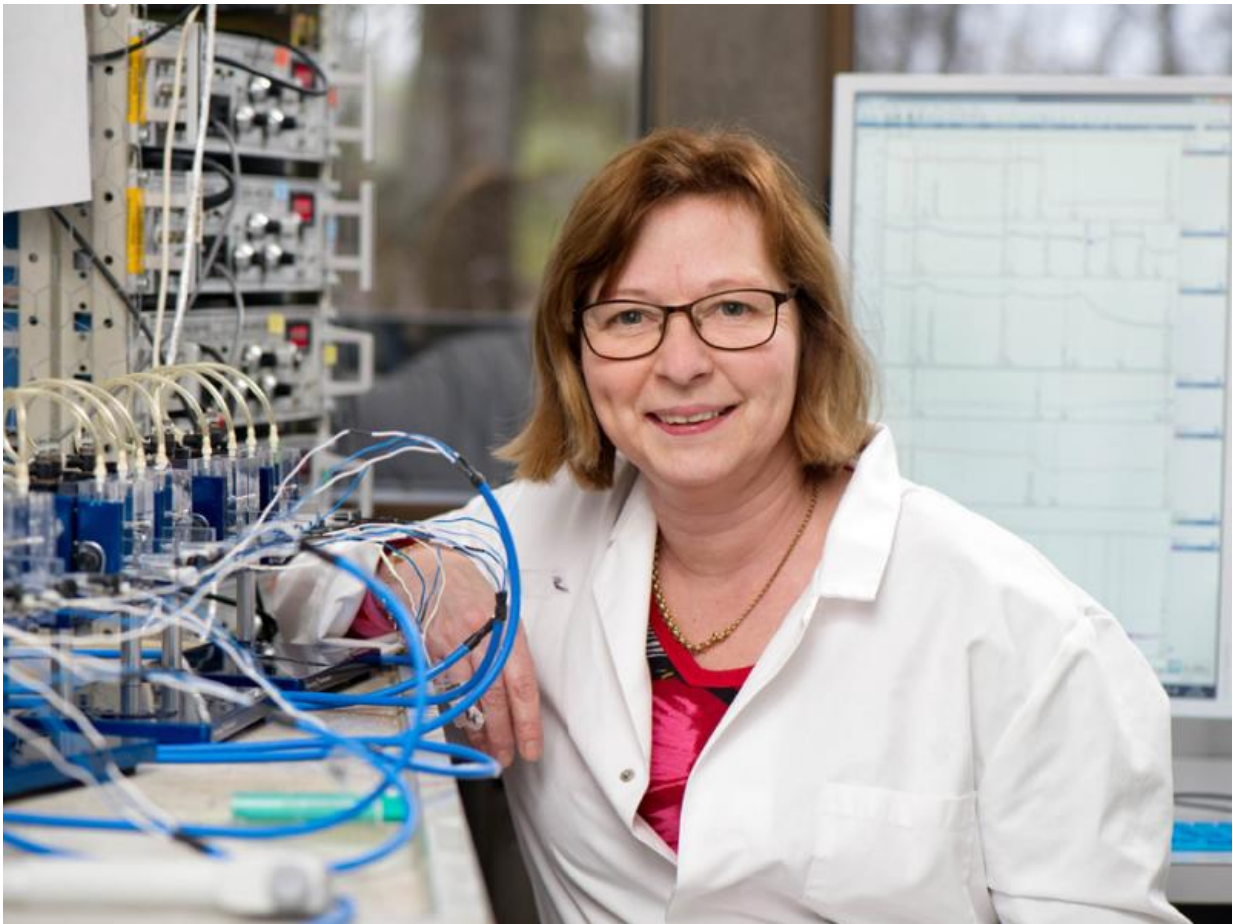


# First large-scale study on the secretion of the human intestine

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Dagmar Krueger of the Department of Human Biology at Technical University of Munich has examined more than 2200 specimens from around 450 patients with bowel disease. Credit: TUM/ A. Eckert

A breakthrough in basic research and the first comprehensive study on the secretory activity of the human intestine: over a period of eight years, Dr. Dagmar Krüger of the Department of Human Biology at TU Munich has examined more than 2200 specimens from around 450 patients with bowel disease. Her findings are startling: contrary to common beliefs, the secretory capacity of the human gut doesn't decline with age. Nor does gender play a role.

The study carried out by the research team headed by Dr. Dagmar Krüger and Professor Michael Schemann of the Department of Human Biology of Technical University of Munich (TUM) was published in the *Journal of Physiology*. Another question, apart from the role of age and gender, was: does an underlying disease such as bowel cancer or Crohn's disease play a role in the evaluation of intestinal samples? Or are there regional differences in intestinal secretion? "On the basis of the large number of bowel samples (surgical resections) examined in vitro and vitality parameters, I was able to show that the function of the [intestinal mucosa](#) is comparable between small or large intestinal specimens and not influenced by the disease for which the surgical intervention was carried out," says TUM scientist Krüger. "The secretion of ions and water into the intestinal lumen (the internal channel of the intestine), including nerve-mediated secretion, was unchanged in all cases."

## Tests with human material are more informative

Unlike previously thought, unaffected sections of bowel resectates are therefore most appropriate and present an attractive alternative for animal tissue work. "Of course, it is much more informative to examine [human gut](#) resections. For example, it is now possible to study how a drug should work to treat secretory disorders" Dr. Krüger explains. "Our study has for the first time demonstrated the feasibility of large scale studies using human gut samples."

Wallace MacNaughton from the *Journal of Physiology* wrote in an Editorial about Krüger's work that scientists studied gastrointestinal epithelium (intestinal mucosa) and its capacity to transport water and electrolytes since the 19th century. The most relevant findings go back to studies in the 1970s and 1980s and were based on animal models, most often guinea pigs. MacNaughton concludes from the findings of the study by Krüger et al. that current concepts based on transgenic mouse models or organoids require confirmation in human samples. The study by Krüger et al. has now provided the basis to pursue such important translational aspects.

## **Study benefits patients with intestinal secretory disorders**

For example, five to ten percent of the population suffers from constipation. "One of the biggest issues in gastroenterology is younger females with constipation," Krüger says. "In their interest, it is now possible to assess how substances act or should act in the human gut." Pharmaceutical companies will gain novel insights into the mode of action of their drugs, also allowing them to develop better ones. This shall further improve treatment option, in particular a more personalized medicine. "In the future, we'll be able to investigate more specifically whether intestinal disorders, for example constipation, are caused by impaired epithelial function or intestinal motility," Dagmar Krüger explains. "We can even carry out studies on gut biopsies now."

**More information:** Dagmar Krueger et al. Neural influences on human intestinal epithelium , *The Journal of Physiology* (2016). [DOI: 10.1113/JP271493](https://doi.org/10.1113/JP271493)

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