Search Plan and Results

Question

What is the optimal proportion of dietary fat, carbohydrate, and protein to lose weight if overweight or obese? (DGAC 2010)

What is the optimal proportion of dietary fat, carbohydrate and protein to avoid regain in weight-reduced persons? (DGAC 2010)

Are low-carbohydrate (less than 45%) hypocaloric diets safe and effective for long-term (more than six months) weight loss or maintenance? (DGAC 2010)

Are high-protein (>35%) hypocaloric diets safe and effective for long term (more than six months) weight loss or maintenance? (DGAC 2010)

Date Searched

08/11/2009, 8/31/2009, 10/29/09

Inclusion Criteria

- January 2004 to present
- RCT or clinical controlled studies, large non-randomized observational studies, cohort, case-control studies, systematic reviews and meta-analysis (cross-sectional studies for research question one only)
- Human subjects
- English language
- International
- *Sample size:* Minimum of 10 subjects per study arm; preference for larger sizes, if available
- *Dropout rate:* Less than 20% for studies under one year and less than 40% for studies one year and over; preference for smaller dropout rates
- *Ages:* Adults, 19 years and older
- *Populations:* Healthy and those with elevated chronic disease risk; p

Exclusion Criteria

- Medical treatment or therapy
- Cross-sectional studies (for research questions two to five only)
- *Ages:* Children, under age 18 years
- Narrative reviews
- Diseased subjects (already diagnosed with disease related to study purpose)
- Hospitalized patients
- Malnourished or third-world populations or disease incidence not relative to US population (e.g., malaria)

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- Animal studies
- In vitro studies
- Articles not peer reviewed (Websites, magazine articles, Federal reports, etc.).

Search Terms: Search Vocabulary

Macronutrient* AND (Proportion*[title] OR distribution*[title] OR percent*[title] OR “diet composition”)

(macronutrient* OR "dietary proteins"[mesh] OR "dietary carbohydrates"[mesh]) AND ("Body Mass Index"[Mesh] OR “weight gain”[mesh] OR “weight loss”[mesh]) AND "English and humans"[Filter] AND "published last 5 years"[Filter]

(Hypocaloric[title] OR hypocaloric diet*) AND (“weight gain”[mesh] OR “weight loss”[mesh]) AND ("dietary proteins"[mesh] OR "dietary carbohydrates"[mesh])

(macronutrient*[title] OR "dietary proteins"[majr] OR "dietary carbohydrates"[majr]) AND ("Diet, Reducing"[Mesh] OR "Caloric Restriction"[Mesh] OR hypocaloric) AND (“weight gain”[mesh] OR “weight loss”[mesh] OR “body weight”[mh])

(High protein* OR high carbohydrate* OR low protein* OR low carbohydrate*) AND (hypocaloric* OR diet OR dietary OR “Diet, Carbohydrate-Restricted”[mesh] OR “Diet, Protein-Restricted”[mesh] OR "Diet, Reducing"[Mesh] OR "Caloric Restriction"[Mesh) AND (“weight gain”[mesh] OR “weight loss”[mesh] OR “body weight”[mh])

(((High protein* OR high carbohydrate* OR low protein* OR low carbohydrate*) AND diet[mh]) OR "Diet, Reducing"[Mesh] OR "Caloric Restriction"[Mesh] OR hypocaloric) AND ("Coronary Disease"[Mesh] OR "Cerebrovascular Disorders"[Mesh:NoExp] OR "Stroke"[Mesh:NoExp] OR "Heart Diseases"[Mesh] OR "Cardiovascular Diseases"[Mesh:NoExp] OR "Diabetes Mellitus, Type 2"[Mesh] OR hypertension[mh])

Electronic Databases

PubMed.

Total hits from all electronic database searches: 1107

Total articles identified to review from electronic databases: 186

Articles Identified Via Handsearch or Other Means

Articles identified via hand search: 2

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Summary of Articles Identified to Review

Number of Primary Articles Identified: 5

Number of Review Articles Identified: 39

Total Number of Articles Identified: 44

Number of Articles Reviewed but Excluded: 144

List of Articles Included for Evidence Analysis

Systematic Reviews/Meta-Analyses (5)

Avenell A, Brown TJ, McGee MA, Campbell MK, Grant AM, Broom J, Jung RT, Smith WC. What are the long-term benefits of weight reducing diets in adults? A systematic review of randomized controlled trials. *J Hum Nutr Diet.* 2004 Aug; 17(4): 317-335. Review. PMID: 15250842.

Halton TL, Hu FB. The effects of high protein diets on thermogenesis, satiety and weight loss: A critical review. *J Am Coll Nutr.* 2004 Oct; 23(5): 373-385. Review. PMID: 15466943.

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Krieger JW, Sitren HS, Daniels MJ, Langkamp-Henken B. Effects of variation in protein and carbohydrate intake on body mass and composition during energy restriction: A meta-regression 1. *Am J Clin Nutr.* 2006 Feb; 83(2): 260-274. PMID: 16469983.

Nordmann AJ, Nordmann A, Briel M, Keller U, Yancy WS Jr, Brehm BJ, Bucher HC. Effects of low-carbohydrate vs low-fat diets on weight loss and cardiovascular risk factors: A meta-analysis of randomized controlled trials. *Arch Intern Med.* 2006 Feb 13; 166(3): 285-293. Review. Erratum in: Arch Intern Med. 2006 Apr 24; 166(8): 932. PMID: 16476868.

Primary Citations (39)

Arvidsson E, Viguerie N, Andersson I, Verdich C, Langin D, Arner P. Effects of different hypocaloric diets on protein secretion from adipose tissue of obese women. *Diabetes.* 2004 Aug; 53(8): 1, 966-1.971. PMID: 15277374.

Benassi-Evans B, Clifton PM, Noakes M, Keogh JB, Fenech M. High protein-high red meat versus high carbohydrate weight loss diets do not differ in effect on genome stability and cell death in lymphocytes of overweight men. *Mutagenesis.* 2009 May; 24(3): 271-277. Epub 2009 Mar 5. PMID: 19264840.

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Bopp MJ, Houston DK, Lenchik L, Easter L, Kritchevsky SB, Nicklas BJ. Lean mass loss is associated with low protein intake during dietary-induced weight loss in postmenopausal women. *J Am Diet Assoc.* 2008 Jul; 108(7): 1, 216-1, 220. PMID: 18589032.

Buscemi S, Verga S, Tranchina MR, Cottone S, Cerasola G. Effects of hypocaloric very-low-carbohydrate diet vs. Mediterranean diet on endothelial function in obese women*. *Eur J Clin Invest.* 2009 May; 39(5): 339-347. PMID: 19302563

Capel F, Viguerie N, Vega N, Dejean S, Arner P, Klimcakova E, Martinez JA, Saris WH, Holst C, Taylor M, Oppert JM, Sørensen TI, Clément K, Vidal H, Langin D. Contribution of energy restriction and macronutrient composition to changes in adipose tissue gene expression during dietary weight-loss programs in obese women. *J Clin Endocrinol Metab.* 2008 Nov; 93(11): 4, 315-4, 322. Epub 2008 Sep 9. PMID: 18782868.

Dale KS, McAuley KA, Taylor RW, Williams SM, Farmer VL, Hansen P, Vorgers SM, Chisholm AW, Mann JI. Determining optimal approaches for weight maintenance: A randomized controlled trial. *CMAJ.* 2009 May 12;180(10):E39-46. PMID: 19433812; PMCID: PMC2679823.

de Luis DA, Sagrado MG, Conde R, Aller R, Izaola O. The effects of two different hypocaloric diets on glucagon-like peptide 1 in obese adults, relation with insulin response after weight loss. *J Diabetes Complications.* 2009 Jul-Aug; 23(4): 239-243. Epub 2008 Apr 16. PMID: 18413175

Due A, Larsen TM, Mu H, Hermansen K, Stender S, Astrup A. Comparison of three ad libitum diets for weight-loss maintenance, risk of cardiovascular disease, and diabetes: A six-month randomized, controlled trial. *Am J Clin Nutr.* 2008 Nov; 88(5): 1, 232-1, 241. PMID: 18996857.

Frisch S, Zittermann A, Berthold HK, Götting C, Kuhn J, Kleesiek K, Stehle P, Körtke H. A randomized controlled trial on the efficacy of carbohydrate-reduced or fat-reduced diets in patients attending a telemedically guided weight loss program. *Cardiovasc Diabetol.* 2009 Jul 18; 8: 36. PMID: 19615091; PMCID: PMC2722581.

Gordon MM, Bopp MJ, Easter L, Miller GD, Lyles MF, Houston DK, Nicklas BJ, Kritchevsky SB. Effects of dietary protein on the composition of weight loss in post-menopausal women. *J Nutr Health Aging.* 2008 Oct; 12(8): 505-509. PMID: 18810296.

Halton TL, Willett WC, Liu S, Manson JE, Albert CM, Rexrode K, Hu FB. Low-carbohydrate-diet score and the risk of coronary heart disease in women. *N Engl J Med.* 2006 Nov 9; 355(19): 1, 991-2, 002. PMID: 17093250

Halton TL, Liu S, Manson JE, Hu FB. Low-carbohydrate-diet score and risk of type 2 diabetes in women. *Am J Clin Nutr.* 2008 Feb; 87(2): 339-346. PMID: 18258623.

Halyburton AK, Brinkworth GD, Wilson CJ, Noakes M, Buckley JD, Keogh JB, Clifton PM. Low- and high-carbohydrate weight-loss diets have similar effects on mood but not cognitive performance. *Am J Clin Nutr.* 2007 Sep; 86(3): 580-587. PMID: 17823420.

Jenkins DJ, Wong JM, Kendall CW, Esfahani A, Ng VW, Leong TC, Faulkner DA, Vidgen E, Greaves KA, Paul G, Singer W. The effect of a plant-based low-carbohydrate ("Eco-Atkins") diet on body weight and blood lipid concentrations in hyperlipidemic subjects. *Arch Intern Med.* 2009 Jun 8; 169(11): 1, 046-1, 054. PMID: 19506174.

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Johnston CS, Tjonn SL, Swan PD, White A, Hutchins H, Sears B. Ketogenic low-carbohydrate diets have no metabolic advantage over nonketogenic low-carbohydrate diets. *Am J Clin Nutr.* 2006 May; 83(5): 1, 055-1, 061. PMID: 16685046.

