HUMAN NUTRITION
RESEARCH COMPENDIUM

TASTE WHAT PORK CAN DO.™

Research is at the heart of the National Pork Board's (NPB) mission, including our targeted goal of elevating the role that pork plays in human nutrition. In the past several decades, we have worked to zero in on nutrition-related effects for pork consumers across various life stages, for pork producers as they respond to consumer needs and for the pork agricultural industry as we aim to support the health of people and the planet.

We have compiled more than 60 NPB-supported nutrition research studies across 22 years, inclusive of the foundational research we continue to build on, research categories we are investigating and top-line findings for each study.*

Meet a better meat. Today's pork is 16% leaner and 27% **lower in saturated fat** compared to about 20 years ago.[1] Eight cuts of fresh pork meet the USDA definition for **lean meats,** including **pork tenderloin, sirloin pork chop, sirloin pork roast, New York pork chop, 96% lean ground pork, New York pork roast, porterhouse pork chop and rib-eye pork chop**.[2]

Pork tenderloin, sirloin pork roast and **sirloin pork chop** are **American Heart Association Heart-Check certified** because they meet rigorous nutrition criteria as heart-healthy foods.[3]

Perfect pork pairings! Pork and plants combined are nutrition dynamos that are delicious with almost any flavor profile. They work together in savory and sweet dishes and shine in many herbs, spices and sauces from **cultures around the world!**

Pork is a nutritional powerhouse that contributes to health and well-being at various life stages, as pork contains important vitamins and minerals.[2] Pork is a **good source**** of choline, phosphorus, and pantothenic acid and an **excellent source***** of thiamin, riboflavin, niacin, vitamin B6, vitamin B12, selenium, zinc and protein.[4]

Lean pork is a high-quality, **nutrient-dense protein** that fuels the active lifestyles of people of all ages and levels — from youth sports to recreational activities to the pros. Pork is your partner in meeting performance goals!




LEGEND

Randomized Controlled Trial | Mixed Methods | Modeling | Observational | Review or Meta-Analysis | Animal

ONGOING STUDIES

PROJECT ID	REFERENCE	STUDY TYPE	KEY MESSAGE	ALTMETRIC SCORE	TOTAL CITATIONS
RP-00633	**Conrad Z.** Environmental sustainability and affordability of pork-modified food menus in randomized controlled trials. William & Mary.		Expected completion: 2027	N/A	N/A
PR-006498	**Eicher Miller H.** Improving dietary quality through animal source protein accessibility in a low-resource setting. Purdue University/HATCH.		Expected completion: 2027	N/A	N/A
PR-006423	**Kreider R.** Determination of creatine content in cooked cuts of pork. Texas A&M University.		Expected completion: 2027	N/A	N/A
PR-006357	**Ilic S.** Nutrition delivered: Designing a meal kit intervention for gestational diabetes. Ohio State University.		Expected completion: 2027	N/A	N/A
PR-006408	**Hess J.** Examining the intersection of ultra-processed foods and nutrient density with pork products using WISEdata. University of Minnesota.		Expected completion: 2027	N/A	N/A
PR-006356	**Tahiri M.** Optimizing nutrition in the GLP-1 era: A scientific review on muscle mass maintenance and symptom mitigation through protein, prebiotics, hydration, and micronutrients with a case study on innovative nutrient-dense fortified foods and whole food combinations. Nutrition Sustainability Solutions.		Expected completion: 2027	N/A	N/A

PROJECT ID	REFERENCE	STUDY TYPE	KEY MESSAGE	ALTMETRIC SCORE	TOTAL CITATIONS
PR-006409	**Leidy H.** The 'Power of Pork Protein' from diverse pork products to promote health and well-being during GLP-1 medication use in middle-age women. University of Texas at Austin.		Expected completion: 2027	N/A	N/A
PR-006282	**Matthews J.** The role of whole foods and protein quality on muscle: An individual participant meta-analysis. University of Arkansas for Medical Sciences.		Expected completion: 2027	N/A	N/A
PR-006290	**Gonzalez D.** Effects of pork protein ingestion before and following performing simulated fire ground test on markers of catabolism, inflammation, and recovery. Sam Houston State University.		Expected completion: 2027	N/A	N/A
PR-006283	**Zhu J.** Pork intake, genetic susceptibility, and social determinants in association with risk of diabetes among a population-based prospective study of U.S. Hispanics/Latinos. Texas State University.		Expected completion: 2027	N/A	N/A
PO-006284	**Hayes J.** Flavor fusion: The role of pork in plant-forward bowl-based meals. Penn State University.		Expected completion: 2027	N/A	N/A
PO-001943	**Aguilera J.** Understanding pork acceptance in school meals through bilingual nutrition education and meal selection in a border-region elementary school. UTHealth Houston School of Public Health.		Expected completion: 2026	N/A	N/A
PO-002492	**International Life Sciences Institute.** Sarcopenia Education Initiative.		Expected completion: 2027	N/A	N/A
PO-002719	**Baum J.** Affordability, nutrition, sustainability, and health—the role of dietary protein in diverse dietary patterns. University of Arkansas.		Expected completion: 2027	N/A	N/A

