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Occurrence, Activity and Impact of Human Parvovirus Persistence in Diseased and Healthy Gut

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Human bocavirus 1 and parvovirus B19 are human-pathogenic parvoviruses. HBoV1 is a respiratory pathogen whereas HBoV2-4 are enteric. HBoV3 has been detected in a biopsy from a symptomatic gut and HBoV2 from gut and lung cancer. B19V causes rash, arthropathies, anemias and fetal death. B19V DNA persist for life in human tissues and has been linked with inflammatory bowel disease (IBD) and tumors. The aim of this study was to elucidate the B19V occurrence, viral activity and impact on host-cell transcriptomes in malignant tumors, IBD and healthy gut. Paired tissues of diseased colon and healthy surrounding tissues and/or ileum were collected from 185 patients with malignant tumors (16), active (42) or inactive IBD (33), polyps (39) and of healthy subjects (55). DNA and RNA were extracted by Qiagen kits. To detect and quantify the viruses, in-house real-time multiplex HBoV1-4 and Pan-B19 qPCRs, and RT-PCR were applied. Immunohistochemistry (IHC) was used for staining B19V capsids in formalin-fixed paraffin-embedded tissues. Next-generation RNA sequencing (RNA-Seq) was used to analyze if and how the cellular transcriptome is changed by the persistent B19V. The overall prevalence of B19V DNA in gut biopsies was 50% (8/16) in malignant tumors, 31% (12/39) in polyps, 45% (19/42) in active and 48% (15/33) in inactive IBD, and 27% (15/55) in healthy gut. Noticeably, in IBD patients, B19V DNA was significantly more often present in the healthy surrounding tissues than in the diseased colon ($P<0.05$; Fischer's exact test). B19 viral loads were low, and no significant prevalence or load differences between patient groups were noted (student's t-test). In addition, all 13 patients with B19V DNA in biopsy and available serum, had pre-existing B19V immunity. Three patients were HBoV-DNA positive (HBoV1 in active IBD and HBoV 2, 3 in healthy guts) with low viral loads. IHC and RNA-Seq are in progress.