Johnstone AM, Horgan GW, Murison SD, Bremner DM, Lobley GE. Effects of a high-protein ketogenic diet on hunger, appetite, and weight loss in obese men feeding ad libitum. *Am J Clin Nutr.* 2008 Jan; 87(1): 44-55. PMID: 18175736.

Keogh JB, Brinkworth GD, Noakes M, Belobrajdic DP, Buckley JD, Clifton PM. Effects of weight loss from a very-low-carbohydrate diet on endothelial function and markers of cardiovascular disease risk in subjects with abdominal obesity. Am J Clin Nutr. 2008 Mar; 87(3): 567-576. PMID: 18326593.

Lagiou P, Sandin S, Weiderpass E, Lagiou A, Mucci L, Trichopoulos D, Adami HO. Low carbohydrate-high protein diet and mortality in a cohort of Swedish women. *J Intern Med.* 2007 Apr; 261(4): 366-374. PMID: 17391111.

Leidy HJ, Carnell NS, Mattes RD, Campbell WW. Higher protein intake preserves lean mass and satiety with weight loss in pre-obese and obese women. *Obesity (Silver Spring).* 2007 Feb; 15(2): 421-429. PMID: 17299116.

Lim SS, Noakes M, Keogh JB, Clifton PM. Long-term effects of a low carbohydrate, low fat or high unsaturated fat diet compared to a no-intervention control. *Nutr Metab Cardiovasc Dis.* 2009 Aug 17. [Epub ahead of print] PMID: 19692216.

López-Fontana CM, Sánchez-Villegas A, Martínez-Gonzalez MA, Martinez JA. Daily physical activity and macronutrient distribution of low-calorie diets jointly affect body fat reduction in obese women. *Appl Physiol Nutr Metab.* 2009 Aug; 34(4): 595-602. PMID: 19767793

Mahon AK, Flynn MG, Stewart LK, McFarlin BK, Iglay HB, Mattes RD, Lyle RM, Considine RV, Campbell WW. Protein intake during energy restriction: Effects on body composition and markers of metabolic and cardiovascular health in postmenopausal women. *J Am Coll Nutr.* 2007 Apr; 26(2): 182-189. PMID: 17536130; PMCID: PMC2556253.

McAuley KA, Hopkins CM, Smith KJ, McLay RT, Williams SM, Taylor RW, Mann JI. Comparison of high-fat and high-protein diets with a high-carbohydrate diet in insulin-resistant obese women. *Diabetologia.* 2005 Jan; 48(1): 8-16. Epub 2004 Dec 23. Erratum in: *Diabetologia.* 2005 May; 48(5): 1, 033. PMID: 15616799.

McLaughlin T, Carter S, Lamendola C, Abbasi F, Yee G, Schaaf P, Basina M, Reaven G. Effects of moderate variations in macronutrient composition on weight loss and reduction in cardiovascular disease risk in obese, insulin-resistant adults. *Am J Clin Nutr.* 2006 Oct; 84(4): 813-821. PMID: 17023708.

McMillan-Price J, Petocz P, Atkinson F, O'neill K, Samman S, Steinbeck K, Caterson I, Brand-Miller J. Comparison of four diets of varying glycemic load on weight loss and cardiovascular risk reduction in overweight and obese young adults: A randomized controlled trial. *Arch Intern Med.* 2006 Jul 24; 166(14): 1, 466-1, 475. PMID: 16864756.

Miller LE, Volpe JJ, Coleman-Kelly MD, Gwazdauskas FC, Nickols-Richardson SM. Anthropometric and leptin changes in women following different dietary approaches to weight loss. *Obesity (Silver Spring).* 2009 Jan; 17(1): 199-201. Epub 2008 Nov 6. PMID: 18997680.

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Nickols-Richardson SM, Coleman MD, Volpe JJ, Hosig KW. Perceived hunger is lower and weight loss is greater in overweight premenopausal women consuming a low-carbohydrate/high-protein vs. high-carbohydrate/low-fat diet. *J Am Diet Assoc.* 2005 Sep; 105(9): 1, 433-1, 437. PMID: 16129086.

Noakes M, Foster PR, Keogh JB, James AP, Mamo JC, Clifton PM. Comparison of isocaloric very low carbohydrate/high saturated fat and high carbohydrate/low saturated fat diets on body composition and cardiovascular risk. *Nutr Metab (Lond).* 2006 Jan 11; 3: 7. PMID: 16403234

Phelan S, Wyatt H, Nassery S, Dibello J, Fava JL, Hill JO, Wing RR. Three-year weight change in successful weight losers who lost weight on a low-carbohydrate diet. *Obesity (Silver Spring).* 2007 Oct; 15(10): 2, 470-2, 477. PMID: 17925473.

Rankin JW, Turpyn AD. Low carbohydrate, high fat diet increases C-reactive protein during weight loss. *J Am Coll Nutr.* 2007 Apr; 26(2): 163-169. PMID: 17536128.

Sacks FM, Bray GA, Carey VJ, Smith SR, Ryan DH, Anton SD, McManus K, Champagne CM, Bishop LM, Laranjo N, Leboff MS, Rood JC, de Jonge L, Greenway FL, Loria CM, Obarzanek E, Williamson DA. Comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates. *N Engl J Med.* 2009 Feb 26; 360(9): 859-873. PMID: 19246357.

Shai I, Schwarzfuchs D, Henkin Y, Shahar DR, Witkow S, Greenberg I, Golan R, Fraser D, Bolotin A, Vardi H, Tangi-Rozental O, Zuk-Ramot R, Sarusi B, Brickner D, Schwartz Z, Sheiner E, Marko R, Katorza E, Thiery J, Fiedler GM, Blüher M, Stumvoll M, Stampfer MJ; Dietary Intervention Randomized Controlled Trial (DIRECT) Group. Weight loss with a low-carbohydrate, Mediterranean, or low-fat diet. *N Engl J Med.* 2008 Jul 17; 359(3): 229-241. PMID: 18635428.

Tay J, Brinkworth GD, Noakes M, Keogh J, Clifton PM. Metabolic effects of weight loss on a very-low-carbohydrate diet compared with an isocaloric high-carbohydrate diet in abdominally obese subjects. *J Am Coll Cardiol.* 2008 Jan 1; 51(1): 59-67. PMID: 18174038.

Trichopoulou A, Psaltopoulou T, Orfanos P, Hsieh CC, Trichopoulos D. Low-carbohydrate-high-protein diet and long-term survival in a general population cohort. *Eur J Clin Nutr.* 2007 May; 61(5): 575-581. Epub 2006 Nov 29. PMID: 17136037.

Viguerie N, Vidal H, Arner P, Holst C, Verdich C, Avizou S, Astrup A, Saris WH, Macdonald IA, Klimcakova E, Clément K, Martinez A, Hoffstedt J, Sørensen TI, Langin D; Nutrient-Gene Interactions in Human Obesity--Implications for Dietary Guideline (NUGENOB) project. Adipose tissue gene expression in obese subjects during low-fat and high-fat hypocaloric diets. *Diabetologia.* 2005 Jan; 48(1): 123-131. Epub 2004 Dec 29. PMID: 15624093.

Volek JS, Phinney SD, Forsythe CE, Quann EE, Wood RJ, Puglisi MJ, Kraemer WJ, Bibus DM, Fernandez ML, Feinman RD. Carbohydrate restriction has a more favorable impact on the metabolic syndrome than a low-fat diet. *Lipids.* 2009 Apr; 44(4): 297-309. Epub 2008 Dec 12. PMID: 19082851.

Wal JS, McBurney MI, Moellering N, Marth J, Dhurandhar NV. Moderate-carbohydrate low-fat versus low-carbohydrate high-fat meal replacements for weight loss. *Int J Food Sci Nutr.* 2007 Jun; 58(4): 321-329. PMID: 17566894.

Westerterp-Plantenga MS, Lejeune MP, Nijs I, van Ooijen M, Kovacs EM. High protein

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intake sustains weight maintenance after body weight loss in humans. *Int J Obes Relat Metab Disord.* 2004 Jan; 28(1): 57-64.PMID: 14710168.

White AM, Johnston CS, Swan PD, Tjonn SL, Sears B. Blood ketones are directly related to fatigue and perceived effort during exercise in overweight adults adhering to low-carbohydrate diets for weight loss: A pilot study. *J Am Diet Assoc.* 2007 Oct; 107(10): 1, 792-1, 796. PMID: 17904939.

QUESTION 1

Systematic Reviews/Meta-Analyses (5)

Avenell A, Brown TJ, McGee MA, Campbell MK, Grant AM, Broom J, Jung RT, Smith WC. What are the long-term benefits of weight reducing diets in adults? A systematic review of randomized controlled trials. *J Hum Nutr Diet.* 2004 Aug; 17(4): 317-335. Review. PMID: 15250842.

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Primary Citations (31)

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McAuley KA, Hopkins CM, Smith KJ, McLay RT, Williams SM, Taylor RW, Mann JI. Comparison of high-fat and high-protein diets with a high-carbohydrate diet in insulin-resistant obese women. Diabe*tologia.* 2005 Jan; 48(1): 8-16. Epub 2004 Dec 23. Erratum in: *Diabetologia.* 2005 May; 48(5): 1, 033. PMID: 15616799.

McLaughlin T, Carter S, Lamendola C, Abbasi F, Yee G, Schaaf P, Basina M, Reaven G. Effects of moderate variations in macronutrient composition on weight loss and reduction in cardiovascular disease risk in obese, insulin-resistant adults. *Am J Clin Nutr.* 2006 Oct; 84(4): 813-821. PMID: 17023708.

McMillan-Price J, Petocz P, Atkinson F, O'neill K, Samman S, Steinbeck K, Caterson I, Brand-Miller J. Comparison of four diets of varying glycemic load on weight loss and cardiovascular risk reduction in overweight and obese young adults: A randomized controlled trial. *Arch Intern Med.* 2006 Jul 24; 166(14): 1, 466-1, 475. PMID: 16864756.

