

AUTHOR CONTRIBUTIONS (listed alphabetically by last name):

Adam C. Bledsoe (ACB): recruited participants, performed endoscopies to obtain biopsies, and edited the manuscript. They also obtained IRB approval.

Rok Seon Choung (RSC): edited manuscript and participated in the design of the clinical study

Anika Gupta (AG): performed viral-specific qPCRs on pre- and post-PTA samples, performed phage propagation of PhiKZ, processed human intestinal biopsies with viralMEM and extraction, created Figure 4 panel A, and contributed to writing the methods.

Rustem F. Ismagilov (RFI): provided funding, feedback on study design, technical guidance, manuscript feedback and editing, and leadership throughout the project.

Bana Jabri (BJ): obtained funding, oversaw the whole clinical study, provided leadership to the entire clinical team, and revised the manuscript.

Sonia S. Kupfer (SSK): recruited participants, performed endoscopies to obtain biopsies, and edited the manuscript. They also obtained IRB approval.

Eric V. Marietta (EVM): edited the manuscript and coordinated initial processing and shipments of the duodenal biopsies. RSC edited the manuscript and participated in the design of the clinical study. BJ obtained funding, oversaw the clinical study, provided leadership to the clinical team, and revised the manuscript. RFI provided funding, feedback on study design, technical guidance, manuscript feedback and editing, and leadership throughout the project.

Joseph A. Murray (JAM): recruited participants, performed endoscopies to obtain biopsies, and edited the manuscript. They also obtained IRB approval.

Anna E. Romero (AER): was a major contributor to the selection and coordination of the viral mock community, generation of manuscript claims, and figure design. This person identified optimal low-biomass workflows and handling steps, performed whole genome amplification on all samples, carried out VLP enrichment methods and viral stock extractions, and performed Illumina and PacBio library preparation on Mock DNA 1-2 and human intestinal biopsies. AER also contributed to bioinformatic processing of Mock DNA 4-6 and Mock RNA 4-6 samples post sequencing, processed human intestinal biopsies with viralMEM and extraction, contributed to bioinformatic processing of Illumina sequencing of Mock DNA 1-2, 4-6, and Mock RNA 4-6, analyzed and generated figures SI Fig. 3-5 and SI Fig. 7, and contributed to writing the methods.

Christopher R. Neimeth (CRN): contributed to selecting and obtaining viral mock communities, performed phage propagation for T4, Qbeta, and PhiKZ, and analyzed and generated figures 1A-B, 1D-E, 2A-D, 4B, SI Fig. 1, SI Fig. 2, SI Fig. 6, and SI Fig. 9. CRN also contributed to figure design, bioinformatic processing of Mock RNA 4-6 samples post sequencing, writing the methods, and phage bioinformatics analysis on human samples.

Xinyue (Penny): Pei (XPP): contributed to the development of low-biomass practices used throughout the project, helped identify a low-biomass extraction kit compatible with human clinical samples, and contributed to initial pilot experiments characterizing PTA performance and background. XPP also identified and validated the initial pilot on RT enzyme and clean-up methods for the Mock RNA community and developed and validated viral-specific qPCR workflows.

Natalie Wu-Woods (NWW): was a major contributor to the framing, experimental design, and writing of the manuscript. She also played a major role in selecting and coordinating the viral mock community, generating manuscript claims, and developing figure design. Her work included VLP enrichment methods, viral stock extractions, Illumina and PacBio library preparation on Mock DNA 4-6 and Mock RNA 4-6, and processing human intestinal biopsies with viralMEM and extraction. She provided important feedback on analysis and interpretation of results, contributed to bioinformatic processing of Mock DNA 4-6 and Mock RNA 4-6 samples after sequencing, performed assembly and viral binning of those samples, analyzed and generated figures 1C, 1F, 2E-G, 3, 4C-E, SI Fig. 1, and SI Fig. 7-9, and performed bioinformatics analysis of human Anellovirus. She was also the primary contributor to drafting the manuscript, contributed to writing the methods, and organized authors and deliverables during manuscript preparation