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RP-00401	**Reichman S.** Improving cognitive performance in esport athletes targeting pork intake. Texas A&M University.		Expected completion: 2026	N/A	N/A
PR-006195	**Church D.** Effects of lean pork loin intake and GLP-1 receptor agonists on protein homeostasis. University of Arkansas for Medical Sciences.		Expected completion: 2026	N/A	N/A
RP-00355	**McNamara J.** Supporting diet quality in young adults using tailored meal-kits. University of Maine.		Expected completion: 2026	N/A	N/A
RP-00358	**Cabre H.** Effects of lean pork intake on endothelial function and vasomotor symptoms in perimenopausal women. Pennington Biomedical Research Center.		Expected completion: 2026	N/A	N/A
PR-006196	**Widen E.** Role of pork in growth and executive function in infants and toddlers. The University of Texas at Austin.		Expected completion: 2026	N/A	N/A
RP-00339	**Brown A.** Lumping vs. splitting–evaluating approaches used in nutrition research to categorize foods and nutrients in assessing nutrition and health. University of Arkansas for Medical Sciences.		Expected completion: 2026	N/A	N/A
RP-00408	**Mastersen T.** The effect of GLP-1 medication on food preferences and perceptions of food noise. Penn State University.		Expected completion: 2026	N/A	N/A
RP-00283	**Gregori D.** Clarifying pork's role in healthy eating patterns: Advanced machine learning techniques for high-dimensional mediation analysis. University of Padova.		Expected completion: 2026	N/A	N/A
RP-00275	**Fulgoni V.** Analysis of intake of pork, its association with diet and health markers in pregnant and lactating women, and those in menopause, using NHANES 2001-2018. Nutrition Impact LLC.		Expected completion: 2026	N/A	N/A

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PR-006010	**Sullivan D.** The impact of pork consumption on brain metabolites, cognition, cardiometabolic health and body composition in older adults. The University of Kansas Medical Center.		Expected completion: 2026	N/A	N/A
RP-00338	**Wallace T.** Developing a standardized means for calculating pork intake in future analyses of NHANES. Think Healthy Group.		Expected completion: 2026	N/A	N/A
23-RP-00104	**Hayes J.** Identifying and understanding factors that influence pork consumption in zoomers aged 18 to 27 using mixed qualitative and quantitative methods. Penn State University.		Expected completion: 2026	N/A	N/A
23-RP-00070	**Barbey A.** Establishing the cognitive and brain health benefits of lean pork consumption. University of Nebraska and University of Illinois.		Expected completion: 2026	N/A	N/A
23-RP-00060	**Church D.** Effects of lean pork loin intake on protein homeostasis and glucose regulation in prediabetic adults. University of Arkansas for Medical Sciences.		Expected completion: 2026	N/A	N/A
23-ASN ECN Award	**Butler L.** Development of quantitative food frequency questionnaire to assess pork and traditional food intake among persons of Mexican heritage in central Texas. Texas State University.		Expected completion: 2026	N/A	N/A
23-RP-00096	**Widen E.** Do pork consuming infants have higher dietary quality and protein intake, compared to non-consumers, during complementary feeding? University of Texas at Austin.		Expected completion: 2026	N/A	N/A
23-RP-00075	**Allison D.** Culturally appropriate recipes for impactful nutrition goals for communities (CARING for Communities). Indiana University.		Expected completion: 2026	N/A	N/A

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23-RP-00132	**Kranz S.** Pilot feasibility study: Increasing lean protein intake in preschool-age children. University of Virginia.		Expected completion: 2026	N/A	N/A
PR-005307	**Hooshmand S.** Personalized pork: Dose-dependent identification of unique biomarkers. San Diego State University.		Expected completion: 2026	N/A	N/A
PR-005338	**Barbey A.** Investigating the role of pork consumption on cognition and brain health through innovation in nutritional cognitive neuroscience. University of Nebraska and University of Illinois.		Expected completion: 2026	N/A	N/A
23-RP-00093	**Coccia C.** Family meal project: A parent-driven culturally responsive program to increase pork consumption. Florida International University.		Expected completion: 2026	N/A	N/A
23-030	**Cardel M.** Relationship between pork consumption, weight loss and diet quality. WW (WeightWatchers).		Expected completion: 2026	N/A	N/A
23-RP-00102	**Ellison B.** The potential for lean pork proteins to mitigate household food waste: An examination of ease of use and re-use in the kitchen. Purdue University.		Expected completion: 2026	N/A	N/A
19-029	**Tang M.** Meat consumption during infancy on growth, gut health, sleep and neurodevelopment. University of Colorado School of Medicine.		Expected completion: 2026	N/A	N/A

