Identified as eligible and

Approached for recruitment

12,585

Provided informed consent

7,621

Pathology confirmed as AD, SSP, or HP case or polyp-free control

7,444

Provided telephone interview and food frequency questionnaire

5,463

Has yogurt intake data

(analytic sample)

5,476

Supplementary Figure 1. Tennessee Colorectal Polyp Study Participant Flowchart

Identified as eligible and

Approached for recruitment

2,548

Provided informed consent

1,101

Filled out baseline questionnaire

1,097

Pathology confirmed as AD, SSP, or HP case or polyp-free control

1,071

Has yogurt and covariate intake data

(analytic sample)

1,061

Supplementary Figure 2. Biofilm Study Participant Flowchart

Supplementary Table 1. Associations between yogurt consumption and probiotic use with risk of colorectal polyps using classification by all adenomatous polyps and all serrated polyps (HP, SSP).

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency of yogurt intake** | **Case-Control Comparisons** |  | **Case-Case Comparisons** |
| **n** |  | **n** | **OR (95% CI)** |  | **n** | **OR (95% CI)** |  | **n** | **OR (95% CI)** |  | **OR (95% CI)** | **OR (95% CI)** | **OR (95% CI)** |
|  | **No Polyp Controls** |  | Adenomatous Polyps (AP) |  | **Serrated Polyps Only (SP)** |  | **Both SP + AP** |  | **SP vs. AP** | **SP+AP vs. AP** | **SP+AP vs. SP** |
|  | **Tennessee Colorectal Polyp Studya** |
| **ALL** |
| Never/Rarely | 1581 |  | 715 | 1.00 (ref) |  | 320 | 1.00 (ref) |  | 256 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| Monthly Less than Weekly | 591 |  | 204 | 1.00(0.82-1.23)  |  | 102 | 1.01(0.78-1.32) |  | 55 | 0.86(0.61-1.21) |  | 1.01(0.75-1.36) | 0.86(0.59-1.23) | 0.85(0.57-1.27) |
| Weekly Less than Daily | 845 |  | 237 | 0.91(0.74-1.10)  |  | 128 | 0.99(0.77-1.28) |  | 69 | 0.97(0.70-1.35)  |  | 1.1(0.82-1.47)  | 1.07(0.76-1.53) | 0.98(0.67-1.45) |
| Daily | 241 |  | 73 | 1.03(0.76-1.39) |  | 20 | 0.56(0.34-0.93) |  | 10 | 0.38(0.17-0.84) |  | 0.55(0.32-0.95) | 0.37(0.16-0.84) | 0.68(0.27-1.68) |
| **Ptrend** |  |  |  | 0.58 |  |  | 0.19 |  |  | 0.11 |  | 0.42 | 0.22 | 0.61 |
| **MALES** |
| Never/Rarely | 1129 |  | 588 | 1.00 (ref) |  | 247 | 1.00 (ref) |  | 211 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| Monthly Less than Weekly | 288 |  | 123 | 1.00(0.78-1.28)  |  | 51 | 0.91(0.64-1.30)  |  | 32 | 0.73(0.47-1.14)  |  | 0.92(0.62-1.35) | 0.74(0.46-1.17)  | 0.8(0.48-1.35)  |
| Weekly Less than Daily | 286 |  | 118 | 1.01(0.78-1.31) |  | 50 | 1.01(0.71-1.45) |  | 47 | 1.38(0.94-2.04)  |  | 1(0.67-1.49)  | 1.37(0.9-2.08)  | 1.36(0.84-2.21) |
| Daily | 77 |  | 42 | 1.40(0.92-2.12)  |  | 6 | 0.37(0.15-0.95) |  | 4 | 0.34(0.10-1.10)  |  | 0.27(0.10-0.70)  | 0.24(0.07-0.80)  | 0.9(0.21-3.87)  |
| **Ptrend** |  |  |  | 0.34 |  |  | 0.25 |  |  | 0.94 |  | 0.09 | 0.54 | 0.44 |
| **FEMALES** |
| Never/Rarely | 452 |  | 127 | 1.00 (ref) |  | 73 | 1.00 (ref) |  | 45 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| Monthly Less than Weekly | 303 |  | 81 | 0.95(0.68-1.33) |  | 51 | 1.17(0.77-1.77) |  | 23 | 0.98(0.55-1.75) |  | 1.22(0.75-1.99) | 1.03(0.55-1.92) | 0.84(0.43-1.64) |
