Supporting Information

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Table S1. Examples of evidence linking red meat consumption to cancer

Ref.	Finding
(1)	Positive correlation between meat consumption with breast and prostate cancer
(2)	Colon, prostate, and bladder cancers significantly higher among meat eaters
(3)	Colon cancer risk higher among red meat consumers
(4)	Red meat intake positively associated with cancers of the stomach, colon, rectum, pancreas, bladder and endometrium
(5)	Red meat, particularly processed meats associated with colorectal cancer
(6)	Higher red meat intake strongly related to ER^+/PR^+ breast cancer
(7)	Red meat and processed meat associated with greater risk of colorectal cancer
(8)	High consumption of meat associated with premenopausal breast cancer
(9)	Meat intake, especially high-temperature cooked meats, positively associated with pancreatic cancer in men
(10)	Red meat diet associated with an increased risk of prostate cancer
(11)	Higher incidence of premenopausal breast cancer, particularly ER^+/PR^+, associated with higher red meat consumption in adolescence
(12)	Red and processed meat positively associated with adenocarcinoma and squamous cell carcinoma of the lung
(13)	Positive association between red meat, well-done meat, and heme iron intake and lung cancer in men and women
(14)	Higher risk of cancer associated with red and processed meat consumption
(15)	Positive association for red and processed meats with colorectal cancer; intake of heme iron, nitrate/nitrite, and heterocyclic amines could explain association
(16)	Red meat consumption associated with elevated risk of cancer mortality
(17)	Red meat consumption associated with pancreatic cancer in men
(18)	Higher red meat intake associated with higher risk of head and neck cancers
(19)	Red and processed meat intake associated with esophageal squamous cancer
(20)	Red and/or processed meat contributed to increased gastric cancer risk
(21)	Higher intake of red meat associated with esophageal adenocarcinoma
(22)	Red meat intake in early adulthood associated with increased breast cancer rates
(23)	Red and processed meat associated with colorectal cancer

ER, estrogen receptor; PR, progesterone receptor.

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Table S2. Comparison between conventional and low temperature method for derivatization of sialic acids

Derivatization method	Free sialic acid released, %
Low-temperature method (4 °C)	0.86
Conventional method (50 °C)	8.60

To determine the amount of sialic acid released during the derivatization reaction conditions, bovine fetuin was used as a model sialoglycoprotein. Fetuin was first dialyzed to remove nonglycosidically bound (free) sialic acids. Total sialic acids were determined by acid release with 2 M acetic acid at 80 °C for 3 h, followed by conventional derivatization. Equal aliquots of nonhydrolyzed samples were directly derivatized with either the low-temperature or conventional reaction condition, and studied by HPLC for percent release of bound sialic acids during the reaction.

Table S3. Free and bound Neu5Ac and Neu5Gc content in food groups

Food sample	Bound Neu5Ac, pmol/mg	Free Neu5Ac, pmol/mg	Bound Neu5Gc, pmol/mg	Free Neu5Gc, pmol/mg	Neu5Gc content, μg/g	Neu5Gc, %
Milk and cheeses						
Butter	3	0	0	0	0	0
Whole milk	244	150	51	3	2	12
Mozzarella cheese	1,555	50	55	2	10	4
Jack cheese	1,334	31	48	2	11	4
Cheddar cheese	5,700	88	104	1	22	2
Goat cheese	325.1	31.2	266.1	18.8	43	44
Red meats						
Bison	586	82	293	22	29	32
Ground beef	375	67	213	19	25	32
Beef steak (raw)	319	45	364	49	134	55
Beef steak (baked)	553	80	599	47	210	52
Beef steak (boiled)	603	67	641	71	231	53
Beef steak (fried)	515	47	581	30	199	53
Ground lamb	787	90	129	3	14	13
Lamb steak (raw)	959	124	157	17	57	15
Lamb steak (baked)	830	92	144	11	50	15
Lamb steak (boiled)	854	85	135	10	47	14
Lamb steak (fried)	339	39	54	5	19	14
Ground pork	532	47	138	5	19	20
Pork chop (raw)	317	172	62	15	25	14
Pork chop (baked)	331	137	36	87	40	22
Pork chop (boiled)	771	130	99	11	36	12
Pork chop (fried)	349	141	75	13	29	16
Pork bratwurst	917	0.2	94	0.4	11	9
Pork bacon	130	12	38	2	7	22
Poultry						
Egg white	226	0.7	0	0	0	0
Egg yolk	380	1.8	0	0	0	0
Turkey (white meat)	53	25	0	0	0	0
Turkey (dark meat)	23	10	0	0	0	0
Chicken (white meat)	87	21	0	0	0	0
Seafood						
Wild-caught salmon	1,488	341	0	0	0	0
Farm-raised salmon	220	55	0	0	0	0
Tilapia	1,849	323	0	0	0	0
Ahi tuna	312	145	0	0	0	0
Mahi-mahi	1,615	377	0	0	0	0
Thresher shark	970	108	0	0	0	0
Swordfish	704	97	0	0	0	0
Rainbow trout	57	32	0	0	0	0
Sardines	121	44	0	0	0	0
Shrimp	7	0	0	0	0	0
Squid	43	15	8	0	1	1
Bay scallop	0	0	0	0	0	0
Little neck clam	0	0	0	0	0	0
Luna oyster	0	0	0	0	0	0
Black mussel	0	0	0	0	0	0
Whitefish caviar	7,400	1,484	1,371	0	446	13
Salmon caviar	3,501	481	1,629	5	531	29
Vegetables						
Carrot	0	0	0	0	0	0
Cucumber	0	0	0	0	0	0
Lettuce	0	0	0	0	0	0
Tomato	0	0	0	0	0	0
Potato	0	0	0	0	0	0
Lemon	0	0	0	0	0	0
Lime	0	0	0	0	0	0
Olive oil	0	0	0	0	0	0
Tofu	0	0	0	0	0	0
Fruits						
Orange	0	0	0	0	0	0

Table S3. Cont.

Food sample	Bound Neu5Ac, pmol/mg	Free Neu5Ac, pmol/mg	Bound Neu5Gc, pmol/mg	Free Neu5Gc, pmol/mg	Neu5Gc content, μg/g	Neu5Gc, %
Banana	0	0	0	0	0	0
Strawberry	0	0	0	0	0	0
Peach	0	0	0	0	0	0
Granny Smith apple	0	0	0	0	0	0
Red Delicious apple	0	0	0	0	0	0

Content of Neu5Ac and Neu5Gc (both free and glycosidically bound forms) in various foods typically seen in the Western diet. Details are provided in *Materials and Methods*.

Table S4. Raw data from two experiments correlating genotype and immunization paradigms with liver adenoma and carcinomas

Genotype	Immunization	No. of mice	Adenoma	Carcinoma
Experiment 1: Terminated at 79–83 wk				
WT	Neu5Ac	5	0	1
WT	Neu5Gc	5	0	0
Cmah$^{-/-}$	Neu5Ac	8	0	1
Cmah$^{-/-}$	Neu5Gc	10	0	4
Experiment 2: Terminated at 81–86 wk				
WT	Neu5Ac	6	1	0
WT	Neu5Gc	6	0	0
Cmah$^{-/-}$	Neu5Ac	6	0	0
Cmah$^{-/-}$	Neu5Gc	7	1	4

Details are provided in *Materials and Methods*, Fig. 4, and the legend for Fig. 4.