Miller LE, Volpe JJ, Coleman-Kelly MD, Gwazdauskas FC, Nickols-Richardson SM. Anthropometric and leptin changes in women following different dietary approaches to weight loss. *Obesity (Silver Spring).* 2009 Jan; 17(1): 199-201. Epub 2008 Nov 6. PMID: 18997680.

Nickols-Richardson SM, Coleman MD, Volpe JJ, Hosig KW. Perceived hunger is lower and weight loss is greater in overweight premenopausal women consuming a low-carbohydrate/high-protein vs high-carbohydrate/low-fat diet. *J Am Diet Assoc.* 2005 Sep; 105(9): 1, 433-1, 437. PMID: 16129086.

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Rankin JW, Turpyn AD. Low carbohydrate, high fat diet increases C-reactive protein during weight loss. *J Am Coll Nutr.* 2007 Apr; 26(2): 163-169. PMID: 17536128.

Sacks FM, Bray GA, Carey VJ, Smith SR, Ryan DH, Anton SD, McManus K, Champagne CM, Bishop LM, Laranjo N, Leboff MS, Rood JC, de Jonge L, Greenway FL, Loria CM, Obarzanek E, Williamson DA. Comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates. *N Engl J Med.* 2009 Feb 26; 360(9): 859-873. PMID: 19246357.

Shai I, Schwarzfuchs D, Henkin Y, Shahar DR, Witkow S, Greenberg I, Golan R, Fraser D, Bolotin A, Vardi H, Tangi-Rozental O, Zuk-Ramot R, Sarusi B, Brickner D, Schwartz Z, Sheiner E, Marko R, Katorza E, Thiery J, Fiedler GM, Blüher M, Stumvoll M, Stampfer MJ; Dietary Intervention Randomized Controlled Trial (DIRECT) Group. Weight loss with a low-carbohydrate, Mediterranean, or low-fat diet. *N Engl J Med.* 2008 Jul 17; 359(3): 229-241. PMID: 18635428.

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Nutrient-Gene Interactions in Human Obesity--Implications for Dietary Guideline (NUGENOB) project. Adipose tissue gene expression in obese subjects during low-fat and high-fat hypocaloric diets. *Diabetologia.* 2005 Jan; 48(1): 123-131. Epub 2004 Dec 29. PMID: 15624093.

Volek JS, Phinney SD, Forsythe CE, Quann EE, Wood RJ, Puglisi MJ, Kraemer WJ, Bibus DM, Fernandez ML, Feinman RD. Carbohydrate restriction has a more favorable impact on the metabolic syndrome than a low fat diet. *Lipids.* 2009 Apr; 44(4): 297-309. Epub 2008 Dec 12. PMID: 19082851.

Wal JS, McBurney MI, Moellering N, Marth J, Dhurandhar NV. Moderate-carbohydrate low-fat versus low-carbohydrate high-fat meal replacements for weight loss. *Int J Food Sci Nutr.* 2007 Jun; 58(4): 321-329. PMID: 17566894.

White AM, Johnston CS, Swan PD, Tjonn SL, Sears B. Blood ketones are directly related to fatigue and perceived effort during exercise in overweight adults adhering to low-carbohydrate diets for weight loss: A pilot study. *J Am Diet Assoc.* 2007 Oct; 107(10): 1, 792-1, 796. PMID: 17904939.

QUESTION 2

Systematic Reviews/Meta-Analyses (2)

Hession M, Rolland C, Kulkarni U, Wise A, Broom J. Systematic review of randomized controlled trials of low-carbohydrate vs. low-fat/low-calorie diets in the management of obesity and its comorbidities. *Obes Rev.* 2009 Jan; 10(1): 36-50. Epub 2008 Aug 11. Review. PMID: 18700873.

Nordmann AJ, Nordmann A, Briel M, Keller U, Yancy WS Jr, Brehm BJ, Bucher HC. Effects of low-carbohydrate vs. low-fat diets on weight loss and cardiovascular risk factors: A meta-analysis of randomized controlled trials. *Arch Intern Med.* 2006 Feb 13; 166(3): 285-293. Review. Erratum in: *Arch Intern Med.* 2006 Apr 24; 166(8): 932. PMID: 16476868.

Primary Citations (10)

Benassi-Evans B, Clifton PM, Noakes M, Keogh JB, Fenech M. High protein-high red meat versus high carbohydrate weight loss diets do not differ in effect on genome stability and cell death in lymphocytes of overweight men. *Mutagenesis.* 2009 May; 24(3): 271-277. Epub 2009 Mar 5. PMID: 19264840.

Dale KS, McAuley KA, Taylor RW, Williams SM, Farmer VL, Hansen P, Vorgers SM, Chisholm AW, Mann JI. Determining optimal approaches for weight maintenance: A randomized controlled trial. *CMAJ.* 2009 May 12; 180(10): E39-E46. PMID: 19433812; PMCID: PMC2679823.

Due A, Larsen TM, Mu H, Hermansen K, Stender S, Astrup A. Comparison of three ad libitum diets for weight-loss maintenance, risk of cardiovascular disease, and diabetes: a six-month randomized, controlled trial. *Am J Clin Nutr.* 2008 Nov; 88(5): 1, 232-1, 241. PMID: 18996857.

Frisch S, Zittermann A, Berthold HK, Götting C, Kuhn J, Kleesiek K, Stehle P, Körtke H. A randomized controlled trial on the efficacy of carbohydrate-reduced or fat-reduced diets in patients attending a telemedically guided weight loss program. *Cardiovasc Diabetol.* 2009 Jul 18; 8: 36. PMID: 19615091; PMCID: PMC2722581.

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Lim SS, Noakes M, Keogh JB, Clifton PM. Long-term effects of a low carbohydrate, low fat or high unsaturated fat diet compared to a no-intervention control. *Nutr Metab Cardiovasc Dis.* 2009 Aug 17. [Epub ahead of print] PMID: 19692216.

McAuley KA, Hopkins CM, Smith KJ, McLay RT, Williams SM, Taylor RW, Mann JI. Comparison of high-fat and high-protein diets with a high-carbohydrate diet in insulin-resistant obese women. *Diabetologia.* 2005 Jan; 48(1): 8-16. Epub 2004 Dec 23. Erratum in: *Diabetologia.* 2005 May; 48(5): 1, 033. PMID: 15616799.

Noakes M, Foster PR, Keogh JB, James AP, Mamo JC, Clifton PM. Comparison of isocaloric very low carbohydrate/high saturated fat and high carbohydrate/low saturated fat diets on body composition and cardiovascular risk. *Nutr Metab (Lond).* 2006 Jan 11; 3: 7. PMID: 16403234.

Phelan S, Wyatt H, Nassery S, Dibello J, Fava JL, Hill JO, Wing RR. Three-year weight change in successful weight losers who lost weight on a low-carbohydrate diet. *Obesity (Silver Spring).* 2007 Oct; 15(10): 2, 470-2, 477. PMID: 17925473.

Sacks FM, Bray GA, Carey VJ, Smith SR, Ryan DH, Anton SD, McManus K, Champagne CM, Bishop LM, Laranjo N, Leboff MS, Rood JC, de Jonge L, Greenway FL, Loria CM, Obarzanek E, Williamson DA. Comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates. *N Engl J Med.* 2009 Feb 26; 360(9): 859-873. PMID: 19246357.

Westerterp-Plantenga MS, Lejeune MP, Nijs I, van Ooijen M, Kovacs EM. High protein intake sustains weight maintenance after body weight loss in humans. *Int J Obes Relat Metab Disord.* 2004 Jan; 28(1): 57-64. PMID: 14710168

QUESTION 3

Systematic Reviews/Meta-Analyses (3)

Avenell A, Brown TJ, McGee MA, Campbell MK, Grant AM, Broom J, Jung RT, Smith WC. What are the long-term benefits of weight reducing diets in adults? A systematic review of randomized controlled trials. *J Hum Nutr Diet.* 2004 Aug; 17(4): 317-335. Review. PMID: 15250842.

Hession M, Rolland C, Kulkarni U, Wise A, Broom J. Systematic review of randomized controlled trials of low-carbohydrate vs. low-fat/low-calorie diets in the management of obesity and its comorbidities. Ob*es Rev.* 2009 Jan; 10(1): 36-50. Epub 2008 Aug 11. Review. PMID: 18700873.

Nordmann AJ, Nordmann A, Briel M, Keller U, Yancy WS Jr, Brehm BJ, Bucher HC. Effects of low-carbohydrate vs. low-fat diets on weight loss and cardiovascular risk factors: A meta-analysis of randomized controlled trials. *Arch Intern Med.* 2006 Feb 13; 166(3): 285-293. Review. Erratum in: *Arch Intern Med.* 2006 Apr 24; 166(8): 932. PMID: 16476868.

Primary Citations (12)

Dale KS, McAuley KA, Taylor RW, Williams SM, Farmer VL, Hansen P, Vorgers SM, Chisholm AW, Mann JI. Determining optimal approaches for weight maintenance: a randomized controlled trial. *CMAJ.* 2009 May 12; 180(10): E39-E46. PMID: 19433812; PMCID: PMC2679823.

Due A, Larsen TM, Mu H, Hermansen K, Stender S, Astrup A. Comparison of three ad

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libitum diets for weight-loss maintenance, risk of cardiovascular disease, and diabetes: A six-month randomized, controlled trial. *Am J Clin Nutr.* 2008 Nov; 88(5): 1, 232-1, 241. PMID: 18996857.

Frisch S, Zittermann A, Berthold HK, Götting C, Kuhn J, Kleesiek K, Stehle P, Körtke H. A randomized controlled trial on the efficacy of carbohydrate-reduced or fat-reduced diets in patients attending a telemedically guided weight loss program. *Cardiovasc Diabetol.* 2009 Jul 18; 8: 36. PMID: 19615091; PMCID: PMC2722581.

Halton TL, Willett WC, Liu S, Manson JE, Albert CM, Rexrode K, Hu FB. Low-carbohydrate-diet score and the risk of coronary heart disease in women. *N Engl J Med.* 2006 Nov 9; 355(19): 1, 991-2, 002. PMID: 17093250.

Halton TL, Liu S, Manson JE, Hu FB. Low-carbohydrate-diet score and risk of type 2 diabetes in women. *Am J Clin Nutr.* 2008 Feb; 87(2): 339-346. PMID: 18258623.