| Weekly Less than Daily | 559 |  | 119 | 0.77(0.56-1.04) |  | 78 | 1.04(0.7-1.52)  |  | 22 | 0.54(0.3-0.99)  |  | 1.35(0.86-2.13) | 0.71(0.37-1.36) | 0.53(0.27-1.04) |
| Daily | 164 |  | 31 | 0.71(0.44-1.13) |  | 14 |  0.75(0.4-1.42)  |  | 6 | 0.39(0.13-1.14) |  | 1.06(0.51-2.24) | 0.55(0.17-1.72) | 0.51(0.15-1.74) |
| **Ptrend** |  |  |  | 0.05 |  |  | 0.63 |  |  | 0.02 |  | 0.36 | 0.20 | 0.07 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **Johns Hopkins Biofilm Studyb** |
| **ALL** |
| Never/Rarely | 196 |  | 118 | 1.00 (ref) |  | 42 | 1.00 (ref) |  | 35 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| 1 or more/month | 110 |  | 57 | 0.94 (0.62, 1.42) |  | 29 | 1.48 (0.85, 2.58) |  | 25 | 1.50 (0.82, 2.72) |  | 1.58 (0.87, 2.88) | 1.60 (0.85, 3.00) | 1.01 (0.49, 2.09) |
| 1 or more/week | 271 |  | 104 | 0.74 (0.52, 1.05) |  | 54 | 1.02 (0.63, 1.65) |  | 28 | 0.71 (0.40, 1.24) |  | 1.38 (0.82, 2.33) | 0.96 (0.53, 1.73) | 0.69 (0.35, 1.36) |
| **Ptrend** |  |  |  | 0.08 |  |  | 1.00 |  |  | 0.23 |  | 0.23 | 0.93 | 0.31 |
| **MALES** |
| Never/Rarely | 106 |  | 75 | 1.00 (ref) |  | 18 | 1.00 (ref) |  | 25 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| 1 or more/month | 34 |  | 30 | 1.25 (0.68, 2.32) |  | 13 | 2.94 (1.25, 6.93) |  | 13 | 1.75 (0.76, 4.04) |  | 2.35 (0.97, 5.70) | 1.40 (0.60, 3.24) | 0.60 (0.21, 1.69) |
| 1 or more/week | 93 |  | 44 | 0.71 (0.43, 1.18) |  | 22 | 1.77 (0.84, 3.72) |  | 9 | 0.44 (0.19, 1.03) |  | 2.49 (1.13, 5.50) | 0.61 (0.25, 1.49) | 0.25 (0.09, 0.71) |
| **Ptrend** |  |  |  | 0.21 |  |  | 0.12 |  |  | 0.09 |  | 0.02 | 0.40 | 0.01 |
| **FEMALES** |
| Never/Rarely | 90 |  | 43 | 1.00 (ref) |  | 24 | 1.00 (ref) |  | 10 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| 1 or more/month | 76 |  | 27 | 0.72 (0.39, 1.31) |  | 16 | 0.85 (0.40, 1.79) |  | 12 | 1.46 (0.57, 3.75) |  | 1.18 (0.51, 2.72) | 2.03 (0.75, 5.55) | 1.73 (0.58, 5.13) |
| 1 or more/week | 178 |  | 60 | 0.66 (0.40, 1.10) |  | 32 | 0.60 (0.32, 1.14) |  | 19 | 1.01 (0.42, 2.39) |  | 0.91 (0.45, 1.86) | 1.51 (0.61, 3.77) | 1.67 (0.62, 4.47) |
| **Ptrend** |  |  |  | 0.12 |  |  | 0.11 |  |  | 0.91 |  | 0.77 | 0.43 | 0.34 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Probiotic use** | **No Polyp Controls** |   |   |   |   |   |   |   |   |   |
| **ALL** |
|  Yes | 119 |  | 42 | 0.80 (0.53, 1.21) |  | 20 | 0.78 (0.46, 1.35) |  | 10 | 0.64 (0.31, 1.31) |  | 0.98 (0.53, 1.79) | 0.80 (0.37, 1.70) | 0.82 (0.35, 1.89) |
|  No | 458 |  | 237 | 1.00 (ref) |  | 105 | 1.00 (ref) |  | 78 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| **MALES** |
|  Yes | 27 |  | 17 | 1.15 (0.57, 2.31) |  | 2 | 0.31 (0.07, 1.40) |  | 6 | 1.56 (0.56, 4.32) |  | 0.27 (0.06, 1.27) | 1.36 (0.47, 3.92) | 4.99 (0.91, 27.47) |
|  No | 206 |  | 132 | 1.00 (ref) |  | 51 | 1.00 (ref) |  | 41 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| **FEMALES** |
|  Yes | 92 |   | 25 | 0.66 (0.39, 1.12) |  | 18 | 1.00 (0.54, 1.87) |  | 4 | 0.34 (0.11, 1.00) |  | 1.51 (0.73, 3.13) | 0.51 (0.16, 1.59) | 0.34 (0.10, 1.10) |
|  No | 254 |   | 105 | 1.00 (ref) |  | 54 | 1.00 (ref) |  | 37 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |

