SUPPORTING INFORMATION

Dynamic viscoelastic properties of EPS solutions and cryogels. The results of the small-amplitude oscillatory shear measurements of the 2% (w/v) EPS solution and 2% (w/v) EPS cryogel are shown in Figure S1. Storage (G') and loss (G'') modulus changes through frequency sweeps provide an understanding of the structure of polymer solutions or gels. Figure S1A represents the frequency sweeps of an EPS solution stored at 4°C for 96 h. The G' modulus was greater than the G'' modulus in the frequency range studied; this indicates weak gel-like behavior and strong frequency dependence in the mechanical spectra observed. After freezing and thawing, the EPS solution exhibited a much stronger gel-like behavior than the unfrozen sample, with high increases in both the G' and G'' moduli and a decrease in frequency dependence (Figures S1B and C). G' is greater than G'', and both moduli were completely independent in the frozen samples; this is consistent with the behavior of cryogels.

At a defined frequency (10 Hz), the G' value of the EPS cryogels (23.5 ± 0.4 Pa) was 5 times higher than that of the EPS solutions (5.2 ± 0.5 Pa; Figure S1C). This value correlates with tan δ (G''/G'), which changes from 0.586 for the EPS solution to 0.222 for the EPS cryogels. The tan δ values for both solutions and cryogels were lower than 1, indicating that the elastic properties are greater than the viscous properties in both the samples. These results indicate an alteration from weak-gel to strong-gel behaviors. These flow changes seem to be caused by

aggregation of the polysaccharide molecules during freezing and the exclusion of solvating water in the freeze–thaw process.

FIGURE LEGENDS

Figure S1. Mechanical spectra of exopolysaccharide (EPS), measured at 25 °C. Spectra of (A) 2% (w/v) EPS solutions refrigerated at 4°C for 96 h and (B) 2% (w/v) EPS cryogels frozen at -20°C for 48 h and thawed at 4°C for 48 h. The curves show changes in the storage modulus (G') and loss modulus (G'') as the frequency increased.

Figure S2. Principal coordinates analysis (PCoA) of feces obtained from mice fed 5% microcrystalline cellulose (MCC; Con), 5% β-glucan (5% BG), 5% EPS, or 8% residue remaining after EPS isolation from kefir grains (8% Res) for 4 weeks (*n* = 5/group).