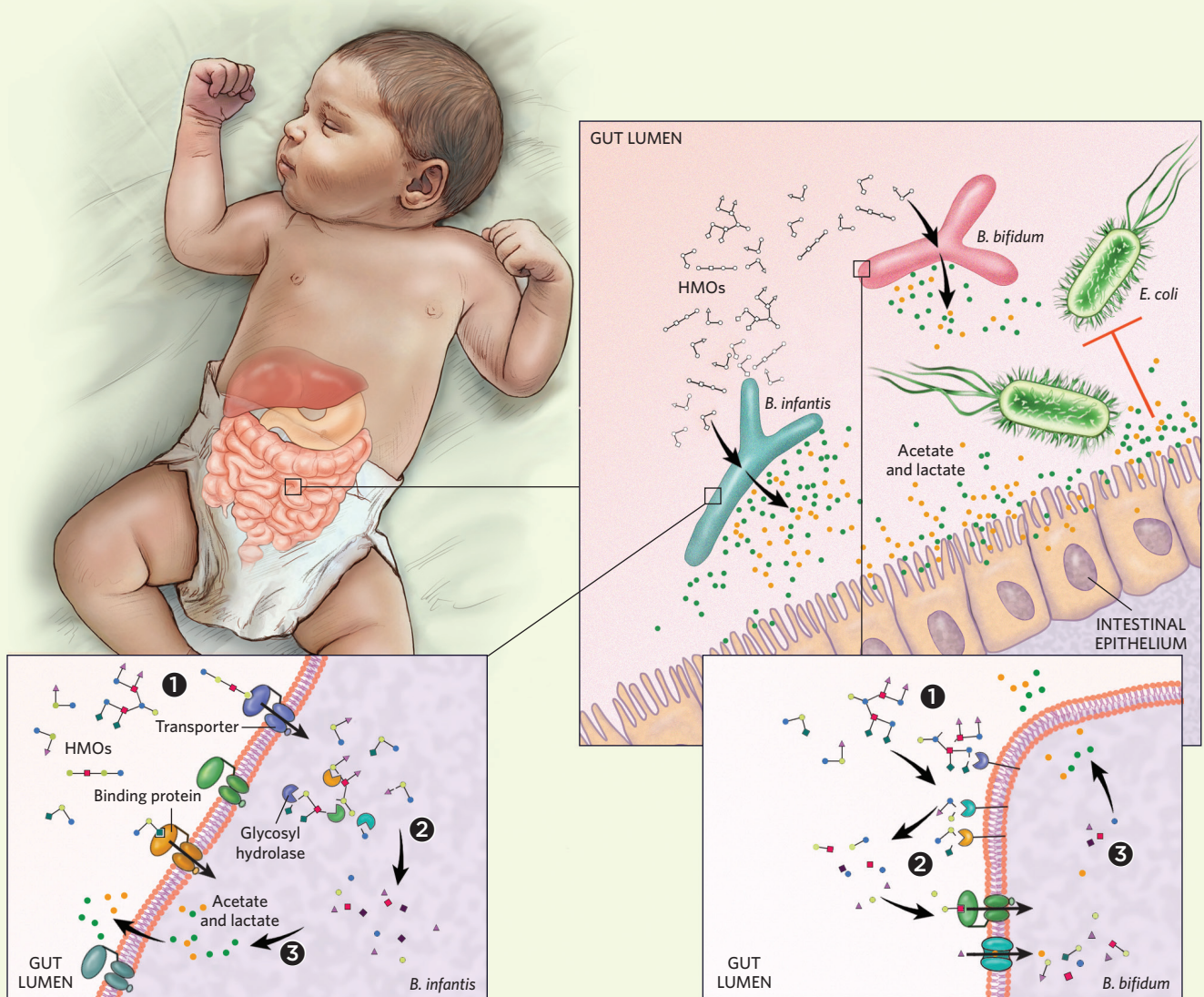


THE MILK-ORIENTED MICROBIOME

Human milk oligosaccharides (HMOs) are complex carbohydrates that microbial species of the milk-oriented microbiome (MOM) can use as a food source. *Bifidobacterium infantis* encodes many proteins that specifically bind and transport all types of HMOs into its cell and digest them internally. Other *Bifidobacterium* species digest only some HMOs and some do so externally. Digestion of HMOs by MOM *Bifidobacterium* results in the production of lactate and the short chain fatty acid acetate, that are secreted into the gut lumen. These molecules lower the pH in the intestinal milieu, which improves their transport into the epithelium for use by the host and creates an undesirable environment for potential pathogens such as *E. coli*.



***B. INFANTIS* PREFERENTIALLY CONSUMES ALL HMO SPECIES OVER ANY OTHER CARBOHYDRATE SOURCE.**

- 1 Binding proteins glom on to HMOs and usher the carbohydrates to transporters that move them into the bacterial cell.
- 2 Intracellular glycosyl hydrolases cleave each glycosidic linkage of all HMO structures, yielding monosaccharides.
- 3 These monosaccharides are metabolized into acetate and lactate that are secreted from the cell.

***B. BIFIDUM* EATS ONLY A SUBSET OF HMOs.**

- 1 Glycosyl hydrolases attached to the outer cell membrane break down HMOs into mono- and disaccharides in the extracellular space.
- 2 These molecules are imported via transporters, and some are gobbled up by other intestinal microbes, a process called cross-feeding.
- 3 The mono- and disaccharides are further metabolized into acetate and lactate, though because *B. bifidum* is a less efficient consumer of HMOs, it likely produces less of these products than *B. infantis*.