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Diet, Chronic Inflammation, and Colorectal Cancer †

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Abstract: Most colorectal cancer (CRC) cases are sporadic and non-inherited, and the CRC onset and progress involve multiple sequential steps with the accumulation of genetic alterations, including mutations, gene amplification, and epigenetic changes. CRC is a multifactorial disease with unknown or partially elucidated mechanisms, sometimes including host factors and local environmental factors, lifestyle factors, microbiome, and diet. The molecular heterogeneity of this disease involves several molecular pathways and molecular changes unique to an individual's tumor. The two main pathways used to classify CRC and guide the therapeutic are chromosomal instability (CIN) and microsatellite instability (MSI) pathways, accounting for 85% and 15% of total CRC cases. CRC patients with different microsatellite statuses have different compositions and distributions of immune cells and cytokines within their tumor microenvironments (TMEs). The reciprocal relationship between TME and cancer cells involves a wide variety of processes like recruitment, activation, reprogramming, and persistence of inflammatory and stromal cells in the extracellular space. Either eubiotic or dysbiotic, the gut microbes could influence the CRC evolution through complex and versatile crosstalk with the intestinal and immune cells, permanently changing the TMEs. The intestinal epithelial cells (IECs), besides other mucosal and sub-mucosal cells, and the overlying mucus layer, act as a barrier and contribute to the protection of the intestinal layer. The barrier damages allow a pathological interaction among epithelial cells, microbiome, and the immune system, leading to homeostasis disruptions, pathological inflammatory responses, and tumorigenesis. The possible link between inflammatory potential of diet, measured through the Dietary Inflammatory Index (DII®), and CRC has been investigated in several populations across the world and indicates that subjects with a high DII score versus the lowest DII category showed an overall 40% increased risk of CRC with moderate evidence of heterogeneity.

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Conflicts of Interest

The authors declare no conflict of interest.