a Adjusted for sex, study location, age, regular alcohol drinking status, BMI, smoking status, physical activity in the past 10 years, educational attainment, NSAID use, red meat intake, dietary energy intake, and frequency of non-yogurt dairy intake

b Adjusted for sex, age, cigarette use (current/former/never), overweight (BMI less than or greater than 25 kg/m2), prior colon polyp (yes/no), history of GI surgery (yes/no), history of cholecystectomy (yes/no), diabetes mellitus diagnosis (yes/no), hypertension diagnosis (yes/no), and hyperlipidemia diagnosis (yes/no).

**Supplementary Table 2.** Associations between yogurt consumption and probiotic use with risk of colorectal polyps using classification by anatomical location of polyps.

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency of yogurt intake** | **Case-Control Comparisons** |  | **Case-Case Comparisons** |
| **n** |  | **n** | **OR (95% CI)a** |  | **n** | **OR (95% CI) a** |  | **n** | **OR (95% CI) a** |  | **OR (95% CI) a** | **OR (95% CI) a** | **OR (95% CI) a** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **No Polyp Controls** |  | **LEFT ONLY** |  | **RIGHT ONLY** |  | **BOTH SIDES** |  | **Right vs Left** | **Both vs Left** | **Right vs Both** |
| **Tennessee Colorectal Polyp Studya** |
| **ALL** |
| Never/Rarely | 1581 |  | 673 | 1.00 (ref) |  | 319 | 1.00 (ref) |  | 286 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| Monthly Less than Weekly | 591 |  | 178 | 0.95(0.77-1.17) |  | 112 | 1.1(0.85-1.42)  |  | 66 | 0.92(0.67-1.27)  |  | 1.16(0.86-1.56) | 0.97(0.69-1.38) | 0.84(0.57-1.22) |
| Weekly Less than Daily | 845 |  | 200 | 0.87(0.71-1.07) |  | 149 | 1.06(0.83-1.36) |  | 76 | 0.88(0.64-1.2)  |  | 1.23(0.92-1.64) | 1.01(0.71-1.43) | 0.82(0.57-1.2)  |
| Daily | 241 |  | 40 | 0.56(0.38-0.83) |  | 45 | 1.21(0.84-1.76) |  | 17 | 0.77(0.44-1.33)  |  | 2.15(1.31-3.52) | 1.36(0.72-2.56) | 0.63(0.34-1.18) |
| **Ptrend** |  |  |  | 0.01 |  |  | 0.35 |  |  | 0.25 |  | 0.008 | 0.62 | 0.11 |
| **MALES** |
| Never/Rarely | 1129 |  | 547 | 1.00 (ref) |  | 251 | 1.00 (ref) |  | 235 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| Monthly Less than Weekly | 288 |  | 96 | 0.87(0.66-1.14) |  | 64 | 1.09(0.79-1.50)  |  | 42 | 0.92(0.62-1.35) |  | 1.26(0.86-1.83)  | 1.06(0.69-1.62) | 0.84(0.53-1.34) |
| Weekly Less than Daily | 286 |  | 91 | 0.96(0.72-1.27) |  | 75 | 1.23(0.89-1.69) |  | 43 | 1.07(0.72-1.59) |  | 1.28(0.88-1.87)  | 1.12(0.73-1.73) | 0.87(0.55-1.39) |
| Daily | 77 |  | 20 | 0.69(0.39-1.20)  |  | 24 | 1.66(1.00-2.75)  |  | 8 | 0.71(0.31-1.60)  |  | 2.42(1.24-4.72)  | 1.03(0.41-2.57) | 0.42(0.17-1.04) |
| **Ptrend** |  |  |  | 0.26 |  |  | 0.04 |  |  | 0.77 |  | 0.01 | 0.65 | 0.11 |
| **FEMALES** |
| Never/Rarely | 452 |  | 126 | 1.00 (ref) |  | 68 | 1.00 (ref) |  | 51 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| Monthly Less than Weekly | 303 |  | 82 | 1.05(0.75-1.46) |  | 48 | 1.07(0.71-1.62) |  | 24 | 0.83(0.47-1.46) |  | 1.02(0.63-1.66) | 0.8(0.43-1.47)  | 0.78(0.4-1.51)  |
| Weekly Less than Daily | 559 |  | 109 | 0.8(0.58-1.1)  |  | 74 | 0.88(0.6-1.29)  |  | 33 | 0.71(0.41-1.22) |  | 1.1(0.69-1.74)  | 0.88(0.49-1.6)  | 0.8(0.43-1.52)  |
| Daily | 164 |  | 20 | 0.48(0.28-0.85) |  | 21 | 0.88(0.5-1.56)  |  | 9 | 0.83(0.38-1.84) |  | 1.82(0.86-3.86) | 1.72(0.68-4.34) | 0.95(0.37-2.42)  |
| **Ptrend** |  |  |  | 0.01 |  |  | 0.46 |  |  | 0.29 |  | 0.27 | 0.71 | 0.64 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Johns Hopkins Biofilm Studyb** |
