

# Exploring Anatomy: the Human Abdomen

## An advanced look at the mesenteric arteries

Welcome to this video for exploring anatomy, the human abdomen. This video is going to detail the branches of the superior and inferior mesenteric arteries.

And to do that, we just need to quickly draw out some of the organs that form the midgut and the hindgut. So I'll just start off by approximately drawing out the jejunum and the ileum. I'm not including the duodenum here because obviously the distal portions of the duodenum form part of the midgut. But that would overcomplicate the diagram.

About here we can see the jejunum and the ileum. The ileum is continuous with the caecum, at the ileocaecal junction. And coming off the caecum, which we can see here, is the appendix. So here's the caecum.

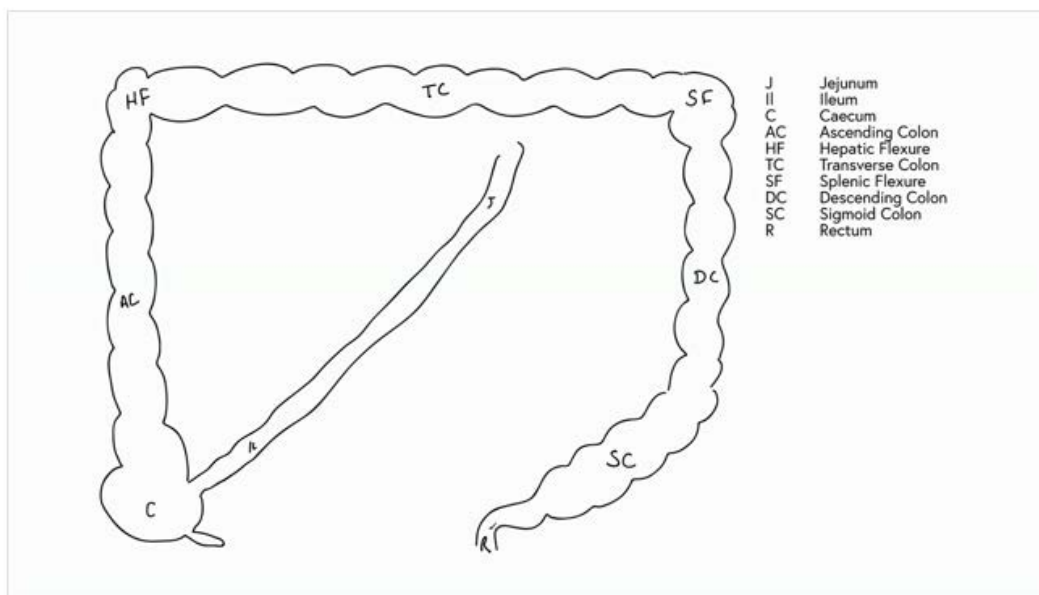
And then the caecum is continuous superiorly with the ascending colon. And we can draw in the ascending colon here.

At the hepatic flexure, the ascending colon turns to the left and becomes the transverse colon. And then as the transverse colon approaches the spleen, at the splenic flexure, the transverse colon becomes the descending colon. The descending colon is continuous with the sigmoid colon, which is continuous in the pelvis with the rectum.

So here we can see the caecum. We've got the ascending colon. We've got the hepatic flexure.

We've got the transverse colon. We've got the splenic flexure, descending colon. We've got the sigmoid colon. And we've got the rectum.

The midgut is going to extend from the distal portion of the duodenum, through the jejunum, ileum, caecum, ascending colon, and 2/3 of the transverse colon. The hindgut is then going to extend from the last third of the transverse colon, the descending colon, sigmoid colon, rectum, and upper portion of the anal canal.



So now let's turn to the blood vessels that supply these various portions of the hindgut and also the midgut. So let's start with the midgut.

And what we have is the abdominal aorta here. And coming away from the abdominal aorta, at the level of the upper border of L1 vertebra, is the superior mesenteric artery. The superior mesenteric artery is going to give rise to numerous jejunal and then ileal branches.

And these jejunal and ileal branches are going to give rise to a whole series of short arteries or straight arteries, which we call vasa recta. And they do this by forming what is known as arterial arcades.

So running parallel to the small intestine is a channel. And that's formed by various jejunal branches, which we can see here, and here, and here, and also here. And then as the jejunum becomes ileum, they become ileal branches. So we can add a few more ileal branches here.

And what we can see is that these jejunal branches, they join or they form an anastomosis, forming what are known as arterial arcades. And we're just drawing in a series of these arterial arcades here. And what they do is they form this channel that runs parallel to the small intestine. And coming from this channel are a whole series of those straight arteries, which can be called vasa recta.

So what we have are these jejunal and ileal branches forming these arcades. So I'll just put "A" here for arcade. And we've got another arcade here. And you can see where these jejunal and ileal branches are joining, we have these arterial arcades.

Coming off these arcades are a series of straight arteries. And we call these vasa recta. So I'll put "V-R" here. And we have a whole series of these coming off the arcades to supply the jejunum and the ileum.

Also coming off the superior mesenteric artery and going to supply the transverse colon, the ascending colon, and the caecum and appendix are a series of colic arteries. What we have coming up here and heading towards the transverse colon is the middle colic. So we've got "M-C" here.

We then have heading towards the right, we've got the right colic artery, "R-C" here. And then coming off the superior mesenteric artery, we have the ileocolic artery. And we can see that ileocolic here.

Now, what these blood vessels do is they go towards the colon or the caecum. And they also run into a channel, just like the arterial arcades. And this channel runs around the colon. So we can draw in this channel here.

And we can see that it's being fed into by various branches. We got the ileocolic, the right colic, and the middle colic running into this channel.