Lagiou P, Sandin S, Weiderpass E, Lagiou A, Mucci L, Trichopoulos D, Adami HO. Low carbohydrate-high protein diet and mortality in a cohort of Swedish women. *J Intern Med.* 2007 Apr; 261(4): 366-374. PMID: 17391111.

Lim SS, Noakes M, Keogh JB, Clifton PM. Long-term effects of a low carbohydrate, low fat or high unsaturated fat diet compared to a no-intervention control. *Nutr Metab Cardiovasc Dis.* 2009 Aug 17. [Epub ahead of print] PMID: 19692216.

McAuley KA, Hopkins CM, Smith KJ, McLay RT, Williams SM, Taylor RW, Mann JI. Comparison of high-fat and high-protein diets with a high-carbohydrate diet in insulin-resistant obese women. *Diabetologia.* 2005 Jan ;48(1): 8-16. Epub 2004 Dec 23. Erratum in: *Diabetologia.* 2005 May; 48(5): 1, 033. PMID: 15616799.

Sacks FM, Bray GA, Carey VJ, Smith SR, Ryan DH, Anton SD, McManus K, Champagne CM, Bishop LM, Laranjo N, Leboff MS, Rood JC, de Jonge L, Greenway FL, Loria CM, Obarzanek E, Williamson DA. Comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates. *N Engl J Med.* 2009 Feb 26; 360(9): 859-873. PMID: 19246357.

Shai I, Schwarzfuchs D, Henkin Y, Shahar DR, Witkow S, Greenberg I, Golan R, Fraser D, Bolotin A, Vardi H, Tangi-Rozental O, Zuk-Ramot R, Sarusi B, Brickner D, Schwartz Z, Sheiner E, Marko R, Katorza E, Thiery J, Fiedler GM, Blüher M, Stumvoll M, Stampfer MJ; Dietary Intervention Randomized Controlled Trial (DIRECT) Group. Weight loss with a low-carbohydrate, Mediterranean, or low-fat diet. *N Engl J Med.* 2008 Jul 17; 359(3): 229-241. PMID: 18635428.

Tay J, Brinkworth GD, Noakes M, Keogh J, Clifton PM. Metabolic effects of weight loss on a very-low-carbohydrate diet compared with an isocaloric high-carbohydrate diet in abdominally obese subjects. *J Am Coll Cardiol.* 2008 Jan 1; 51(1): 59-67. PMID: 18174038.

Trichopoulou A, Psaltopoulou T, Orfanos P, Hsieh CC, Trichopoulos D. Low-carbohydrate-high-protein diet and long-term survival in a general population cohort. *Eur J Clin Nutr.* 2007 May; 61(5): 575-581. Epub 2006 Nov 29. PMID: 17136037.

QUESTION 4

Primary Citations (4)

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Benassi-Evans B, Clifton PM, Noakes M, Keogh JB, Fenech M. High protein-high red meat versus high carbohydrate weight loss diets do not differ in effect on genome stability and cell death in lymphocytes of overweight men. *Mutagenesis.* 2009 May; 24(3): 271-277. Epub 2009 Mar 5. PMID: 19264840.

Lim SS, Noakes M, Keogh JB, Clifton PM. Long-term effects of a low carbohydrate, low fat or high unsaturated fat diet compared to a no-intervention control. *Nutr Metab Cardiovasc Dis.* 2009 Aug 17. [Epub ahead of print] PMID: 19692216.

Tay J, Brinkworth GD, Noakes M, Keogh J, Clifton PM. Metabolic effects of weight loss on a very-low-carbohydrate diet compared with an isocaloric high-carbohydrate diet in abdominally obese subjects. *J Am Coll Cardiol.* 2008 Jan 1; 51(1): 59-67. PMID: 18174038.

Trichopoulou A, Psaltopoulou T, Orfanos P, Hsieh CC, Trichopoulos D. Low-carbohydrate-high-protein diet and long-term survival in a general population cohort. *Eur J Clin Nutr.* 2007 May; 61(5): 575-581. Epub 2006 Nov 29. PMID: 17136037.

List of Excluded Articles with Reason

Article (A-G)	Reason for Exclusion
Abete I, Parra D, Martinez JA. Energy-restricted diets based on a distinct food selection affecting the glycemic index induce different weight loss and oxidative response. *Clin Nutr.* 2008 Aug; 27(4): 545-551. Epub 2008 Mar 4. PMID: 18308431.	Does not answer question; examined relationship between glycemic index and weight.
Abete I, Parra D, Martinez JA. Legume-, fish-, or high-protein-based hypocaloric diets: Effects on weight loss and mitochondrial oxidation in obese men. *J Med Food.* 2009 Feb; 12(1): 100-108. PMID: 19298202.	Sample size less than inclusion criteria.
Advani A, Taylor R. Life-threatening hypokalaemia on a low-carbohydrate diet associated with previously undiagnosed primary hyperaldosteronism [corrected]. *Diabet Med.* 2005 Nov; 22(11): 1, 605-1, 607. Erratum in: *Diabet Med.* 2005 Dec; 22(12): 1, 785. PMID: 16241928.	Sample size less than inclusion criteria.
Ahluwalia N, Ferrières J, Dallongeville J, Simon C, Ducimetière P, Amouyel P, Arveiler D, Ruidavets JB. Association of macronutrient intake patterns with being overweight in a population-based random sample of men in France. *Diabetes Metab.* 2009 Apr; 35(2): 129-136. Epub 2009 Feb 28. PMID: 19251447.	Study design is cross-sectional.

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Alissa EM, Bahijri SM, Ferns GA. Dietary macronutrient intake of Saudi males and its relationship to classical coronary risk factors. *Saudi Med J.* 2005 Feb; 26(2): 201-207. PMID: 15770291.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Alnasir FA, Fateha BE. Low carbohydrate diet. Its effects on selected body parameters of obese patients. *Saudi Med J.* 2003 Sep; 24(9): 949-952. PMID: 12973475.	Does not include a comparison of diets differing in macronutrient content in analyses.
Arefhosseini SR, Edwards CA, Malkova D, Higgins S. Effect of advice to increase carbohydrate and reduce fat intake on dietary profile and plasma lipid concentrations in healthy postmenopausal women. *Ann Nutr Metab.* 2009; 54(2): 138-144. Epub 2009 Apr 1. PMID: 19339775.	Sample size less than inclusion criteria.
Aston LM, Stokes CS, Jebb SA. No effect of a diet with a reduced glycaemic index on satiety, energy intake and body weight in overweight and obese women. *Int J Obes (Lond).* 2008 Jan; 32(1): 160-165. Epub 2007 Oct 9. PMID: 17923862; PMCID: PMC2699494.	Does not answer question; examined relationship between glycemic index and weight.
Astrup A, Meinert Larsen T, Harper A. Atkins and other low-carbohydrate diets: Hoax or an effective tool for weight loss? Lancet. 2004 Sep 4-10; 364(9, 437): 897-899. Review. PMID: 15351198.	Study is a narrative review.
Aucott LS. Influences of weight loss on long-term diabetes outcomes. *Proc Nutr Soc.* 2008 Feb; 67(1): 54-59. Review. PMID: 18234132.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Backes AC, Abbasi F, Lamendola C, McLaughlin TL, Reaven G, Palaniappan LP. Clinical experience with a relatively low carbohydrate, calorie-restricted diet improves insulin sensitivity and associated metabolic abnormalities in overweight, insulin resistant South Asian Indian women. *Asia Pac J Clin Nutr.* 2008; 17(4): 669-671. PMID: 19114407.	Does not include a comparison of diets differing in macronutrient content in analyses.
Beasley JM, Ange BA, Anderson CA, Miller ER 3rd, Erlinger TP, Holbrook JT Sacks FM, Appel LJ. Associations between macronutrient intake and self-reported appetite and fasting levels of appetite hormones: Results from the Optimal Macronutrient Intake Trial to Prevent Heart Disease. *Am J Epidemiol.* 2009 Apr 1; 169(7): 893-900. Epub 2009 Feb 18. PMID: 19224977.	Does not answer question; examined relationship between macronutrient proportion and appetite and hormone levels.

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Best D, Grainger P. Low-fat or low-carbohydrate diet for cardiovascular health. *Can J Cardiovasc Nurs.* 2007; 17(3): 19-26. Review. PMID: 17941565.	Study is a narrative review.
Blanck HM, Gillespie C, Serdula MK, Khan LK, Galusk DA, Ainsworth BE. Use of low-carbohydrate, high-protein diets among americans: Correlates, duration, and weight loss. *MedGenMed.* 2006 Apr 5; 8(2): 5. PMID: 16926744.	Does not answer question; did not examine relationship between macronutrient proportion and weight; cross-sectional study.
Boden G. High- or low-carbohydrate diets: which is better for weight loss, insulin resistance, and fatty livers?*Gastroenterology.* 2009 May; 136(5): 1, 490-1, 492. Epub 2009 Mar 21. PMID: 19318102; PMCID: PMC2677123.	Study is a comment/editorial.
Boden G, Sargrad K, Homko C, Mozzoli M, Stein TP. Effect of a low-carbohydrate diet on appetite, blood glucose levels, and insulin resistance in obese patients with type 2 diabetes. *Ann Intern Med.* 2005 Mar 15; 142(6): 403-411. PMID: 15767618.	Participants diagnosed with type 2 diabetes.
Bowen J, Noakes M, Clifton PM. A high dairy protein, high-calcium diet minimizes bone turnover in overweight adults during weight loss. *J Nutr.* 2004 Mar; 134(3): 568-573. PMID: 14988448.	Does not answer question; examined relationship between protein intake and bone loss during weight loss.
Brehm BJ, D'Alessio DA. Weight loss and metabolic benefits with diets of varying fat and carbohydrate content: separating the wheat from the chaff. *Nat Clin Pract Endocrinol Metab.* 2008 Mar; 4(3): 140-146. Epub 2008 Jan 29. Review. PMID: 18227817.	Study is a narrative review.
Brinkworth GD, Noakes M, Buckley JD, Keogh JB, Clifton PM. Long-term effects of a very-low-carbohydrate weight loss diet compared with an isocaloric low-fat diet after 12 months. *Am J Clin Nutr.* 2009 Jul; 90(1): 23-32. Epub 2009 May 13. PMID: 19439458.	Dropout rate higher than inclusion criteria.
Brinkworth GD, Noakes M, Clifton PM, Bird AR. Comparative effects of very low-carbohydrate, high-fat and high-carbohydrate, low-fat weight-loss diets on bowel habit and faecal short-chain fatty acids and bacterial populations. *Br J Nutr.* 2009 May; 101(10): 1, 493-1, 502. Epub 2009 Feb 19. PMID: 19224658.	Dropout rate higher than inclusion criteria.