|  | **No Polyp Controls** |  | **LEFT ONLY** |  | **RIGHT ONLY** |  | **BOTH SIDES** |  | **Right vs Left** | **Both vs Left** | **Right vs Both** |
| **ALL** |
|  DOES NOT EAT YOGURT/RARELY | 196 |  | 61 | 1.00 (ref) |  | 81 | 1.00 (ref) |  | 51 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
|  1 OR MORE/MONTH | 110 |  | 38 | 1.18 (0.72, 1.91) |  | 45 | 1.07 ( 0.68, 1.68) |  | 27 |  1.18 (0.67, 2.07) |  |  0.91 (0.52, 1.60)  | 1.00 (0.52, 1.92) |  0.91 (0.49, 1.70) |
|  1 OR MORE/WEEK | 271 |  | 74 | 0.99 (0.65, 1.50) |  | 73 |  0.70 (0.48, 1.04) |  | 38 |  0.75 (0.46, 1.25) |  |  0.71 (0.43, 1.16) | 0.76 (0.43, 1.36) |  0.93 (0.53, 1.63) |
| **Ptrend** |  |  |  | 0.92 |  |  | 0.07 |  |  | 0.28 |  | 0.17 | 0.38 | 0.77 |
| MALES |
|  DOES NOT EAT YOGURT/RARELY | 106 |  | 29 | 1.00 (ref) |  | 50 | 1.00 (ref) |  | 39 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
|  1 OR MORE/MONTH | 34 |  | 17 | 1.91 (0.91, 4.00) |  | 23 | 1.47 (0.76, 2.83) |  | 16 | 1.30 (0.60, 2.80) |  |  0.77 (0.34, 1.72) | 0.68 (0.28, 1.63) | 1.13 (0.50, 2.55) |
|  1 OR MORE/WEEK | 93 |  | 31 | 1.41 (0.76, 2.60) |  | 25 | 0.59 (0.33, 1.06) |  | 18 | 0.58 (0.29, 1.17) |  | 0.42 (0.20, 0.88) |  0.41 (0.18, 0.93) |  1.02 (0.46, 2.24) |
| **Ptrend** |  |  |  | 0.26 |  |  | 0.11 |  |  | 0.15 |  | 0.03 | 0.04 | 0.94 |
| FEMALES |
|  DOES NOT EAT YOGURT/RARELY | 91 |  | 32 | 1.00 (ref) |  | 31 | 1.00 (ref) |  | 12 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
|  1 OR MORE/MONTH | 76 |  | 21 | 0.77 (0.40, 1.50) |  | 22 | 0.83 (0.43, 1.60) |  | 11 | 1.20 (0.47, 3.04) |  | 1.08 (0.48, 2.40) |  1.56 (0.55, 4.40) | 0.69 (0.53, 3.31) |
|  1 OR MORE/WEEK | 179 |  | 43 | 0.66 (0.38, 1.16) |  | 48 | 0.69 (0.40, 1.20) |  | 20 | 0.95 (0.41, 2.16) |  | 1.05 (0.53, 2.07) | 1.43 (0.57, 3.55) |  0.73 (0.25, 1.91) |
| **Ptrend** |  |  |  | 0.15 |  |  | 0.19 |  |  | 0.84 |  | 0.90 | 0.47 | 0.53 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Probiotic use** |  |   |   |   |   |   |   |   |   |   |  |
| ALL |
|  Yes | 119 |  | 28 | 0.84 (0.52, 1.34) |  | 27 | 0.69 (0.43, 1.11) |  | 17 |  0.86 (0.47, 1.59) |  | 0.83 (0.46, 1.50) | 1.03 (0.51, 2.09) | 0.80 (0.39, 1.61) |
|  No | 460 |  | 145 | 1.00 (ref) |  | 172 | 1.00 (ref) |  | 99 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| MALES |
|  Yes | 27 |  | 8 | 1.00 (0.42, 2.37) |  | 7 | 0.70 (0.29, 1.71) |  | 10 | 1.50 (0.61, 3.64) |  | 0.70 (0.24, 2.08) | 1.50 (0.52, 4.33) | 0.47 (0.16, 1.40) |
|  No | 206 |  | 69 | 1.00 (ref) |  | 91 | 1.00 (ref) |  | 63 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| FEMALES |
|  Yes | 92 |   | 20 | 0.80 (0.45, 1.42) |  | 20 | 0.67 (0.38, 1.18 ) |  | 7 | 0.56 (0.23, 1.36) |  |  0.84 (0.41, 1.71) | 0.70 (0.26, 1.88) | 1.19 (0.45, 3.19) |
|  No | 254 |   | 76 | 1.00 (ref) |  | 81 | 1.00 (ref) |  | 36 | 1.00 (ref) |  | 1.00 (ref) | 1.00 (ref) | 1.00 (ref) |
| a Adjusted for sex, study location, age, regular alcohol drinking status, BMI, smoking status, physical activity in the past 10 years, educational attainment, NSAID use, red meat intake, dietary energy intake, and frequency of non-yogurt dairy intakeb Adjusted for sex, age, cigarette use (current/former/never), overweight (BMI less than or greater than 25 kg/m2), prior colon polyp (yes/no), history of GI surgery (yes/no), history of cholecystectomy (yes/no), diabetes mellitus diagnosis (yes/no), hypertension diagnosis (yes/no), and hyperlipidemia diagnosis (yes/no).  |  |