PUBLISHED STUDIES

PROJECT ID	REFERENCE	STUDY TYPE	KEY MESSAGE	ALTMETRIC SCORE	TOTAL CITATIONS
PR-005310	**Vaezi, et al.** Effects of minimally processed red meat within a plant-forward diet on biomarkers of physical and cognitive aging: A randomized controlled crossover feeding trial. *Current Developments in Nutrition*. 2025. Available online ahead of print December 10, 2025. DOI: 10.1016/j.cdnut.2025.107615.		Including lean pork in a healthy overall dietary pattern improved cognitive-related metabolic biomarkers, reduced fasting insulin, higher HDL cholesterol, decreased body weight, maintained grip strength and chair rise performance, and favorably shifted concentrations of neuroactive metabolites and bioactive amino acids.	7	0
RP-00274	**Agarwal S, Fulgoni III VL.** Association of pork to key nutrient intake and adequacy in U.S. adolescents aged 9-18 years: A cross-sectional analysis of National Health and Nutrition Examination Survey 2011-2018 data. *Food Nutr J*. 2025;10:332.		Pork consumers had higher intakes of calcium, copper, iron, magnesium, phosphorus, potassium, selenium, sodium, zinc, thiamine, riboflavin, niacin, vitamin B6, vitamin B12 and choline compared to non-consumers.	0	0
RP-00274	**Agarwal S, et al.** Intake of pork is associated with higher nutrient intake and adequacy in race/ethnic population subgroups of adults in the United States. *Journal of Food Science and Nutrition Research*. 2025;8:14-23.		NHANES 2011–2018 shows that pork eaters across U.S. race/ethnic groups (≈50–62% of adults) had higher intakes of key nutrients (phosphorus, selenium, zinc, B vitamins, potassium, choline) and were less likely to fall below requirements (e.g., iron, zinc, thiamine, riboflavin, B12, choline) than non-eaters.	0	0
PR-005310	**Vaezi S, et al.** Impacts of minimally-processed omnivorous vs lacto-ovo-vegetarian diets on insulin sensitivity, lipid profile, and adiposity in older adults: Secondary findings from a randomized crossover feeding trial. *Clin. Nutr.* 2025;55:90-103.		Switching older adults from a diet high in ultra-processed foods (~50% of calories) to two low-ultra-processed, U.S. Dietary Guidelines–style diets, one with minimally processed pork and one lacto-ovo vegetarian with lentils, for 8 weeks led to eating fewer calories without trying, weight and fat loss, better insulin control, healthier cholesterol, and lower inflammation, with no real differences between the two diets.	401	1
PR-005310	**de Vargas BO, et al.** Design and implementation of the Protein-Distinct Macronutrient-Equivalent Diet (PRODMED) study: An eighteen-week randomized crossover feeding trial among free-living rural older adults. *Curr. Dev. Nutr.* 2025;9(5):104588.		An 18-week randomized crossover in free-living rural older adults showed that plant-forward, macronutrient-matched menus differing only by protein source (162 g/day lean pork vs. pulses; each ≥45% of total protein) are feasible with comparable adherence and energy intake. Both diets improved overall diet quality from baseline by increasing fiber and reducing total and saturated fat, sodium, and ultra-processed foods, offering a scalable model to isolate protein-source effects.	43	2

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PR-005301	**Zupančič Ž, et al.** Ingestion of a lipid-rich meat matrix blunts the postexercise increase of myofibrillar protein synthesis rates in healthy adults: a randomized controlled trial. *Am. J. Clin. Nutr.* 2025;122(5):1252-1264.		After resistance exercise, both low-fat and high-fat ground pork stimulated greater myofibrillar protein synthesis compared to a carbohydrate drink.	323	0
23-RP-00130	**Gonzalez DE, et al.** Effects of pork protein ingestion prior to and following performing the army combat fitness test on markers of catabolism, inflammation, and recovery. *Nutrients*. 2025;17(12):1995.		After the Army Combat Fitness Test, cadets who ate pork-based meals had lower muscle breakdown and inflammation, less muscle soreness, better mood, and a higher testosterone:cortisol ratio versus a plant-based meal.	49	0
23-RP-00128	**Conrad Z, et al.** Modeled sustainability impacts of increasing pork consumption among adults in the United States. *Front. Nutr.* 2024;11.		Modeled substitution of beef with pork was associated with reductions in GHGE, land, pesticides, and fertilizer nutrients by 11-35%, and substitution of seafood with pork was associated with reductions in cumulative energy demand by 6% and diet cost by <1%.	40	1
N/A	**Hicks-Roof K.** Exploring protein dietary guidance statements. *Nutrition Today*. 2024;59(6):298-305.		Uniform adoption of Dietary Guidance Statements across protein food groups allows for equal representation of how a variety of proteins can contribute to a nutritious dietary pattern.	N/A	N/A
22-056	**Jung A-J, et al.** The relationship of pork meat consumption with nutrient intakes, diet quality, and biomarkers of health status in Korean older adults. *Nutrients*. 2024;16(23):4188.		In Korean older adults, pork consumption may contribute to a higher intake of energy and most nutrients, improved diet quality scores, higher vegetable intake, and small improvements in health biomarkers.	34	1
17-018	**Wang Y, et al.** Healthy dietary pattern cycling affects gut microbiota and cardiovascular disease risk factors: Results from a randomized controlled feeding trial with young, healthy adults. *Nutrients*. 2024;16(21):3619.		Young adults are encouraged to adopt and sustain a healthy dietary pattern to improve cardiovascular health, potentially through modifying gut microbiota composition.	76	4
N/A	**Leidy HJ, et al.** Perspective: Key considerations when developing and publishing dietary interventions for human clinical trials. *J. Nutr.* 2024;154(10):2904-2908.		Developing tailored recipes with familiar ingredients and spice blends can improve taste, flavor and textures while supporting the reduction in sodium, sugar and/or saturated fats—potentially improving dietary adherence in clinical research.	1	4

