

# Live microbe dietary microbes and health

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## Abstract

Ingested microorganisms are increasingly regarded to benefit human health. However, links between health and dietary intake of live microbes have yet to be directly investigated. In this ISAPP led project, we estimated the quantities of live microbes in over 9000 foods included in the National Health and Nutrition Examination Survey (NHANES) for the US population. The mean intake of live microbes (low ( $<10^4$  CFU/g), medium ( $10^4$  to  $10^7$  CFU/g), or high ( $>10^4$  CFU/g) and percentage of subjects consuming them were determined. Our findings showed that there has been a steady increase in the consumption of foods with live microbes from 2001-2002 to the latest (2017-2018) NHANES results. Vegetables, fruits, and milk and dairy contributed the most live microbes in the diet, and milk/dairy encompassed over 93% of foods with high numbers of microbes. Fermented foods largely comprised the high microbe category. Raw fruits and vegetables were dominant foods in the medium category. Besides live microbes, these foods are also important sources of calcium, fiber, and potassium. Intake of medium and/or high levels of foods with live microbes was inversely associated with risk factors for cardiovascular disease and type 2 diabetes.