**Supplementary Table 3.** Associations between yogurt consumption and probiotic use with risk of colorectal polyps using classification by advanced versus non-advanced adenoma.

|  |  |
| --- | --- |
| **Frequency of yogurt intake** | **Case-Control Comparisons** |
| **n** |  | **n** | **OR (95% CI)a** |  | **n** | **OR (95% CI) a** |  |
|  |  |  |  |  |  |  |  |  |
|  | **No Polyp Controls** |  | **Non-Advanced APs** |  | **Advanced APs** |  |
| **Tennessee Colorectal Polyp Studya** |  |
| Never/Rarely | 1581 |  | 682 | 1.00 (ref) |  | 279 | 1.00 (ref) |  |
| Monthly Less than Weekly | 591 |  | 177 | 0.90 (0.73-1.12) |  | 76 | 1.06 (0.79-1.43) |  |
| Weekly Less than Daily | 845 |  | 225 | 0.94 (0.77-1.15) |  | 76 | 0.81 (0.59-1.11) |  |
| Daily | 241 |  | 61 | 0.92 (0.66-1.27) |  | 22 | 0.87 (0.52-1.45) |  |
| **Ptrend** |  |  |  | 0.43 |  |  | 0.26 |  |
| **Johns Hopkins Biofilm Studyb** |
|  | **No Polyp Controls** |  | **Non-Advanced APs** |  | **Advanced APs** |  |
| DOES NOT EAT YOGURT/RARELY | 197 |  | 117 | 1.00 (ref) |  | 22 | 1.00 (ref) |  |
| 1 OR MORE/MONTH | 110 |  | 68 | 1.11 (0.74, 1.66) |  | 4 | 0.33 ( 0.10, 1.03) |  |
| 1 OR MORE/WEEK | 272 |  | 107 | 0.76(0.54, 1.08) |  | 15 | 0.66 (0.31, 1.40) |  |
| **Ptrend** |  |  |  | 0.12 |  |  | 0.23 |  |
| **Probiotic use** |  |  |  |  |  |   |
| Yes | 119 |  | 40 | 0.66 (0.43, 1.00) |  | 7 | 0.86(0.35, 2.06) |  |
| No | 460 |  | 252 | 1.00 (ref) |  | 34 | 1.00 (ref) |  |

a Adjusted for sex, study location, age, regular alcohol drinking status, BMI, smoking status, physical activity in the past 10 years, educational attainment, NSAID use, red meat intake, dietary energy intake, and frequency of non-yogurt dairy intake

b Adjusted for sex, age, cigarette use (current/former/never), overweight (BMI less than or greater than 25 kg/m2), prior colon polyp (yes/no), history of GI surgery (yes/no), history of cholecystectomy (yes/no), diabetes mellitus diagnosis (yes/no), hypertension diagnosis (yes/no), and hyperlipidemia diagnosis (yes/no).