PROJECT ID	REFERENCE	STUDY TYPE	KEY MESSAGE	ALTMETRIC SCORE	TOTAL CITATIONS
23-RP-00062	**Poinsot R, et al.** Hispanic Thrifty Food Plan (H-TFP): Healthy, affordable, and culturally relevant. *Nutrients*. 2024;16(17):2915.		The modeled H-TFP illustrates how healthy food plans on a budget can be developed for specific subpopulations in the U.S. A growing segment of the U.S. population that self-identifies as Hispanic appears to follow distinct food patterns that may reflect collective identity and culture. The optimized cost-neutral H-TFP market basket fixed at $186/week for a family of four selected fresh pork and reduced the amount of poultry.	39	1
23-RP-005751	**Ankersen L.** Comprehensive sensory and flavor nuances of pork protein and fat. *InnovaConsult.* [Internal Report] [2024].		Pork has more than 110 unique flavor nuances. Some of pork's flavors include sweet, fruity and floral tones, clove, hazelnut and mushrooms. The most "juicy" and "sweet" pork cuts included Air Fryer Pork Tenderloin and Roasted Pork Roast.	N/A	N/A
22-079	**Drewnowski A.** Perspective: The place of pork meat in sustainable healthy diets. *Adv. Nutr.* 2024;15(5):100213.		Pork meat is a source of affordable, high-quality protein and may have a lower environmental (greenhouse gas emissions) impact than previously supposed. Separating pork from other red meat may reshape our ideas about diets and health and the environmental cost of meat production.	35	44
22-029	**Agarwal S, et al.** Association of pork (all pork, fresh pork and processed pork) consumption with nutrient intakes and adequacy in U.S. children (age 2–18 years) and adults (age 19+ years): NHANES 2011–2018 analysis. *Nutrients*. 2023;15(10):2293.		Pork helps millions of Americans reach daily nutrient and food group recommendations, including under-consumed nutrients of public health importance like potassium.	12	24
21-143	**Datlow LY, et al.** Association of pork intake with cognitive performance in older adults enrolled in the National Health and Nutrition Examination Survey (NHANES), 2011-2014 data cycles. *J. Alzheimers Dis.* 2023;96(1):351-358.		Pork intake was not beneficially or detrimentally associated with performance on any of the cognitive tests in both the crude and multivariate models.	1	0
PR-005299	**Fanelli NS, et al.** Pork cuts, hams, and sausages have digestible indispensable amino acid scores (DIAAS) close to or over 100. *JSFA Reports*. 2024;4(9):326-335.		With the exception of chorizo for children less than 3 years old, all pork products have "excellent" protein quality for individuals older than 6 months of age, with DIAAS greater than 100. Pork proteins can, therefore, complement proteins with low quality to produce a meal that is adequate in all amino acids.	18	1

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21-144	**Poinsot R, et al.** Fresh pork as protein source in the USDA Thrifty Food Plan 2021: A modeling analysis of lowest-cost healthy diets. *Nutrients*. 2023;15(8):1897.		Fresh pork is a preferred and cost-effective meat source in the Thrifty Food Plan because it helps people across the lifespan meet nutrient requirements within a low-cost healthy diet.	26	12
21-143	**Datlow LY, et al.** Consumption patterns and the nutritional contribution of total, processed, fresh and fresh-lean pork to the U.S. diet. *Nutrients*. 2023;15(11):2595.		The top co-consumed foods alongside pork include fruits and vegetables like lettuce, tomatoes, bananas and apples.	1	23
18-013	**Connolly G, et al.** Effects of consuming ounce-equivalent portions of animal- vs. plant-based protein foods, as defined by the Dietary Guidelines for Americans on essential amino acids bioavailability in young and older adults: Two cross-over randomized controlled trials. *Nutrients*. 2023;15(13):2870.		Consuming meals with 2 ounce equivalents of animal-based protein foods, like lean pork, resulted in more essential amino acids in the bloodstream compared to meals with 2 ounce equivalents of plant-based protein foods in both young and older adults.	271	18
17-018	**Wang Y, et al.** Effects of adding lean red meat to a U.S.-style healthy vegetarian dietary pattern on gut microbiota and cardiovascular risk factors in young adults: A crossover randomized controlled trial. *J. Nutr.* 2023;153(5):1439-1452.		Healthy young adults who adopt a healthy U.S.-style dietary pattern that may be vegetarian or omnivorous, including fresh lean pork, experience short-term changes in gut microbial composition, which are associated with improvements in multiple lipid-related heart disease risk factors.	33	21
19-226	**Nair M.** A comparative life cycle assessment of pork meat and non-meat alternative patties. Colorado State University. [Internal Report] [2022].		Pork was the most nutrient-dense of the burgers when B vitamins and zinc content were considered.	N/A	N/A
18-006	**Dhakal S, et al.** Effects of lean pork on microbiota and microbial-metabolite trimethylamine-N-oxide: A randomized controlled non-inferiority feeding trial based on the Dietary Guidelines for Americans. *Mol. Nutr. Food Res.* 2022;66(9):e2101136.		Lean pork does not exacerbate TMAO response (a marker of increased risk of heart disease), highlighting pork as a high-quality and nutrient-dense animal protein for a balanced diet with heart health in mind.	4	17

