

The surface area of the digestive tract 'only' as large as a studio apartment

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The internal surface area of the gastro-intestinal tract has long been considered to be between 180 and 300 square meters. Scientists at the Sahlgrenska Academy have used refined microscopic techniques that indicate a much smaller area.

"Actually, the [inner surface](#) of the gastro-intestinal tract is only as large as a normal studio apartment," says scientist Lars Fändriks.

The [digestive tract](#), which passes from the mouth through the esophagus and onwards through the intestines, has a length of about 5 meters in a normal adult, and is built up with many folds and protrusions.

Previous calculations, which are reproduced in reference works and textbooks, state that the area of the inner surface of the digestive tract is between 180 and 300 square meters – as large as, or even larger than, a tennis court.

Wrong figures

A new study from the Sahlgrenska Academy, published in the *Scandinavian Journal of Gastroenterology*, shows that these figures are wrong.

Scientists Lars Fändriks and Herbert Helander have used quantitative [microscopic techniques](#) to determine that the surface area of the gastro-

intestinal tract in healthy adults is "only" between 30 and 40 square meters.

By far the greatest part of this is the small intestine. The area of the large intestine is approximately 2 square meters, while the mouth, esophagus and stomach amount to less than 1 square meter.

Half of a badminton court

Lars Fändriks finds it surprising that the area of the gastro-intestinal tract is not that of a tennis court, rather half of a badminton court.

"It may appear to be simply a curious fact, but the dimensions of the inner surface of the gastro-intestinal tract are important for the uptake of nutrients and drugs, and the new information will help us understand how the mucous membrane protects the body from harmful factors in the intestinal contents," he says.

Misleading measurements

The Gothenburg scientists explain how the previously erroneous results were arrived at:

"The gastro-intestinal tract is a dynamic system that is difficult to access in the abdominal cavity, and this makes it difficult to measure. Since the past measurements were carried out either during post mortems or during abdominal surgery, when the tissue is relaxed, it is easy to obtain misleading measurements," says Herbert Helander.

Radiological investigations

The two scientists from Gothenburg have used data from radiological

investigations, supplemented with studies of the microscopical structure of the gastro-intestinal tract, where they have used endoscopes to obtain samples of the [mucous membrane](#) of the intestines.

The scientists emphasize that the new dimensions are valid for a healthy "average" adult: the length and [surface area](#) of the digestive tract differs from person to person. In addition, the measurement for an individual is probably affected by diet and lifestyle.

"From an anatomical point of view, 30-40 square meters is more than enough for the uptake of nutrients. Furthermore, the smaller area is actually quite logical, since it means that the risk of effects from the intestinal contents is lower," says Herbert Helander.

More information: The article Surface area of the digestive tract – revisited was published in the *Scandinavian Journal of Gastroenterology* on 2 April. [informahealthcare.com/doi/abs/ ... 00365521.2014.898326](http://informahealthcare.com/doi/abs/.../00365521.2014.898326)

Provided by University of Gothenburg

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