**Supplementary Materials**  
  
**Table S1**. Forward and reverse primer sequences and final cDNA concentrations of all target genes, as determined in sigmoid biopsies.

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| **Name** | **Gene description** | **Primer sequences** | **Final cDNA concentration** |
| CAMP | Cathelicidin antimicrobial peptide | 5’-AGGATTGTGACTTCAAGAAGGACG-3’ 5’-GTTTATTTCTCAGAGCCCAGAAGC-3’ | 80 ng/µl |
| CDH1 | Cadherin 1 | 5’-CACCTGGAGAGAGGCCGCGT -3’  5’-AACGGAGGCCTGATGGGGCG -3’ | 20 ng/µl |
| CLDN2 | Claudin 2 | 5’-AACTACTACGATGCCTACC-3’  5’-GAACTCACTCTTGACTTTGG -3’ | 20 ng/µl |
| CLDN3 | Claudin 3 | 5’-TTCATCGGCAGCAACATCATC-3’  5’-CGCCTGAAGGTCCTGTGG-3’ | 20 ng/µl |
| CLDN4 | Claudin 4 | 5’-ACAGACAAGCCTTACTCC-3’  5’-GGAAGAACAAAGCAGAG-3’ | 20 ng/µl |
| CTNNB1 | Catenin beta 1 | 5’-GTGCTATCTGTCTGCTCTAGTA -3’  5’-CTTCCTGTTTAGTTGCAGCATC -3’ | 20 ng/µl |
| DEFB1 | Defensin beta 1 | 5’-CTCTGTCAGCTCAGCCTC-3’  5’-CTTGCAGCACTTGGCCTTCCC-3’ | 20 ng/µl |
| GAPDH | Glyceraldehyde-3-phosphate dehydrogenase | 5’-TGCACCACCAACTGCTTAGC-3’  5’-GGCATGGACTGTGGTCATGAG-3’ | 20 ng/µl |
| IL1B | Interleukin 1 beta | 5’-AAACAGATGAAGTGCTCCTTCCAGG-3’  5’-TGGAGAACACCACTTGTTGCTCCA-3’ | 40 ng/µl |
| IL10 | Interleukin 10 | 5’-TCAGGGTGGCGACTCTAT-3’  5’-TGGGCTTCTTTCTAAATCGTTC-3’ | 80 ng/µl |
| MUC2 | Mucin 2 | 5’-GTCAACCCTGCCGACACCTG-3’  5’-ACTCACACCAGTAGAAAGGACAGC-3’ | 20 ng/µl |
| MLCK | Myosin light chain kinase | 5-GCCTGACCACGAATATAAGTT-3’  5’-GCTCCTTCTCATCATCATCTG-3’ | 20 ng/µl |
| OCLN | Occludin | 5’-TCAGGGAATATCCACCTATCACTTCAG-3’  5’-CATCAGCAGCAGCCATGTACTCTTCAC-3’ | 20 ng/µl |
| TFF3 | Trefoil factor 3 | 5’-CTTGCTGTCCTCCAGCTCT-3’  5’-CCGGTTGTTGCACTCCTT-3’ | 20 ng/µl |
| TJP1  (ZO-1) | Tight junction protein 1 | 5’-AGGGGCAGTGGTGGTTTTCTGTTCTTTC-3’  5’-GCAGAGGTCAAAGTTCAAGGCTCAAGAGG-3’ | 20 ng/µl |
| TLR1 | Toll like receptor 1 | 5’-CAGTGTCTGGTACACGCATGGT-3’  5’-TTTCAAAAACCGTGTCTGTTAAGAGA-3’ | 80 ng/µl |
| TLR2 | Toll like receptor 2 | 5’-GCCAAAGTCTTGATTGATTGG-3’  5’-TATACCACAGGCCATGGAAAC-3’ | 20 ng/µl |
| TLR4 | Toll like receptor 4 | 5’-CCTGCGTGAGACCAGAAAGC-3’  5’-TCAGCTCCATGCATTGATAAGTAATA-3’ | 80 ng/µl |
| TLR6 | Toll like receptor 6 | 5’-GAAGAAGAACAACCCTTTAGGATAGC-3’  5’-AGGCAAACAAAATGGAAGCTT-3’ | 20 ng/µl |
| TNF | Tumor Necrosis Factor | 5’-CCGAGTGACAAGCCTGTAGC-3’  5’-GAGGACCTGGGAGTAGATGAG-3’ | 40 ng/µl |
| 18S RNA | 18S ribosomal RNA | 5’-GTAACCCGTTGAACCCCATT-3’  5’-CCATCCAATCGGTAGTAGCG-3’ | 20 ng/µl |