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19-234	**Fanelli NS, et al.** Digestible indispensable amino acid score (DIAAS) is greater in animal-based burgers than in plant-based burgers if determined in pigs. *Eur. J. Nutr.* 2022;61:461-475.		A pork burger has greater protein digestibility and is a higher-quality protein source than plant-based burgers for children from 6 months to 3 years and individuals older than 3 years.	117	58
19-046	**Murphy MM, et al.** Adequacy and sources of protein intake among pregnant women in the United States, NHANES 2003-2012. *Nutrients*. 2021;13(3):795.		Approximately 1 in 8 women in the second and third trimesters of pregnancy were found to have inadequate protein intake, emphasizing the need for high-quality protein foods, like pork, to meet nutritional needs during pregnancy.	43	33
17-003	**Ellis JL, et al.** Dietary vitamin K is remodeled by gut microbiota and influences community composition. *Gut Microbes*. 2021;13(1):1-16.		These results suggest that dietary vitamin K deficiency alters the gut microbial community composition.	30	147
18-188	**Swing CJ, et al.** Nutritional composition of novel plant-based meat alternatives and traditional animal-based meats. *HSOA Journal of Food Science & Nutrition*. 2021;7(109):2.		Pork burgers have considerably lower sodium and saturated fat than plant-based burgers. It is important to further investigate the bioavailability of nutrients in plant-based meat alternatives compared to animal-based foods like pork.	0	50
17-001	**Park S, et al.** Metabolic evaluation of the Dietary Guidelines' ounce equivalents of protein food sources in young adults: A randomized controlled trial. *J. Nutr.* 2021;151(5):1190-1196.		Consumption of ounce equivalents of animal-based protein food sources (pork loin) resulted in a greater gain in whole-body net protein balance above baseline than the ounce equivalents of plant-based protein food sources (tofu, kidney beans, peanut butter, mixed nuts).	268	43
15-108	**Tang M, et al.** Different blood metabolomics profiles in infants consuming a meat- or dairy-based complementary diet. *Nutrients*. 2021;13(2):388.		Providing protein-rich foods during infancy, including puréed meats such as pork, can increase protein intakes in infants and elevate concentrations of certain essential branched-chain amino acids (BCAAs). Serum BCAAs may at least partially contribute to infant linear growth during complementary feeding.	0	8
18-012	**O'Connor LE, et al.** Effects of total red meat intake on glycemic control and inflammatory biomarkers: A meta-analysis of randomized controlled trials. *Adv. Nutr.* 2021;12(1):115-127.		Total red meat consumption, including pork, for up to 16 weeks does not affect changes in biomarkers of glycemic control or inflammation for adults free of, but at risk for, cardiometabolic disease.	267	68

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N/A	**Penkert LP, et al.** Pork consumption and its relationship to human nutrition and health: A scoping review. *Meat and Muscle Biology*. 2021;5(1):1-22.		The scientific literature on pork for human nutrition and health contains mostly observational studies, a large majority being case-controlled and cross-sectional analyses. Future clinical trials should address the role of pork consumption in health outcomes, intermediate outcomes and validated biomarkers.	5	25
19-151	**An R, et al.** Pork consumption in relation to body weight and composition: A systematic review and meta-analysis. *Am. J. Health Behav*. 2020;44(4):513-525.		Among the experimental studies without daily total energy intake restrictions, pork intake was associated with a reduction in body weight by 0.86 kg and body fat percentage by 0.77%, whereas pork intake was not associated with change in lean mass. Among the experimental studies with energy restrictions, pork intake was associated with a reduction in body weight by 5.56 kg, lean mass by 1.50 kg and fat mass.	17	16
18-002	**An R, et al.** Fresh- and lean-pork intake in relation to functional limitations among U.S. older adults, 2005-2016. *Nutrition and Health*. 2020;26(4):295-301.		Increased consumption of fresh lean pork is linked with a reduced risk of functional limitations among older adults, including activities of daily living, instrumental activities of daily living and general physical activities.	0	8
17-083	**Bailey HM, et al.** Pork products have digestible indispensable amino acid scores (DIAAS) that are greater than 100 when determined in pigs, but processing does not always increase DIAAS. *J. Nutr*. 2020;150(3):475-482.		Bacon, ham and loin are excellent proteins with DIAAS > 100, and processing may sometimes, but not always, increase DIAAS. In conclusion, pork products are high-quality proteins with DIAAS > 100.	12	33
16-144	**Porter Starr KN, et al.** Impact on cardiometabolic risk of a weight loss intervention with higher protein from lean red meat: Combined results of two randomized controlled trials in obese middle-aged and older adults. *J. Clin. Lipidol*. 2019;13(6):920-931.		A weight loss diet with either traditional or higher protein from lean proteins like pork improves risk markers of heart disease and type 2 diabetes in middle-aged and older adults with obesity. Both diets were also associated with improved physical function, and neither had an adverse impact on cardiometabolic outcomes.	43	24
18-002	**An R, et al.** Fresh and lean pork consumption in relation to nutrient intakes and diet quality among U.S. adults, NHANES 2005-2016. *Health Behav. Policy Rev*. 2019;6(6):570-581.		Increased fresh and lean pork intake was related to marginally improved nutritional intakes (i.e., protein, magnesium, potassium, selenium, zinc, phosphorus, and vitamins B1, B2, B3 and B6) with lesser increases in daily total energy, saturated fat and sodium intakes.	0	8

