
In this material, the terms “female” and “woman” are used to refer to people assigned female at birth; the terms “male” and “man” are used to refer to people assigned male at birth.

Small intestinal cancer is cancer that develops in the small intestine, also known as the small bowel. For cancers in the large intestine, please refer to the educational resource for colon cancer. Cancer of the small intestine begins in its lining when malignant cells begin to grow uncontrollably. The specific causes of intestinal cancer are not well understood, however genetic and environmental factors play a role. Small intestinal cancer is a type of gastrointestinal cancer, and it contributes to about 3% of gastrointestinal cancer cases. There are several types of small intestinal cancers depend on the type of cells where the cancer begins.

ADENOCARCINOMA: This type of cancer begins in the glandular epithelial cells that line the small intestine. Adenocarcinomas are the most common type of intestinal cancer and contribute to 1 in 3 intestinal cancer cases. Most malignant growths begin in the part of the small intestine closest to the stomach (duodenum) and block the small intestine. The signs and symptoms of adenocarcinoma include bloating, difficulty swallowing, nausea, and feeling full after eating small amounts of food.

SARCOMA: This type of cancer begins in soft tissues such as muscle or cartilage. The most common type of sarcoma in the small intestine is called a gastrointestinal stromal tumor (GIST). Symptoms for GISTS include stomach pain, weight loss, vomiting blood and difficulty swallowing.

NEUROENDOCRINE TUMORS: This type of tumor begins in the neuroendocrine cells which help the body produce hormones. Most neuroendocrine tumors (NETs) start in the ileum and are also referred to as carcinoid tumors. NETs are rare and account for less than 1% of intestinal cancer cases. The signs and symptoms of NETs can include flushing on the face and neck, abdominal pain, rectal bleeding and vomiting.

LYMPHOMA: This type of intestinal cancer begins in lymphocytes (a type of white blood cell) that are present within the small bowel wall. The signs and symptoms include unexplained weight loss, abdominal pain, nausea, vomiting and diarrhea.
STAGES OF INTESTINAL CANCER

The stages of intestinal cancer indicate where the cancer has spread throughout the body and the severity of the cancer. At certain stages, the cancer is only in specific parts of the small intestine.

STAGE 0: The cancer is only in the most inner part (epithelium) of the lining of the small intestine.

STAGE I: The cancer has spread to one of the following:
- The submucosa (just below the epithelium)
- The layer of muscle in the mucosa
- The muscularis propria (the larger, outer layer of muscle)

STAGE II: The cancer has grown through the muscularis propria and into the serosa or subserosa, which is the outermost layer of the small intestine. The cancer has not spread to lymph nodes.

STAGE III: The cancer has grown through the muscularis propria and into the serosa or subserosa, which is the outermost layer of the small intestine. The cancer has not spread to lymph nodes.

STAGE IV: The cancer has spread to other parts of the body such as the liver and the lungs.

UNDER THE MICROSCOPE

The normal small intestine, on the left and right of the slide, has finger-like projections (villi) which are responsible for absorption of nutrients. The tumor (large blue/purple mass) has completely replaced the small intestine lining cells in the center of the tissue.

LAB TESTS RELATED TO SMALL INTESTINAL CANCER

*Please note that reference ranges are set by individual laboratories for their specific populations and might differ slightly.

BIOPSY: This test involves the removal of tissue for analysis in the laboratory. For small intestinal cancer, a biopsy can be done during an endoscopy. Biopsy forceps can be used through the endoscope tube to take small samples of the tumor to be tested. If the tumor cannot be reached with an endoscope, a sample is obtained during surgery.

CARCINOEMBRYONIC ANTIGEN (CEA): This test measures the level of the protein and tumor marker, CEA in the blood. High levels of CEA in the blood in adults can be an indication of cancer. The typical reference range* is between 0 to 2.5 ng/mL.

COMPLETE BLOOD COUNT (CBC): This test determines your overall health status by looking at your overall blood count levels, including your red and white blood cell count, your platelets, and lymphocytes. This test is important because it can indicate if you are having a condition or disease, such as an infection, anemia, inflammation, or cancer. Specifically, a decreased hemoglobin or hematocrit with no known cause can possibly indicate blood loss, which can occur from a bleeding tumor of the small intestine.

TYPICAL REFERENCE RANGES FOR MEN:

<table>
<thead>
<tr>
<th>Complete Blood Count</th>
<th>Role in Health</th>
<th>Typical Reference Range*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematocrit</td>
<td>Plasma in Red Blood Cells</td>
<td>38.3-48.6%</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>Oxygen-Carrying Protein</td>
<td>13.2-16.6 grams/dL</td>
</tr>
<tr>
<td>Platelet Count</td>
<td>Blood Clotting</td>
<td>135-317 x 10^3 /uL</td>
</tr>
<tr>
<td>Red Blood Cell Count</td>
<td>Carry Oxygen</td>
<td>Between 4.35-5.65 x 10^6 /uL</td>
</tr>
<tr>
<td>White Blood Cell Count</td>
<td>Fight Infections</td>
<td>3400-9600 cells/uL</td>
</tr>
</tbody>
</table>

TYPICAL REFERENCE RANGES FOR WOMEN:

<table>
<thead>
<tr>
<th>Complete Blood Count</th>
<th>Role in Health</th>
<th>Typical Reference Range*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematocrit</td>
<td>Plasma in Red Blood Cells</td>
<td>35.5-44.9%</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>Oxygen-Carrying Protein</td>
<td>11.6-15 grams/dL</td>
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<tr>
<td>Platelet Count</td>
<td>Blood Clotting</td>
<td>157-371 x 10^3 /uL</td>
</tr>
<tr>
<td>Red Blood Cell Count</td>
<td>Carry Oxygen</td>
<td>Between 3.92-5.13 x 10^6 /uL</td>
</tr>
<tr>
<td>White Blood Cell Count</td>
<td>Fight Infections</td>
<td>3400-9600 cells/uL</td>
</tr>
</tbody>
</table>
MEET DARYL

“In my care team told me that I am lucky due to my early diagnosis and early treatment. It is to my benefit that I had annual scans and colonoscopies.”

In 2021, Daryl asked his doctor to perform a colonoscopy at the age of 45. He knew he was younger than most routine colonoscopy patients, but because of his family history of gastrointestinal cancer, he wanted to be careful.

During the procedure, the doctor found an unusual mass in Daryl’s terminal ileum, which is the last segment of the small intestine before it turns into the colon. She performed a biopsy on the mass and sent it to the lab. The results came back a week before his wedding — the mass they had found was cancer.

Daryl went on to have surgery to remove the tumor. In addition to the diseased part of his small intestine, his doctors also removed lymph nodes, his appendix, and some of his colon. These tissues were all tested by the pathology team.

He is deeply grateful for the work of lab professionals and pathologists; “They are highly specialized in their diagnostic work. Medical doctors can’t report findings until all testing is completed. It is the collaboration of all the professionals with various disciplines that create the successful environment for successful treatment.”

To watch a video about Daryl and learn more about other lab tests, go to www.ascp.org/patients

ASK YOUR DOCTOR

• What type of small intestinal cancer do I have?
• How does the type affect my treatment options?
• What are my treatment options?
• Why do you recommend this particular treatment option?
• What are the follow-up tests and what are we looking for?
• Are there any additional tests that would help better understand my disease prognosis?
• What screening tests do you recommend?
• Should I make any dietary or lifestyle changes?

ADDITIONAL RESOURCES

Scan the QR code to view and download our educational resources.

Scan the QR code to watch videos of our Champions sharing their stories.