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Brinkworth GD, Noakes M, Keogh JB, Luscombe ND, Wittert GA, Clifton PM. Long-term effects of a high-protein, low-carbohydrate diet on weight control and cardiovascular risk markers in obese hyperinsulinemic subjects. *Int J Obes Relat Metab Disord.* 2004 May; 28(5): 661-670. Erratum in: *Int J Obes Relat Metab Disord.* 2004 Sep; 28(9): 1, 187. PMID: 15007396.	Dropout rate higher than inclusion criteria.
Brinkworth GD, Noakes M, Parker B, Foster P, Clifton PM. Long-term effects of advice to consume a high-protein, low-fat diet, rather than a conventional weight-loss diet, in obese adults with type 2 diabetes: one-year follow-up of a randomised trial. *Diabetologia.* 2004 Oct; 47(10): 1, 677-1, 686. Epub 2004 Oct 6. PMID: 15480538.	Participants diagnosed with type 2 diabetes.
Cardillo S, Seshadri P, Iqbal N. The effects of a low-carbohydrate versus low-fat diet on adipocytokines in severely obese adults: Three-year follow-up of a randomized trial. *Eur Rev Med Pharmacol Sci.* 2006 May-Jun; 10(3): 99-106. PMID: 16875041.	Dropout rate higher than inclusion criteria.
Castan-Laurell I, Vítkova M, Daviaud D, Dray C, Kováciková M, Kovacova Z, Hejnova J, Stich V, Valet P. Effect of hypocaloric diet-induced weight loss in obese women on plasma apelin and adipose tissue expression of apelin and APJ. *Eur J Endocrinol.* 2008 Jun; 158(6): 905-910. Epub 2008 Apr 7. PMID: 18390990; PMCID: PMC2683032.	Does not answer question; examined relationship between hypocaloric diets and weight loss.
Clifton PM, Keogh JB, Noakes M. Long-term effects of a high-protein weight-loss diet. *Am J Clin Nutr.* 2008 Jan; 87(1): 23-29. PMID: 18175733.	Dropout rate higher than inclusion criteria.
Clifton P. The science behind weight loss diets: A brief review. *Aust Fam Physician.* 2006 Aug; 35(8): 580-582. Review. PMID: 16894429.	Study is a narrative review.
Coelho JS, Polivy J, Herman CP. Selective carbohydrate or protein restriction: Effects on subsequent food intake and cravings. *Appetite.* 2006 Nov; 47(3): 352-360. Epub 2006 Jul 17. PMID: 16844265.	Does not answer question; examined relationship between macronutrient proportion and food intake and cravings.
Crujeiras AB, Parra MD, Rodríguez MC, Martínez de Morentin BE, Martínez JA. A role for fruit content in energy-restricted diets in improving antioxidant status in obese women during weight loss. *Nutrition.* 2006 Jun; 22(6): 593-599. PMID: 16704952.	Sample size less than inclusion criteria.

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Culling KS, Neil HA, Gilbert M, Frayn KN. Effects of short-term low- and high-carbohydrate diets on postprandial metabolism in non-diabetic and diabetic subjects. *Nutr Metab Cardiovasc Dis.* 2009 Jun; 19(5): 345-351. Epub 2007 Dec 20. PMID: 18083355,	Sample size less than inclusion criteria.
D'Anci KE, Watts KL, Kanarek RB, Taylor HA. Low-carbohydrate weight-loss diets. Effects on cognition and mood. *Appetite.* 2009 Feb; 52(1): 96-103. Epub 2008 Aug 29. PMID: 18804129.	Sample size less than inclusion criteria.
Dallongeville J, Gruson E, Dallinga-Thie G, Pigeyre M, Gomila S, Romon M. Effect of weight loss on the postprandial response to high-fat and high-carbohydrate meals in obese women. *Eur J Clin Nutr.* 2007 Jun; 61(6): 711-718. Epub 2007 Jan 17. PMID: 17228347.	Does not answer question; examined relationship between macronutrient proportion and postprandial lipid responses.
Das SK, Gilhooly CH, Golden JK, Pittas AG, Fuss PJ, Cheatham RA, Tyler S, Tsay M, McCrory MA, Lichtenstein AH, Dallal GE, Dutta C, Bhapkar MV, Delany JP, Saltzman E, Roberts SB. Long-term effects of 2 energy-restricted diets differing in glycemic load on dietary adherence, body composition, and metabolism in CALERIE: A one-year randomized controlled trial. *Am J Clin Nutr.* 2007 Apr; 85(4): 1, 023-1, 030. PMID: 17413101.	Does not answer question; examined relationship between glycemic index and weight.
Dashti HM, Al-Zaid NS, Mathew TC, Al-Mousawi M, Talib H, Asfar SK, Behbahani AI. Long-term effects of ketogenic diet in obese subjects with high cholesterol level. *Mol Cell Biochem.* 2006 Jun; 286(1-2): 1-9. Epub 2006 Apr 21. PMID: 16652223.	Does not include a comparison of diets differing in macronutrient content in analyses.
Davis NJ, Cohen HW, Wylie-Rosett J, Stein D. Serum potassium changes with initiating low-carbohydrate compared to a low-fat weight loss diet in type 2 diabetes. *South Med J.* 2008 Jan; 101(1): 46-49. PMID: 18176291.	Participant diagnosed with type 2 diabetes.
Davis NJ, Tomuta N, Schechter C, Isasi CR, Segal-Isaacson CJ, Stein D, Zonszein J, Wylie-Rosett J. Comparative study of the effects of a one-year dietary intervention of a low-carbohydrate diet versus a low-fat diet on weight and glycemic control in type 2 diabetes. *Diabetes Care.* 2009 Jul; 32(7): 1, 147-1, 152. Epub 2009 Apr 14. PMID: 19366978.	Participant diagnosed with type 2 diabetes mellitus.

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de Luis DA, Aller R, Izaola O, Gonzalez Sagrado M, Conde R. Differences in glycaemic status do not predict weight loss in response to hypocaloric diets in obese patients. *Clin Nutr.* 2006 Feb; 25(1): 117-122. Epub 2005 Nov 8. PMID: 16278036.	Does not answer question; examined relationship between hypocaloric diets and weight loss.
De Peter V, Cloetens L, Rutgeerts P, Verbeke K. Influence of resistant starch alone or combined with wheat bran on gastric emptying and protein digestion in healthy volunteers. *Scand J Gastroenterol.* 2007 Oct; 42(10): 1, 187-1, 193. PMID:17852844.	Does not answer question; examined relationship between resistant starch and gastric emptying and protein digestion.
Demling RH, DeSanti L. Effect of a hypocaloric diet, increased protein intake and resistance training on lean mass gains and fat mass loss in overweight police officers. *Ann Nutr Metab.* 2000; 44(1): 21-29. PMID: 10838463.	Does not include a comparison of diets differing in macronutrient content in analyses.
Demol S, Yackobovitch-Gavan M, Shalitin S, Nagelberg N, Gillon-Keren M, Phillip M. Low-carbohydrate (low and high-fat) versus high-carbohydrate low-fat diets in the treatment of obesity in adolescents. *Acta Paediatr.* 2009 Feb; 98(2): 346-351. Epub 2008 Sep 29. PMID: 18826492.	Subjects are under 18 years of age.
Dick JJ. Weight loss interventions for adult obesity: Evidence for practice. *Worldviews Evid Based Nurs.* 2004 ;1(4): 209-214. Review. PMID: 17166150.	Study is a narrative review.
Douketis JD, Macie C, Thabane L, Williamson DF. Systematic review of long-term weight loss studies in obese adults: Clinical significance and applicability to clinical practice. *Int J Obes (Lond).* 2005 Oct; 29(10): 1, 153-1, 167. Review. PMID: 15997250.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Drummond S, Dixon K, Griffin J, De Looy A. Weight loss on an energy-restricted, low-fat, sugar-containing diet in overweight sedentary men. *Int J Food Sci Nutr.* 2004 Jun; 55(4): 279-290. PMID: 15369982.	Dropout rate higher than inclusion criteria.
Due A, Toubro S, Stender S, Skov AR, Astrup A. The effect of diets high in protein or carbohydrate on inflammatory markers in overweight subjects. *Diabetes Obes Metab.* 2005 May; 7(3): 223-229. PMID: 15811138.	Does not answer question; examined relationship between macronutrient proportion and inflammatory markers.
Dyson PA. A review of low and reduced carbohydrate diets and weight loss in type 2 diabetes. *J Hum Nutr Diet.* 2008 Dec; 21(6): 530-538. Epub 2008 Aug 27. Review. PMID: 18759958.	Participants diagnosed with type 2 diabetes.