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15-108;13-197	**Tang M, et al.** Different growth patterns persist at 24 months of age in formula-fed infants randomized to consume a meat— or dairy-based complementary diet from 5 to 12 months. *J. Pediatr.* 2019;206:78-82.		Feeding infants puréed meats, including pork, as complementary foods can support normal growth and development through 2 years of age.	34	18
13-117	**Bergia RE III, et al.** Differential relationship between intermuscular adipose depots with indices of cardiometabolic health. *Int. J. Endocrinol.* 2018;2018:2751250.		Greater intermuscular adipose tissue in the thigh is a better predictor of cardiometabolic risk than greater intermuscular adipose tissue in the calf in adults who are overweight and obese.	7	19
15-080	**O'Connor LE, et al.** Adopting a Mediterranean-style eating pattern with different amounts of lean unprocessed red meat does not influence short-term subjective personal well-being in adults with overweight or obesity. *J. Nutr.* 2018;148(12):1917-1923.		Following a Mediterranean-style eating pattern with different amounts of lean, unprocessed red meat may not be an effective short-term strategy to meaningfully improve indexes of personal well-being in adults who are overweight or obese.	3	19
15-108;13-197	**Tang M, et al.** A meat- or dairy-based complementary diet leads to distinct growth patterns in formula-fed infants: A randomized controlled trial. *Am. J. Clin. Nutr.* 2018;107(5):734-742.		Formula-fed older infants who eat meat-based complementary foods such as puréed pork experience normal growth patterns, especially for length.	617	63
15-080	**O'Connor LE, et al.** A Mediterranean-style eating pattern with lean, unprocessed red meat has cardiometabolic benefits for adults who are overweight or obese in a randomized, crossover, controlled feeding trial. *Am. J. Clin. Nutr.* 2018;108(1):33-40.		Adults who are overweight or obese may improve multiple cardiometabolic disease risk factors by adopting a Mediterranean-style eating pattern with lean pork.	542	104
16-104	**Palacios OM, et al.** A lean pork-containing breakfast reduces hunger and glycemic response compared to a refined carbohydrate-containing breakfast in adults with prediabetes. *J. Am. Coll. Nutr.* 2018;37(4):293-301.		Intake of a higher-protein, lean pork-containing breakfast may favorably impact appetite and cardiometabolic measures.	10	9

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16-012	**Beals JW, et al.** Protein-rich food ingestion stimulates mitochondrial protein synthesis in sedentary young adults of different BMIs. *J. Clin. Endocrinol. Metab.* 2017;102(9):3415-3424.		Eating a dinner-sized amount of protein, including from pork, strongly stimulates an after-meal mitochondrial protein synthesis response irrespective of BMI.	18	35
12-147	**Emilien CH, et al.** The effect of the macronutrient composition of breakfast on satiety and cognitive function in undergraduate students. *Eur. J. Nutr.* 2017;56(6):2139-2150.		Results suggest that changing the macronutrient content of breakfast influences the glycemic response but has no effect on the appetite or cognitive performance measures among undergraduate students. Pork can be an ideal protein for breakfast.	16	17
13-207	**Bales CW, et al.** Influence of protein intake, race and age on responses to a weight-reduction intervention in obese women. *Curr. Dev. Nutr.* 2017;1(5):e000703.		A high-protein, calorie-restricted weight loss intervention featuring pork is feasible for obese women to follow and can improve functional outcomes such as walking.	130	30
13-177	**Hudson JL, et al.** Within-day protein distribution does not influence body composition responses during weight loss in resistance-training adults who are overweight. *Am. J. Clin. Nutr.* 2017;106(5):1190-1196.		Improvements in body composition may be achieved through dietary energy restriction combined with resistance training when adequate total protein from food sources including pork is consumed in either an even (30 g each at breakfast, lunch and dinner) or skewed (10 g at breakfast, 20 g at lunch and 60 g at dinner) distribution pattern.	18	29
18-013	**Li J, et al.** Effects of dietary protein source and quantity during weight loss on appetite, energy expenditure and cardio-metabolic responses. *Nutrients.* 2016;8(2):63.		Diets varying in protein quantity with either beef/pork or soy/legume as the predominant source have minimal effects on appetite control, energy expenditure and cardio-metabolic risk factors during energy restriction-induced weight loss.	42	75
14-205	**Beals JW, et al.** Anabolic sensitivity of postprandial muscle protein synthesis to the ingestion of a protein-dense food is reduced in overweight and obese young adults. *Am. J. Clin. Nutr.* 2016;104(4):1014-1022.		Adults who are overweight or obese have a diminished response to dietary protein compared with healthy-weight controls.	53	125

