

Role of Zinc in Shaping the Gut Microbiome; Proposed Mechanisms and Evidence from the Literature

Usama Usama, Muhammad Jaffar Khan and Sadia Fatima

Institute of Basic Medical Sciences, Khyber Medical University Peshawar, Khyber Pakhtunkhwa, Pakistan

Corresponding author: Usama U, Institute of Basic Medical Sciences, Khyber Medical University Peshawar, Khyber Pakhtunkhwa, Pakistan, Tel: +923415342307; E-

reduces the inflammation of intestinal mucosa [30]. Zinc also regulates

Furthermore, increase in the concentration of phytase enzyme is important in dietary supplementation of post-weaning piglets as its absence or reduced concentration is linked to increased *E. coli* numbers in wheat bran (WB) [41]. However, no evidence regarding mechanism of increase in *E. coli* after ZnO blockage is not clear. It may be that zinc oxide increases resistance to Gram negative bacteria [42], the mechanism of which needs further investigation [43,44].

Studies on chicks have suggested that there may have a decrease of cecal zinc concentration at germ free chicks when compared to their counterparts. Beside alteration occur at the phylum levels in gut microbiota composition between normal and chronic zinc deficient chicks [27]. Evidence (Table 1) shows overall summary of listed studies.

Human Studies Suggesting Role of Zinc in Modifying Gut Microbiota

In humans, zinc medicines are mainly used for the prevention and treatment of loose bowels [45], and less often in connection with the improvement of immune response [46], and metabolic and epithelial permeability [3].

In developing countries [47,48] such as Bangladesh [45] Pakistan [49] and India [50] zinc is inexpensive, simple and affordable strategy to overcome diarrhea [51].

Study	Study type	Participants	Treatment	Main Outcomes
Roya [45]	Randomized double blind controlled trial	111 children, 3 to 24 months' old	Treatment Group: 20 mg zinc/day Control Group: Zinc-free diet	Weight gain in children with the treatment of diarrheal complication through zinc intervention
Sazawal [50]	Double-blind, randomized, Controlled trial	937 children, 6 to 35 Months of age	20 mg zinc/day	For infants and young children Zinc supplementation reduce duration and the severity of diarrhoea.