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Dyson PA, Beatty S, Matthews DR. A low-carbohydrate diet is more effective in reducing body weight than healthy eating in both diabetic and non-diabetic subjects. *Diabet Med.* 2007 Dec; 24(12): 1, 430-1, 435. Epub 2007 Oct 29. PMID: 17971178.	Sample size less than inclusion criteria.
Eckel RH, Hernandez TL, Bell ML, Weil KM, Shepard TY, Grunwald GK, Sharp A, Francis CC, Hill JO. Carbohydrate balance predicts weight and fat gain in adults. *Am J Clin Nutr.* 2006 Apr; 83(4): 803-808. PMID: 16600931.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Erdem G, Ercin CN, Dogru T, Tasci I, Sonmez A. Re: Effect of a hypocaloric diet on serum visfatin in obese non-diabetic patients. *Nutrition.* 2009 Feb; 25(2): 240. Epub 2008 Oct 23. PMID: 18947975.	Study is a letter.
Evangelista LS, Heber D, Li Z, Bowerman S, Hamilton MA, Fonarow GC. Reduced body weight and adiposity with a high-protein diet improves functional status, lipid profiles, glycemic control, and quality of life in patients with heart failure: a feasibility study. *J Cardiovasc Nurs.* 2009 May-Jun; 24(3): 207-215. PMID: 19390338.	Participants diagnosed with type 2 diabetes and heart failure.
Feinman RD, Volek JS. Carbohydrate restriction as the default treatment for type 2 diabetes and metabolic syndrome. *Scand Cardiovasc J.* 2008 Aug; 42(4): 256-263. Review. PMID: 18609058.	Study is a narrative review.
Fletcher ES, Rugg-Gunn AJ, Matthews JN, Hackett A, Moynihan PJ, Mathers JC, Adamson AJ. Changes over 20 years in macronutrient intake and body mass index in 11- to 12-year-old adolescents living in Northumberland. *Br J Nutr.* 2004 Aug; 92(2): 321-33. PMID: 15333164.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Fletcher ES, Rugg-Gunn AJ, Matthews JN, Hackett A, Moynihan PJ, Mathers JC, Adamson AJ. Changes over 20 years in macronutrient intake and body mass index in 11- to 12-year-old adolescents living in Northumberland. *Br J Nutr.* 2004 Aug; 92(2): 321-333. PMID: 15333164.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Fontana L, Villareal DT, Weiss EP, Racette SB, Steger-May K, Klein S, Holloszy JO; and the Washington University School of Medicine CALERIE Group. Calorie restriction or exercise: Effects on coronary heart disease risk factors. A randomized, controlled trial. *Am J Physiol Endocrinol Metab.* 2007 Jul; 293(1): E197-E202. Epub 2007 Mar 27. PMID: 17389710.	Does not answer question; did not examine relationship between macronutrient proportion and weight.

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Fontana L, Weiss EP, Villareal DT, Klein S, Holloszy JO. Long-term effects of calorie or protein restriction on serum IGF-1 and IGFBP-3 concentration in humans. *Aging Cell.* 2008 Oct; 7(5): 681-687. PMID: 18843793; PMCID: PMC2673798.	Sample size less than inclusion criteria.
Franz MJ, VanWormer JJ, Crain AL, Boucher JL, Histon T, Caplan W, Bowman JD, Pronk NP. Weight-loss outcomes: A systematic review and meta-analysis of weight-loss clinical trials with a minimum one-year follow-up. *J Am Diet Assoc.* 2007 Oct; 107(10): 1, 755-1, 767. Review. PMID: 17904936.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Furlow EA, Anderson JW. A systematic review of targeted outcomes associated with a medically supervised commercial weight-loss program. *J Am Diet Assoc.* 2009 Aug; 109(8): 1, 417-1, 421. Review. PMID: 19631049.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Gardner CD, Kiazand A, Alhassan S, Kim S, Stafford RS, Balise RR, Kraemer HC, King AC. Comparison of the Atkins, Zone, Ornish, and LEARN diets for change in weight and related risk factors among overweight premenopausal women: The A TO Z Weight Loss Study: A randomized trial. *JAMA.* 2007 Mar 7; 297(9): 969-977. Erratum in: *JAMA.* 2007 Jul 11; 298(2): 178. PMID: 17341711.	Included in Hession et al, 2009.
Gately PJ, King NA, Greatwood HC, Humphrey LC, Radley D, Cooke CB, Hill AJ. Does a high-protein diet improve weight loss in overweight and obese children? *Obesity (Silver Spring).* 2007 Jun; 15(6): 1, 527-1, 534. PMID: 17557990.	Dropout rate higher than inclusion criteria.
Gibson LJ, Peto J, Warren JM, dos Santos SilvaI. Lack of evidence on diets for obesity for children: A systematic review. *Int J Epidemiol.* 2006 Dec; 35(6): 1, 544-1, 552. Epub 2006 Sep 19. Review. PMID: 16984930	Subjects are under 18 years of age.
Gondoni LA, Titon AM, Nibbio F, Caetani G, Augello G, Mian O, Tuzzi C, Averna E, Parisio C, Liuzzi A. Short-term effects of a hypocaloric diet and a physical activity programme on weight loss and exercise capacity in obese subjects with chronic ischaemic heart disease: A study in everyday practice. *Acta Cardiol.* 2008 Apr; 63(2): 153-159. PMID: 18468193.	Does not include a comparison of diets differing in macronutrient content in analyses.
Greene-Finestone LS, Campbell MK, Evers SE, Gutmanis IA. Adolescents' low-carbohydrate-density diets are related to poorer dietary intakes. *J Am Diet Assoc.* 2005 Nov; 105(11): 1, 783-1, 788. PMID: 16256764.	Subjects are under 18 years of age.

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Günther AL, Buyken AE, Kroke A. Protein intake during the period of complementary feeding and early childhood and the association with body mass index and percentage body fat at 7 years of age. *Am J Clin Nutr.* 2007 Jun; 85(6): 1, 626-1, 633. PMID: 17556702.	Study subjects are under 18 years of age.

Article (H-R)	**Reason for Exclusion**
Hadi S, Jensen GL. Efficacy of a low-carbohydrate diet for short-term weight loss. *Nutr Clin Pract.* 2005 Feb; 20(1): 17-20. Review. PMID: 16207643.	Study is a narrative review.
Harber MP, Schenk S, Barkan AL, Horowitz JF. Effects of dietary carbohydrate restriction with high protein intake on protein metabolism and the somatotropic axis. *J Clin Endocrinol Metab.* 2005 Sep; 90(9): 5, 175-5, 181. Epub 2005 Jun 21. PMID: 15972575.	Sample size less than inclusion criteria.
Hilbig A, Kersting M. Effects of age and time on energy and macronutrient intake in German infants and young children: Results of the DONALD study. *J Pediatr Gastroenterol Nutr.* 2006 Oct; 43(4): 518-524. PMID: 17033529.	Study subjects are under two years of age.
Jensen L, Sloth B, Krog-Mikkelsen I, Flint A, Raben A, Tholstrup T, Brünner N, Astrup A. A low-glycemic-index diet reduces plasma plasminogen activator inhibitor-1 activity, but not tissue inhibitor of proteinases-1 or plasminogen activator inhibitor-1 protein, in overweight women. *Am J Clin Nutr.* 2008 Jan; 87(1): 97-105. PMID: 18175742.	Does not answer question; examined relationship between glycemic index and weight.
Johnston CS, Tjonn SL, Swan PD. High-protein, low-fat diets are effective for weight loss and favorably alter biomarkers in healthy adults. *J Nutr.* 2004 Mar; 134(3): 586-591. PMID: 14988451.	Sample size less than inclusion criteria.
Katcher HI, Legro RS, Kunselman AR, Gillies PJ, Demers LM, Bagshaw DM, Kris-Etherton PM. The effects of a whole grain-enriched hypocaloric diet on cardiovascular disease risk factors inmen and women with metabolic syndrome. *Am J Clin Nutr.* 2008 Jan; 87(1): 79-90. PMID: 18175740.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Keogh JB, Luscombe-Marsh ND, Noakes M, Wittert GA, Clifton PM. Long-term weight maintenance and cardiovascular risk factors are notdifferent following weight loss on carbohydrate-restricted diets high in either monounsaturated fat or protein in obese	Dropout rate higher than inclusion criteria.

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hyperinsulinaemic menand women. *Br J Nutr.* 2007 Feb; 97(2): 405-410. PMID: 17298712.	
Kirk E, Reeds DN, Finck BN, Mayurranjan SM, Patterson BW, Klein S. Dietary fat and carbohydrates differentially alter insulin sensitivity during caloric restriction. *Gastroenterology.* 2009 May; 136(5): 1, 552-1, 560. Epub 2009 Jan 25. Erratum in: *Gastroenterology.* 2009 Jul; 137(1): 393. Mayurranjan, Mitra S [corrected to Mayurranjan S Mitra]. PMID: 19208352; PMCID: PMC2677125.	Does not answer question; examines relationship between macronutrient proportion and insulin sensitivity.
Klein S. Clinical trial experience with fat-restricted vs. carbohydrate-restricted weight-loss diets. *Obes Res.* 2004 Nov; 12 Suppl 2: 141S-144S. Review. PMID: 15601962.	Study is a narrative review.
Kleiner RE, Hutchins AM, Johnston CS, Swan PD. Effects of an eight-week high-protein or high-carbohydrate diet in adults with hyperinsulinemia. *Med Gen Med.* 2006 Nov 22; 8(4): 39. PMID: 17415320; PMCID: PMC1868379.	Sample size less than inclusion criteria.
Kodama S, Saito K, Tanaka S, Maki M, Yachi Y, Sato M, Sugawara A, Totsuka K, Shimano H, Ohashi Y, Yamada N, Sone H. Influence of fat and carbohydrate proportions on the metabolic profile in patients with type 2 diabetes: A meta-analysis. *Diabetes Care.* 2009 May; 32(5): 959-965. PMID: 19407076; PMCID: PMC2671123.	Does not answer question; examines relationship between macronutrient proportion and blood glucose and lipid parameters.
Koppes LL, Boon N, Nooyens AC, van Mechelen W, Saris WH. Macronutrient distribution over a period of 23 years in relation to energy intake and body fatness. *Br J Nutr.* 2009 Jan; 101(1): 108-115. Epub 2008 May 9. PMID: 18466652.	Does not answer question; examines relationship between macronutrient proportion and energy intake and percent body fat.
Kushner RF. Low-carbohydrate diets, con: the mythical phoenix or credible science? *Nutr Clin Pract.* 2005 Feb; 20(1): 13-16. Review. PMID: 16207642.	Study is a narrative review.
Labayen I, Díez N, González A, Parra D, Martínez JA. Effects of protein vs. carbohydrate-rich diets on fuel utilisation in obese women during weight loss. *Forum Nutr.* 2003; 56: 168-170. PMID: 15806847	Sample size less than inclusion criteria
Laferrère B, Teixeira J, McGinty J, Tran H, Egger JR, Colarusso A, Kovack B, Bawa B, Koshy N, Lee H, Yapp K, Olivan B. Effect of weight loss by gastric bypass surgery versus hypocaloric diet on glucose and incretin levels in patients with type 2 diabetes. *J Clin Endocrinol Metab.* 2008 Jul; 93(7): 2, 479-2, 485. Epub 2008 Apr 22. PMID: 18430778; PMCID: PMC2453054.	Participants diagnosed with type 2 diabetes and heart failure.