PROJECT ID	REFERENCE	STUDY TYPE	KEY MESSAGE	ALTMETRIC SCORE	TOTAL CITATIONS
14-100	**Fu X, et al.** Measurement of multiple vitamin K forms in processed and fresh-cut pork products in the U.S. food supply. *J. Agric. Food Chem.* 2016;64(22):4531-4535.		Processed and fresh-cut pork products are a rich dietary source of vitamin K2 that are currently unaccounted for in assessment of vitamin K in the food supply.	11	34
11-154	**Sayer RD, et al.** Dietary Approaches to Stop Hypertension diet retains effectiveness to reduce blood pressure when lean pork is substituted for chicken and fish as the predominant source of protein. *Am. J. Clin. Nutr.* 2015;102(2):302-308.		Lean pork can be an acceptable protein option within the heart-healthy DASH diet for individuals looking to manage or reduce elevated blood pressure.	33	86
10-170	**Leidy HJ, et al.** A high-protein breakfast prevents body fat gain, through reductions in daily intake and hunger, in "breakfast skipping" adolescents. *Obes.* 2015;23(9):1761-1764.		The daily addition of a high-protein breakfast featuring pork improved indices of weight management as illustrated by the prevention of body fat gain, voluntary reductions in daily intake and reductions in daily hunger in breakfast-skipping adolescents who are overweight or obese.	1013	108
12-159	**Stettler N, et al.** Systematic review of clinical studies related to pork intake and metabolic syndrome or its components. *Diabetes. Metab. Syndr. Obes.* 2013;6:347-357.		There is limited research on the impact of pork intake on glucose-insulin metabolism and metabolic syndrome, highlighting the need to address research gaps. There is a potential positive effect of pork on waist circumference and cholesterol.	5	19
09-155	**Campbell W.** Effect of protein source (animal versus vegetable) and quantity on indices of mood, tryptophan and large neutral amino acids. Purdue University. [Internal Report] [2012].		Protein intakes from pork have an effect on plasma amino acids and tryptophan.	N/A	N/A
08-177	**Puangsombat K, et al.** Occurrence of heterocyclic amines in cooked meat products. *Meat Sci.* 2012;90(3):739-746.		This study suggests that total heterocyclic amines in cooked meat are significantly lower when cooked to a medium-rare compared to well-done. Type of meat, cooking methods, cooking time and temperature have an impact on the type and content of heterocyclic amines in meat samples.	84	189

PROJECT ID	REFERENCE	STUDY TYPE	KEY MESSAGE	ALTMETRIC SCORE	TOTAL CITATIONS
08-124	**Nuñez De González MT, et al.** Survey of residual nitrite and nitrate in conventional and organic/natural/uncured/indirectly cured meats available at retail in the United States. *J. Agric. Food Chem.* 2012;60(15):3981-3990.		There were no significant differences in nitrite (NO_2^-) concentrations between conventional, organic, natural, uncured and indirectly cured meat categories. In certain cities, nitrate (NO_3^-) content was lower for indirectly cured meats.	1	79
08-017	**Nuttall FQ, et al.** Effect of a $LoBAG_{30}$-diet on protein metabolism in men with type 2 diabetes. A randomized controlled trial. *Nutr. Metab.* 2012;9(1):43.		A high-protein, low-carbohydrate diet with a macronutrient ratio of 30% carbohydrates, 30% protein (including pork) and 40% fat strongly favors a positive protein balance in individuals with untreated type 2 diabetes, but changes in lean mass were not observed.	5	18
10-173	**Leidy HJ, et al.** The effects of consuming frequent, higher protein meals on appetite and satiety during weight loss in overweight/obese men. *Obes.* 2011;19(4):818-824.		High protein intake from foods including pork can improve daily satiety and evening appetite control during weight loss in men who are overweight or obese.	761	178
09-058	**Murphy MM, et al.** Fresh and fresh lean pork are substantial sources of key nutrients when these products are consumed by adults in the United States. *Nutr. Res.* 2011;31(10):776-783.		Fresh lean pork consumption contributes to higher intakes of protein, selenium, thiamin and vitamin B6 compared to nonconsumers, suggesting that including lean cuts of fresh pork in the diet align with dietary guidance.	1	58
08-017	**Gannon MC, et al.** Effect of a high-protein diet on ghrelin, growth hormone and insulin-like growth factor-I and binding proteins 1 and 3 in subjects with type 2 diabetes mellitus. *Metab.* 2011;60(9):1300-1311.		A Low Biologically Available Glucose (LoBAG) diet, which consists of 30% carbohydrate, 30% protein (including from pork) and 40% fat, can lead to a decrease in fasting glucose, 24-hour glucose concentrations and total glycated hemoglobin in individuals with type 2 diabetes. There was also an increase in fasting insulin-like growth factor-1, but the mechanism behind this needs further investigation.	9	34
09-066	**Hollis J.** Consumer acceptability and stability of omega-3 enriched pork products. Iowa State University. [Internal Report] [2010].		Supplementing a pig's diet with omega-3 fatty acids had no effect on consumer acceptability of the pork products and no consistent effect on measures of oxidation or rancidity.	N/A	N/A

