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# The blood virome in Crohn's disease

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Summary (maximum 300 words):

Viral communities (viromes) are integral components of various body microbiomes. The intestinal virome has recently been associated with multiple diseases, including Crohn's disease (CD), suggesting implications for health. However, the virome of other environments, such as the blood, despite its potential as a disease biomarker and implications for health, remains poorly studied. Indeed, most studies of the blood virome have focused on eukaryotic viruses, and broad metagenomic investigations are lacking.

With the aim of improving our limited understanding of the link between CD and the microbiota, we conducted virome sequencing on 29 blood samples obtained from healthy individuals and CD patients. We rigorously addressed the specific limitations of this supposedly sterile environment (such as the low quantity of viruses, leading to high risks of studying contaminants) to provide the first comprehensive characterisation of the human blood virome.

We show that the blood virome contains diverse phages, which mostly infect Proteobacteria. Using fecal samples obtained conjointly from the same individuals, we also demonstrate that the contigs present in the blood virome are rarely found in the intestinal virome. We further explore other origins for the blood phages, including the oral environment. We also reveal that the blood virome is significantly different in CD patients compared to healthy individuals, contrary to the fecal virome which does not differ significantly between the two groups. Although very few phages were shared between the blood and intestinal environments, we found that CD patients had significantly more of them, suggesting that their altered intestinal permeability could lead to the passage of viral particles to the blood.

Collectively, these results unveil the presence of phages in human blood, suggest that their origin is only partially intestinal, and underscore differences in the blood virome composition between CD and healthy individuals.