**Table S2**. Baseline characteristics of the subgroups of young adults (n=22) and elderly (n=22), undergoing sigmoidoscopy after the pectin or placebo intervention

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|  | **Young adults (n=22)** | | | **Elderly (n=22)** | | |
| **Pectin**  **(n=12)** | **Placebo**  **(n=10)** | ***P*-value** | **Pectin**  **(n=12)** | **Placebo**  **(n=10)** | ***P*-value** |
| Age (yrs, mean ± SD) | 23.9 ± 4.6 | 24.2 ± 5.4 | 0.893 | 70.4 ± 3.0 | 70.7 ± 2.8 | 0.784 |
| Sex (% female) | 58.3 | 30.0 | 0.184 | 41.7 | 20.0 | 0.277 |
| BMI (kg/m2, mean ± SD) | 22.3 ± 2.8 | 23.7 ± 3.2 | 0.299 | 25.6 ± 2.6 | 27.3 ± 1.7 | 0.083 |
| Serum CRP (mg/L, mean ± SD) | 1.8 ± 1.8 | 0.6 ± 0.7 | 0.061 | 0.7 ± 0.6 | 1.8 ± 1.6 | 0.032 |
| Medication (%) PPI Statins Antihypertensives | N.A. | N.A. | N.A. | 8.3  8.3  0 | 20.0  0  10 | 0.427  0.350  0.262 |
| Alcohol consumption  (units/week, mean ± SD) | 3.0 ± 2.7 | 6.3 ± 6.3 | 0.156 | 5.5 ± 5.0 | 10.8 ± 6.8 | 0.049 |

BMI: body mass index, CRP: C-reactive protein, N.A: not applicable, PPI: proton-pump inhibitors. Age, BMI, CRP and alcohol consumption were compared between intervention groups with the use of an independent samples t-test. Sex and medication were compared between intervention groups with the use of a Pearson Chi-square test.

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**Figure S1.** Mucosal defense parameters at baseline and after four weeks of pectin (circles) or placebo (triangles) intervention in young adults and elderly. A: Salivary sIgA1 (g/ml) in young adults. B: Salivary sIgA1 (g/ml) in elderly. C: Salivary sIgA2 (g/ml) in young adults. D: Salivary sIgA2 (g/ml) in elderly. E: Serum IgA1 (g/ml) in young adults. F: Serum IgA1 (g/ml) in elderly. G: Serum IgA2 (g/ml) in young adults. H: Serum IgA2 (g/ml) in elderly. I: Fecal sIgA (g/L) in young adults. J: Fecal sIgA (g/L) in elderly. Values are presented in scatter plots with median line and IQR (25-75th interquartile range). Sample sizes vary due to drop-outs and technical reasons. Within age groups, mucosal defense parameters were compared between intervention groups with unstructured linear mixed models and correction for baseline values. IgA, Immunoglobulin A; sIgA, secretory Immunoglobulin A.

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**Figure S2.** Gastrointestinal symptoms at baseline and every week of pectin (fixed lines) and placebo (dashed lines) intervention in young adults. A: Abdominal pain scores. B: Constipation scores. C: Diarrhea scores. D: Indigestion scores. E: Reflux scores. Means and standard deviations are shown. Missing values at specific weeks were due to drop-outs. Gastrointestinal symptom scores were compared between intervention groups with random intercept linear mixed models and correction for baseline values. *P*-values per time point were corrected for multiple testing by calculating the false-discovery-rate (FDR) of Benjamini-Hochberg.

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**Figure S3.** Gastrointestinal symptoms at baseline and every week of pectin (fixed lines) and placebo (dashed lines) intervention in elderly. A: Abdominal pain scores. B: Constipation scores. C: Diarrhea scores. D: Indigestion scores. E: Reflux scores. Means and standard deviations are shown. Gastrointestinal symptom scores were compared between intervention groups with random intercept linear mixed models and correction for baseline values. *P*-values per time point were corrected for multiple testing by calculating the false-discovery-rate (FDR) of Benjamini-Hochberg.

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**Figure S4.** Representative images of tight junction protein TJP1 (green) immunofluorescence staining in sigmoid biopsy sections of a healthy young adult and healthy elderly after four weeks pectin or placebo intervention. Scale bar represents 100 μm. Blue counterstaining (DAPI) shows nuclei. TJP1: Tight junction protein 1.

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**Figure S5.** Representative images of tight junction protein occludin (red) immunofluorescence staining in sigmoid biopsy sections of a healthy young adult and healthy elderly after four weeks pectin or placebo intervention. Scale bar represents 100 μm. Blue counterstaining (DAPI) shows nuclei.