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15-149	**Alexander DD, et al.** A review and meta-analysis of red and processed meat consumption and breast cancer. *Nutr. Res. Rev.* 2010;23(2):349-365.		Red meat and processed meat intake does not appear to be independently associated with increasing the risk of breast cancer, although further investigations of potential effect modifiers, such as analyses by hormone receptor status, may provide valuable insight to potential patterns of associations.	19	144
08-176	**Miller A.** Assessment of the potential human exposure to heterocyclic amines from cooked meat products. Exponent. [Internal Report] [2009].		There are uncertainties associated with the dietary exposure estimates, particularly those associated with the existing data gaps in HCA levels in foods.	N/A	N/A
98-107	**Guenther PM, et al.** Sociodemographic, knowledge, and attitudinal factors related to meat consumption in the United States. *J. Am. Diet Assoc.* 2005;105(8):1266-1274.		Sociodemographic factors are strong predictors of the probability of choosing types of meat and of the amounts eaten. Knowledge and attitudes about diet and meat products also influence choices.	3	160
99-135	**Gupta SV, et al.** Replacing 40% of dietary animal fat with vegetable oil is associated with lower HDL cholesterol and higher cholesterol ester transfer protein in cynomolgus monkeys fed sufficient linoleic acid. *J. Nutr.* 2003;133(8):2600-6.		Within the context of currently recommended diets, it may be possible to manipulate HDL-C beneficially by replacing 40% of dietary animal fat with vegetable oil (comprised of 50% pork fat and 35% olive oil).	1	11
98-193	**Scott LW, et al.** Long-term, randomized clinical trial of two diets in the metabolic syndrome and type 2 diabetes. *Diabetes Care.* 2003;26(8):2481-2482.		The study's trends support the hypothesis that a diet high in protein and monounsaturated fatty acids may be advantageous in correcting glucose and lipid metabolism abnormalities.	0	56
01-075	**Gates G.** Protein intake in potentially insulin resistant adults: Impact on glycemic and lipoprotein profiles. Oklahoma State University. [Internal Report] [2002].		The study did not demonstrate a consistent relationship between total and animal protein intakes and blood sugar control or blood lipid concentrations.	N/A	N/A
01-130	**Shaw DT, et al.** Impact of vitamin and mineral supplement withdrawal and wheat middling inclusion on finishing pig growth performance, fecal mineral concentration, carcass characteristics, and the nutrient content and oxidative stability of pork. *J. Anim. Sci.* 2002;80(11):2920-30.		Supplement withdrawal and dietary wheat middling inclusion alter pork nutrient content and fecal mineral concentration, but not the oxidative stability of pork.	3	101

PROJECT ID	REFERENCE	STUDY TYPE	KEY MESSAGE	ALTMETRIC SCORE	TOTAL CITATIONS
98-179	**Buege DR.** A survey of nitrate and nitrite in selected food in the USA. University of Wisconsin-Madison. [Internal Report] [2002].		The results of this study confirm that a wide range of foods contain substantial amounts of nitrate and low levels of nitrite.	N/A	N/A
99-300	**Prestat C, et al.** Cooking method and endpoint temperature effects on sensory and color characteristics of pumped pork loin chops. *Meat Sci.* 2002;60(4):395-400.		Pumping loins appears to enhance sensory attributes of chops even when cooked to abusive endpoint temperatures with limited detrimental effects on physical characteristics.	0	90
97-1917	**Gupta SV, Khosla P.** Pork fat and chicken fat similarly affect plasma lipoprotein metabolism in cynomolgus monkeys fed diets with adequate levels of linoleic acid. *J. Nutr.* 2000;130(5):1217-24.		The results from this study demonstrated no significant difference in serum LDL cholesterol in an animal model for lipoprotein metabolism.	0	13
97-1905	**Khosla P.** Pork fat and lipid metabolism. Wayne State University. [Internal Report] [1998].		These results show that when consumed as part of currently recommended heart-healthy diets, pork fat is as effective as chicken fat in maintaining a desirable blood lipid profile.	N/A	N/A

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*Visit the human nutrition research category on **porkcheckoff.org** for a full digital compendium of National Pork Board-funded studies.
**Good Source: ≥10%-19% of the Daily Value [DV] per 3 oz serving
***Excellent Source: ≥20% of the Daily Value [DV] per 3 oz serving

[1] USDA Nutrient Data Set for Fresh Pork (Derived from SR), Release 1.1. ARS USDA website. **https://www.ars.usda.gov/ARSUserFiles/80400525/Data/Pork/Pork1-1.pdf**. Accessed 1/24/24.
[2] FoodData Central. USDA website. **https://fdc.nal.usda.gov/**. Accessed 1/24/24.
[3] Heart-Check Digital Grocery List. American Heart Association website. **https://www.heart.org/en/grocery-list**. Accessed 1/24/24.
[4] Pork, fresh, composite of trimmed retail cuts (leg, loin and shoulder), separable lean only, cooked [FDC ID 167855; NDB Number 10093]. FoodData Central website. **https://fdc.nal.usda.gov/fdc-app.html#/food-details/167855/nutrients**. Published 4/1/2019. Accessed 1/22/24.