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Layman DK, Evans EM, Erickson D, Seyler J, Weber J, Bagshaw D, Griel A, Psota T, Kris-Etherton P. A moderate-protein diet produces sustained weight loss and long-term changes in body composition and blood lipids in obese adults. *J Nutr.* 2009 Mar; 139(3): 514-521. Epub 2009 Jan 21. PMID: 19158228.	Dropout rate higher than inclusion criteria.
Lecheminant JD, Gibson CA, Sullivan DK, Hall S, Washburn R, Vernon MC, Curry C, Stewart E, Westman EC, Donnelly JE. Comparison of a low carbohydrate and low fat diet for weight maintenance in overweight or obese adults enrolled in a clinical weight management program. *Nutr J.* 2007 Nov 1; 6: 36. PMID: 17976244; PMCID: PMC2228297.	Dropout rate higher than inclusion criteria.
Lefevre M, Redman LM, Heilbronn LK, Smith JV, Martin CK, Rood JC, Greenway FL, Williamson DA, Smith SR, Ravussin E; Pennington CALERIE team. Caloric restriction alone and with exercise improves CVD risk in healthy non-obese individuals. *Atherosclerosis.* 2009 Mar; 203(1): 206-213. Epub 2008 Jul 7. PMID: 18602635.	Does not include a comparison of diets differing in macronutrient content in analyses.
Levine MJ, Jones JM, Lineback DR. Low-carbohydrate diets: Assessing the science and knowledge gaps, summary of an ILSI North America Workshop. *J Am Diet Assoc.* 2006 Dec; 106(12): 2, 086-2, 094. PMID: 17126641.	Study is a narrative review.
Lofgren I, Zern T, Herron K, West K, Sharman MJ, Volek JS, ShachterNS, Koo SI, Fernandez ML. Weight loss associated with reduced intake of carbohydrate reduces the atherogenicity of LDL in premenopausal women. *Metabolism.* 2005 Sep; 54(9): 1, 133-1, 141. PMID: 16125523.	Does not include a comparison of diets differing in macronutrient content in analyses.
Lofgren IE, Herron KL, West KL, Zern TL, Patalay M, Koo SI, Fernandez ML. Carbohydrate intake is correlated with biomarkers for coronary heart disease in a population of overweight premenopausal women. *J Nutr Biochem.* 2005 Apr; 16(4): 245-250. PMID: 15808329.	Does not include a comparison of diets differing in macronutrient content in analyses.
Luscombe-Marsh ND, Noakes M, Wittert GA, Keogh JB, Foster P, Clifton PM. Carbohydrate-restricted diets high in either monounsaturated fat or protein are equally effective at promoting fat loss and improving blood lipids. *Am J Clin Nutr.* 2005 Apr; 81(4): 762-772. PMID: 15817850.	Included in Krieger et al, 2006.

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Lyles TE 3rd, Desmond R, Faulk LE, Henson S, Hubbert K, Heimburger DC, Ard JD. Diet variety based on macronutrient intake and its relationship with body mass index. *Med Gen Med.* 2006 Aug 16; 8(3): 39. PMID: 17406172; PMCID: PMC1781268.	Does not answer question; examines relationship between dietary variety and weight.
Ma Y, Olendzki B, Chiriboga D, Hebert JR, Li Y, Li W, Campbell M, Gendreau K, Ockene IS. Association between dietary carbohydrates and body weight. *Am J Epidemiol.* 2005 Feb 15; 161(4): 359-367. PMID: 15692080; PMCID: PMC1199523.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Ma Y, Pagoto SL, Griffith JA, Merriam PA, Ockene IS, HafnerAR, OlendzkiBC. A dietary quality comparison of popular weight-loss plans. *J Am Diet Assoc.* 2007 Oct; 107(10): 1, 786-1, 791. PMID: 17904938; PMCID: PMC2040023.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Maffeis C, Schutz Y, Chini L, Grezzani A, Piccoli R, Tatò L. Effects of dinner composition on postprandial macronutrient oxidation in prepubertal girls. *Obes Res.* 2004 Jul; 12(7): 1, 128-1, 135. PMID: 15292477.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Malik VS, Hu FB. Popular weight-loss diets: from evidence to practice. *Nat Clin Pract Cardiovasc Med.* 2007 Jan; 4(1): 34-41. Review. PMID: 17180148.	Study is a narrative review.
Mazlan N, Horgan G, Whybrow S, Stubbs J. Effects of increasing increments of fat- and sugar-rich snacks in the diet on energy and macronutrient intake in lean and overweight men. *Br J Nutr.* 2006 Sep; 96(3): 596-606. PMID: 16925867.	Sample size less than inclusion criteria.
Meckling KA, Gauthier M, Grubb R, Sanford J. Effects of a hypocaloric, low-carbohydrate diet on weight loss, blood lipids, blood pressure, glucose tolerance, and body composition in free-living overweight women. *Can J Physiol Pharmacol.* 2002 Nov; 80(11): 1, 095-1, 105. PMID: 12489929.	Does not include a comparison of diets differing in macronutrient content in analyses.
Meckling KA, O'Sullivan C, Saari D. Comparison of a low-fat diet to a low-carbohydrate diet on weight loss, body composition, and risk factors for diabetes and cardiovascular disease in free-living, overweight men and women. *J Clin Endocrinol Metab.* 2004 Jun; 89(6): 2, 717-2, 723. PMID: 15181047.	Dropout rate higher than inclusion criteria.

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Meckling KA, Sherfey R. A randomized trial of a hypocaloric high-protein diet, with and without exercise, on weight loss, fitness, and markers of the Metabolic Syndrome in overweight and obese women. *Appl Physiol Nutr Metab.* 2007 Aug; 32(4): 743-752. PMID: 17622289.	Dropout rate higher than inclusion criteria.
Melanson EL, Donahoo WT, Dong F, Ida T, Zemel MB. Effect of low- and high-calcium dairy-based diets on macronutrient oxidation in humans. *Obes Res.* 2005 Dec; 13(12): 2, 102-2, 112. PMID: 16421344.	Does not answer question; examined relationship between calcium intake and weight.
Merchant AT, Vatanparast H, Barlas S, Dehghan M, Shah SM, De Koning L, Steck SE. Carbohydrate intake and overweight and obesity among healthy adults. *J Am Diet Assoc.* 2009 Jul; 109(7): 1, 165-1, 172. PMID: 19559132.	Study design is cross-sectional.
Mirmiran P, Esmaillzadeh A, Azizi F. Diet composition and body mass index in Tehranian adults. *Asia Pac J Clin Nutr.* 2006; 15(2): 224-230. PMID: 16672207.	Study population not from a develop country as defined by the Human Development Index 2010.
Miyashita Y, Koide N, Ohtsuka M, Ozaki H, Itoh Y, Oyama T, Uetake T, Ariga K, Shirai K. Beneficial effect of low carbohydrate in low calorie diets on visceral fat reduction in type 2 diabetic patients with obesity. *Diabetes Res Clin Pract.* 2004 Sep; 65(3): 235-241. PMID: 15331203.	Participants diagnosed with type 2 diabetes.
Mohammad MA, Sunehag AL, Haymond MW. Effect of dietary macronutrient composition under moderate hypocaloric intake on maternal adaptation during lactation. *Am J Clin Nutr.* 2009 Jun; 89(6): 1, 821-1, 827. Epub 2009 Apr 22. PMID: 19386740; PMCID: PMC2682997.	Sample size less than inclusion criteria.
Moreno O, Meoro A, Martinez A, Rodriguez C, Pardo C, Aznar S, Lopez P, Serrano J, Boix E, Martin MD, Pico Alfonso AM. Comparison of two low-calorie diets: A prospective study of effectiveness and safety. *J Endocrinol Invest.* 2006 Jul-Aug; 29(7): 633-640. PMID: 16957412.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Morgan LM, Griffin BA, Millward DJ, DeLooy A, Fox KR, Baic S, Bonham MP, Wallace JM, MacDonald I, Taylor MA, Truby H. Comparison of the effects of four commercially available weight-loss programmes on lipid-based cardiovascular risk factors. *Public Health Nutr.* 2009 Jun; 12(6): 799-807. Epub 2008 Jul 23. PMID: 18647427.	Dropout rate higher than inclusion criteria.

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Murtaugh MA, Herrick JS, Sweeney C, Baumgartner KB, Guiliano AR, Byers T, Slattery ML. Diet composition and risk of overweight and obesity in women living in the southwestern United States. *J Am Diet Assoc.* 2007 Aug; 107(8): 1, 311-1, 321. PMID: 17659896.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Muzio F, Mondazzi L, Harris WS, Sommariva D, Branchi A. Effects of moderate variations in the macronutrient content of the diet on cardiovascular disease risk factors in obese patients with the metabolic syndrome. *Am J Clin Nutr.* 2007 Oct; 86(4): 946-951. PMID: 17921369.	Does not answer question; examined relationship between macronutrient proportion and cardiovascular risk factors.
Noakes M, Keogh JB, Foster PR, Clifton PM. Effect of an energy-restricted, high-protein, low-fat diet relative to a conventional high-carbohydrate, low-fat diet on weight loss, body composition, nutritional status, and markers of cardiovascular health in obese women. *Am J Clin Nutr.* 2005 Jun; 81(6): 1, 298-1, 306. PMID: 15941879.	Included in Krieger et al, 2006.
Norris SL, Zhang X, Avenell A, Gregg E, Bowman B, Serdula M, Brown TJ, Schmid CH, Lau J. Long-term effectiveness of lifestyle and behavioral weight loss interventions in adults with type 2 diabetes: A meta-analysis. *Am J Med.* 2004 Nov 15; 117(10): 762-774. PMID: 15541326.	Participants diagnosed with type 2 diabetes.
Nuttall FQ, Gannon MC. The metabolic response to a high-protein, low-carbohydrate diet in men with type 2 diabetes mellitus. *Metabolism.* 2006 Feb; 55(2): 243-251. PMID: 16423633.	Does not include body weight in analyses.
Pan Y, Guo LL, Jin HM. Low-protein diet for diabetic nephropathy: A meta-analysis of randomized controlled trials. *Am J Clin Nutr.* 2008 Sep; 88(3): 660-666.PMID: 18779281.	Participants diagnosed with diabetic nephropathy.
Park MI, Camilleri M, O'Connor H, Oenning L, Burton D, Stephens D, Zinsmeister AR. Effect of different macronutrients in excess on gastric sensory and motor functions and appetite in normal-weight, overweight, and obese humans. *Am J Clin Nutr.* 2007 Feb; 85(2): 411-418. PMID: 17284737.	Does not answer question; examined relationship between macronutrient proportion and gastric sensory and motor functions and appetite.
Pasiakos SM, Mettel JB, West K, Lofgren IE, Fernandez ML, Koo SI, Rodriguez NR. Maintenance of resting energy expenditure after weight loss in premenopausal women: Potential benefits of a high-protein, reduced-calorie diet. *Metabolism.* 2008 Apr; 57(4): 458-464. PMID: 18328345.	Does not include a comparison of diets differing in macronutrient content in analyses.

