

P39 – Riboflavin supplementation enhances antigen specific humoral and cellular immune responses to oral vaccines

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In contrast to injectable vaccines, effective mucosal vaccines can provide protective local and systemic immunity. Oral vaccination in particular has the potential to offer a safer and more efficacious approach than injection-based approaches, especially in developing countries.

Nevertheless, in general, antigen delivery via the oral route triggers weak immune responses or immunological tolerance. The effectiveness of oral vaccination can be improved by coadministering adjuvants. However, a major challenge is the absence of potent and safe oral adjuvants for clinical application. A second obstacle is that responses to oral vaccines vary between developed Western countries and developing countries where they are often less effective. This may be attributed in part to nutritional deficiencies including a limited intake of factors including vitamins, impacting on the microbiome and the generation of specific metabolites. Here, the immunomodulatory potential of oral supplementation with riboflavin (Vitamin B2) was investigated. It was found that oral delivery of the vitamin enhanced antigen specific Th1 and Th17 responses in draining lymph nodes in addition to antigen specific antibody responses in mice orally vaccinated with the heat killed oral vaccines against enteric bacterial infections. Supplementation with riboflavin prior to and during vaccination with oral cholera vaccine enhanced antigen-specific intestinal and serum humoral immunity. These findings suggest the potential of riboflavin supplementation to enhance the capacity of oral vaccines to trigger mucosal and systemic immunity.