And it does the same as the arterial arcades. It gives rise to a series of arteries that then go to supply the various parts of the colon. This is known as the marginal artery. And as we'll see later on, it really is very important.

If we look at the ileocolic artery here, this ileocolic artery is going to supply the proximal portion of the colon and the caecum, these various branches. And it also gives rise to what's known as the appendicular artery. Notice how the appendicular artery here goes posterior to the ileum and it supplies the appendix. So these dotted lines show it going posterior to the ileum.

And we can see the appendicular artery coming down here. So we'll just write in "A-P-P" for appendicular artery.

Here we can see the ileocolic artery. Here we can see the right colic artery. Here we can see the middle colic artery. And they're all running in to what's called the marginal artery. Coming off the marginal artery are a series of short arteries, just like the vasa recta coming off the arterial arcades.

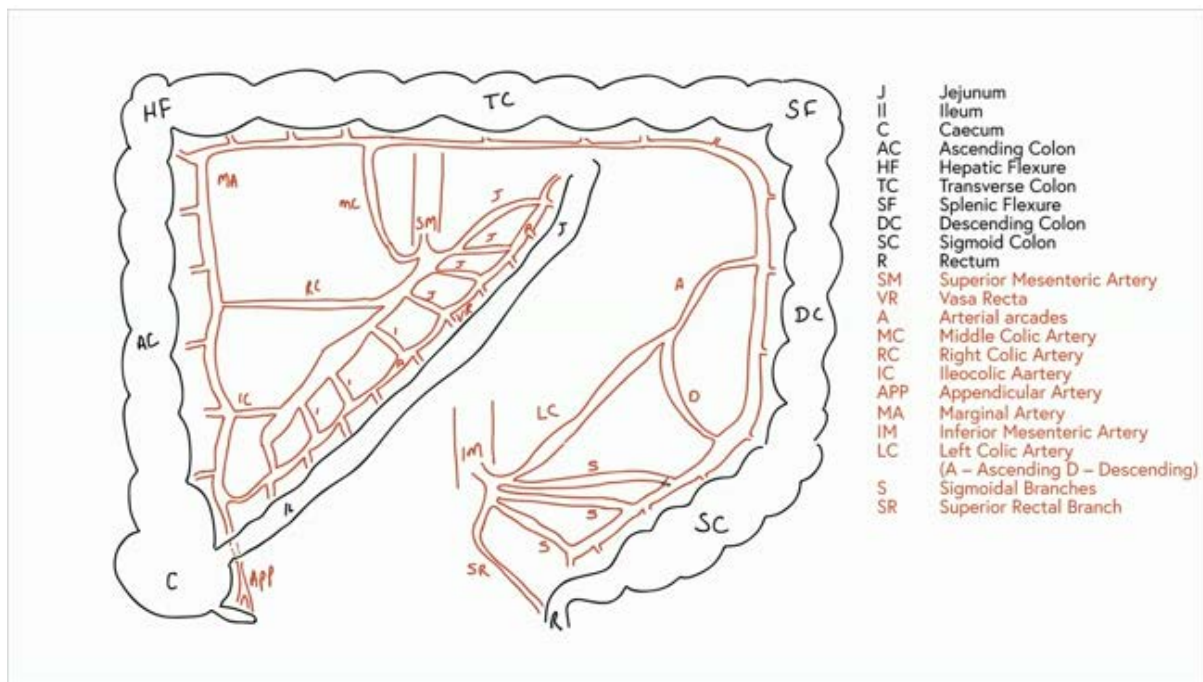
What I haven't included in this diagram is the small, inferior pancreaticoduodenal artery. That would overcomplicate this diagram. And you can look elsewhere at other screencasts to cover this.

So, the superior mesenteric artery is going to give a whole series of branches that supply organs of the midgut. And we can see the marginal artery here is being fed into by the middle colic, the right colic, and the ileocolic.

So now, let's look at the blood supply to the hindgut. Once again, let's draw in our abdominal aorta. And this time, coming away from the abdominal aorta, at the level of the L3 lumbar vertebra, is the inferior mesenteric artery. This time the inferior mesenteric artery is going to go towards the lefthand side. And it gives off a major branch, which is the left colic.

The left colic artery heads retroperitoneal towards the descending colon, where it gives rise to a couple of branches. These are known as the ascending and the descending branches of the left colic. So, ascending and descending.

And just like the branches that are coming off the superior mesenteric artery, these branches are going to run into the marginal artery, the marginal artery that continues all the way along the large intestine. So here we can see the marginal artery running all the way around the large intestine.



Now as its running alongside the hindgut, its receiving branches from the ascending portion of the left colic. It's now receiving branches from the descending portion of the left colic. As it runs parallel to the sigmoid colon, it's going to receive maybe two or three branches that are known as sigmoidal arteries, coming off the inferior mesenteric. So we can draw a couple of these in here.

And then the final branch that is coming away from the inferior mesenteric artery is going to be the superior rectal. The superior rectal is going to supply the upper portons of the rectum. So here we can see we have-- we've just drawn in three here-- sigmoidal branches. And here's superior rectal branch.

So what we've seen is the superior mesenteric artery and the inferior mesenteric artery, giving rise to a whole series of branches that supply the midgut and the hindgut. We can see jejunal branches and ileal branches forming arterial arcades that give rise to the vasa recta, that supply the small intestine.

Back to the superior mesenteric artery, giving rise to a middle colic, a right colic, an ileocolic. They all run into this marginal artery. The marginal artery we can see runs parallel to the entire large intestine. And here, towards the hindgut, receives branches from the left colic and the sigmoidal arteries.

The significance of this marginal artery is that if the inferior mesenteric artery becomes damaged and blood cannot enter into these arteries, the hindgut can still receive blood by way of the marginal artery.

[end of transcript]