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The mechanism underlying anti-tumor glucan absorption by intestine

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Dietary fiber is the edible parts of plants or analogous carbohydrates that are resistant to digestion and absorption in the human small intestine with complete or partial fermentation in the large intestine. Most scientists insist that dietary fibers could not be absorbed by the small intestine. However, we surprisingly find at least some polysaccharides can be absorbed by intestine. Here, GFPBW1, a β -1,3 glucan from *Grifola frondosa* and WGE, a branched α -1,4 linked resistant starch from *Gastrodia elata* were used to test their absorption characters. Both glucans can inhibit tumor cells xenografts in mice. Caco-2 models showed that the apparent permeability coefficient (P_{app}) of them was $7.875 \pm 0.2739 \times 10^{-6}$ and $1.990 \pm 0.3746 \times 10^{-6}$ cm/s, respectively. Next, the pharmacokinetics studies showed that the bioavailability of GFPBW1 and WGE was 73.91% and 63.89%. And, fluorescence-labeled polysaccharides could be visualized in mouse small intestine cells after oral administration. Then, we found the ingested GFPBW1 and WGE colocalized with clathrin and its associated proteins dynamin, Rab5 and Eps15 in Human Intestine Mucosa Epithelial Cell (HIMCs) and the uptake of polysaccharides in HIMCs was reduced after silencing clathrin, dynamin1 and Rab5 or mutant Eps15 or treating with clathrin inhibitor Pitstop-1. Thus, this work provides novel insight on understanding of anti-tumor soluble dietary fiber absorption mechanism by intestine.

Biography

Kan Ding has completed his PhD from Shanghai Institute of Materia Medica, Chinese Academy of Sciences in 1999. Then he did his Postdoctoral training in Lund University, Sweden, University of California, Irvine, and Harvard Medical School, USA, respectively. He has special interest in carbohydrate-based anti-liver and pancreatic cancer new drug development. He has published more than 75 papers in reputed journals.

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