

Pioneering University of Limerick, Ireland professor of surgery sheds light on a new order in the abdomen

January 28 2022



J Calvin Coffey, Foundation Chair of Surgery at UL's School of Medicine in Ireland, whose major discovery led to the reclassification of the mesentery as a new organ in 2016, has published new research on the makeup and structure of the abdomen. Credit: Alan Place

A pioneering University of Limerick professor of surgery whose groundbreaking research led to the reclassification of an organ has published new evidence detailing the fundamental order of the abdomen.

J Calvin Coffey, Foundation Chair of Surgery at UL's School of Medicine in Ireland, whose major discovery led to the reclassification of the mesentery as a new organ in 2016, has published new research on the makeup and structure of the [abdomen](#).

In a research paper published in the Nature Portfolio journal *Communications Biology*, Professor Coffey's team has detailed the development and structure of the mesentery. In doing this, they uncovered a new order by which all contents of the abdomen are organised or arranged—or the "fundamental order of the abdomen".

The importance of these findings on the mesentery and the impact these have on our understanding of the abdomen have been further explained in a review article just published in *The Lancet Gastroenterology and Hepatology*.

"Since 2016, Kevin Byrnes, Dara Walsh and members of the team been looking at the development and structure of the mesentery," explained Professor Coffey, who is also Head of Department of Surgery, Consultant General and Colorectal Surgeon at UL Hospitals Group.

"We showed how the mesentery is a single and continuous organ in and on which all abdominal digestive organs develop and then remain connected to throughout life.

"These findings revealed a simplicity in the abdomen that was not apparent in conventional descriptions of anatomy," he explained.

In an international collaboration, Professor Coffey's team used a variety of state of the art techniques to clarify how the mesentery develops and the shape it has in adults.

The conclusion of the work revealed that the organisation of the abdomen has a remarkably simple design. This design is summarised in a description called the 'Mesenteric Model of Abdominal Anatomy'.

"The abdomen is not the dauntingly complex collection of separate organs it was previously thought to be," said Professor Coffey.

"Instead, all digestive organs are neatly packaged and arranged by the mesentery into a single digestive engine. That simplicity lay hidden until clarification of the nature of the mesentery."

The model itself was described by the team in the most recent edition of Gray's Anatomy. The supportive evidence was published in *Communications Biology* and the clinical importance was explained in the review in *The Lancet Gastroenterology and Hepatology*.

"The most important finding here was the discovery of the fundamental order of the abdomen. At the foundation level, all contents of the abdomen are simply organised into one of two compartments," explained Professor Coffey.

"The fundamental order of any structure is of considerable importance, in particular when it comes to diagnosing patients with illness and treating their disease. The fundamental order is the foundation from which all science launches and clinical practice is based.

"The organisational simplicity of the abdomen now immediately explains the behaviours of viral and bacterial infections, cancer, [inflammatory bowel disease](#), obesity, diabetes and many others," he added.

Better understanding of the mesentery and its functions has already led to improvements in surgery and the new research builds on those advances. There are also exciting areas for future investigation, Professor Coffey outlined.

"Patients are already benefiting from what we now call mesenteric-based approaches to the diagnosis and treatment of most abdominal conditions. The Mesenteric Model of Abdominal Anatomy—or the description of the order of the abdomen—is being incorporated into numerous reference curricula at this moment," he said.

"Regarding the future, it is being argued that we are seeing a paradigmatic shift from old to new order. Already, intriguing questions are emerging that we can call 'legitimate or admissible' in the strictest scientific sense. Science can approach numerous questions in a new light. Clinicians can design diagnostic and treatment approaches based on a new foundation," Professor Coffey concluded.

More information: Kevin G. Byrnes et al, The development and structure of the mesentery, *Communications Biology* (2021). [DOI: 10.1038/s42003-021-02496-1](https://doi.org/10.1038/s42003-021-02496-1) J

Calvin Coffey et al, Update on the mesentery: structure, function, and role in disease, *The Lancet Gastroenterology & Hepatology* (2021). [DOI: 10.1016/S2468-1253\(21\)00179-5](https://doi.org/10.1016/S2468-1253(21)00179-5)

Provided by University of Limerick

Citation: Pioneering University of Limerick, Ireland professor of surgery sheds light on a new order in the abdomen (2022, January 28) retrieved 13 March 2023 from <https://medicalxpress.com/news/2022-01-university-limerick-ireland-professor-surgery.html>

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