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Peairs AT, Rankin JW. Inflammatory response to a high-fat, low-carbohydrate weight loss diet: Effect of antioxidants. *Obesity (Silver Spring).* 2008 Jul; 16(7): 1, 573-1, 578. Epub 2008 May 1. PMID: 18451774.	Sample size less than inclusion criteria.
Phillips SA, Jurva JW, Syed AQ, Syed AQ, Kulinski JP, Pleuss J, Hoffmann RG, Gutterman DD. Benefit of low-fat over low-carbohydrate diet on endothelial health in obesity. *Hypertension.* 2008 Feb; 51(2): 376-382. Epub 2008 Jan 14. PMID: 18195164; PMCID: PMC2702133.	Dropout rate higher than inclusion criteria.
Raffensperger JF. The least-cost low-carbohydrate diet is expensive. *Nutr Res.* 2008 Jan; 28(1): 6-12. PMID: 19083381.	Does not answer question; examined the cost of consuming a low-carbohydrate diet.
Randi G, Pelucchi C, Gallus S, Parpinel M, Dal Maso L, Talamini R, Augustin LS, Giacosa A, Montella M, Franceschi S, La Vecchia C. Lipid, protein and carbohydrate intake in relation to body mass index: an Italian study. *Public Health Nutr.* 2007 Mar; 10(3): 306-310. PMID: 17288629.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Rasmussen LG, Larsen TM, Mortensen PK, Due A, Astrup A. Effect on 24-hour energy expenditure of a moderate-fat diet high in monounsaturated fatty acids compared with that of a low-fat, carbohydrate-rich diet: A six-month controlled dietary intervention trial. *Am J Clin Nutr.* 2007 Apr; 85(4): 1, 014-1, 022. PMID: 17413100.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Raynor HA, Jeffery RW, Ruggiero AM, Clark JM, Delahanty LM; Look AHEAD (Action for Health in Diabetes) Research Group. Weight loss strategies associated with BMI in overweight adults with type 2 diabetes at entry into the Look AHEAD (Action for Health in Diabetes) trial. *Diabetes Care.* 2008 Jul; 31(7): 1, 299-1, 304. Epub 2008 Mar 28. PMID: 18375417.	Does not include a comparison of diets differing in macronutrient content in analyses.
Reinehr T, Roth CL, Alexy U, Kersting M, Kiess W, Andler W. Ghrelin levels before and after reduction of overweight due to a low-fat high-carbohydrate diet in obese children and adolescents. *Int J Obes (Lond).* 2005 Apr; 29(4): 362-368. PMID: 15768041.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Roberts SB, Hajduk CL, Howarth NC, Russell R, McCrory MA. Dietary variety predicts low body mass index and inadequate macronutrient and micronutrient intakes in community-dwelling older adults. *J Gerontol A Biol Sci Med Sci.* 2005 May; 60(5): 613-621. PMID: 15972614.	Does not answer question; examines the relationship between dietary variety and BMI.

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Rodríguez G, Moreno LA. Is dietary intake able to explain differences in body fatness in children and adolescents? *Nutr Metab Cardiovasc Dis.* 2006 May; 16(4): 294-301. Epub 2006 Jan 18. Review. PMID: 16679222.	Study is a narrative review.
Rodríguez MC, Parra MD, Marques-Lopes I, De Morentin BE, González A, Martínez JA. Effects of two energy-restricted diets containing different fruit amounts on body weight loss and macronutrient oxidation. *Plant Foods Hum Nutr.* 2005 Dec; 60(4): 219-224. PMID: 16395633.	Sample size less than inclusion criteria.
Romon M, Gomila S, Hincker P, Soudan B, Dallongeville J. Influence of weight loss on plasma ghrelin responses to high-fat and high-carbohydrate test meals in obese women. *J Clin Endocrinol Metab.* 2006 Mar; 91(3): 1, 034-1, 041. Epub 2005 Dec 29. PMID: 16384853.	Does not answer question; did not examine relationship between macronutrient proportion and weight.

Article (S-Z)	**Reason for Exclusion**
Sargrad KR, Homko C, Mozzoli M, Boden G. Effect of high protein vs. high carbohydrate intake on insulin sensitivity, body weight, hemoglobin A1c, and blood pressure in patients with type 2 diabetes mellitus. *J Am Diet Assoc.* 2005 Apr; 105(4): 573-580. PMID: 15800559.	Participants diagnosed with type 2 diabetes.
Segal-Isaacson CJ, Johnson S, Tomuta V, Cowell B, Stein DT. A randomized trial comparing low-fat and low-carbohydrate diets matched for energy and protein. *Obes Res.* 2004 Nov; 12 Suppl 2: 130S-140S. PMID: 15601961.	Sample size less than inclusion criteria.
Seshadri P, Iqbal N, Stern L, Williams M, Chicano KL, Daily DA, McGrory J, Gracely EJ, Rader DJ, Samaha FF. A randomized study comparing the effects of a low-carbohydrate diet and a conventional diet on lipoprotein subfractions and C-reactive protein levels in patients with severe obesity. *Am J Med.* 2004 Sep 15; 117(6): 398-405. Erratum in: *Am J Med.* 2006 Feb; 119(2): 191. PMID: 15380496.	Does not include body weight in analyses.
Shah M, Adams-Huet B, Garg A. Effect of high-carbohydrate or high-cis-monounsaturated fat diets on blood pressure: A meta-analysis of intervention trials. *Am J Clin Nutr.* 2007 May; 85(5): 1, 251-1, 256. PMID: 17490960.	Does not include body weight in analyses.

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Sichieri R, Moura AS, Genelhu V, Hu F, Willett WC. An 18-month randomized trial of a low-glycemic-index diet and weight change in Brazilian women. *Am J Clin Nutr.* 2007 Sep; 86(3): 707-713. PMID: 17823436.	Does not answer question; examined the relationship between glycemic index and weight.
Skrha J, Kunesová M, Hilgertová J, Weiserová H, Krízová J, Kotrlíková E. Short-term very low calorie diet reduces oxidative stress in obese type 2 diabetic patients. *Physiol Res.* 2005; 54(1): 33-39. PMID: 15717839.	Participants diagnosed with type 2 diabetes.
Stern L, Iqbal N, Seshadri P, Chicano KL, Daily DA, McGrory J, Williams M, Gracely EJ, Samaha FF. The effects of low-carbohydrate versus conventional weight loss diets in severely obese adults: One-year follow-up of a randomized trial. *Ann Intern Med.* 2004 May 18; 140(10): 778-785. PMID: 15148064.	Participants diagnosed with type 2 diabetes.
Suen VM, SilvaGA, Tannus AF, Unamuno MR, Marchini JS. Effect of hypocaloric meals with different macronutrient compositions on energy metabolism and lung function in obese women. *Nutrition.* 2003 Sep; 19(9) :703-707. PMID: 12921877.	Does not answer question; examined the relationship between macronutrient proportion and metabolic parameters.
Sumithran P, Proietto J. Safe year-long use of a very-low-calorie diet for the treatment of severe obesity. *Med J Aust.* 2008 Mar 17; 188(6): 366-368. PMID: 18341463.	Sample size less than inclusion criteria.
Thorpe MP, Jacobson EH, Layman DK, He X, Kris-Etherton PM, Evans EM. A diet high in protein, dairy, and calcium attenuates bone loss over twelve months of weight loss and maintenance relative to a conventional high-carbohydrate diet in adults. *J Nutr.* 2008 Jun; 138(6): 1, 096-1, 100. PMID: 18492840.	Dropout rate higher than inclusion criteria.
Truby H, Baic S, deLooy A, Fox KR, Livingstone MB, Logan CM, Macdonald IA, Morgan LM, Taylor MA, Millward DJ. Randomised controlled trial of four commercial weight loss programmes in the UK: Initial findings from the BBC "diet trials". *BMJ.* 2006 Jun 3; 332(7, 553): 1, 309-1, 314. Epub 2006 May 23. Erratum in: *BMJ.* 2006 Jun 17; 332(7, 555): 1, 418. PMID: 16720619.	Does not include macronutrient proportion in analyses.
Tsai AG, Wadden TA. Systematic review: An evaluation of major commercial weight loss programs in the United States. *Ann Intern Med.* 2005 Jan 4; 142(1): 56-66. Review. PMID: 15630109.	Does not answer question; did not examine relationship between macronutrient proportion and weight.

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Tsai AG, Wadden TA. The evolution of very-low-calorie diets: an update and meta-analysis. *Obesity (Silver Spring).* 2006 Aug; 14(8): 1, 283-1, 293. Review. PMID: 16988070.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Verhoef P, van Vliet T, Olthof MR, Katan MB. A high-protein diet increases postprandial but not fasting plasma total homocysteine concentrations: A dietary controlled, crossover trial in healthy volunteers. *Am J Clin Nutr.* 2005 Sep; 82(3): 553-558. PMID: 16155267	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Volek JS, Sharman MJ, Gómez AL, DiPasquale C, Roti M, Pumerantz A, Kraemer WJ. Comparison of a very low-carbohydrate and low-fat diet on fasting lipids, LDL subclasses, insulin resistance, and postprandial lipemic responses in overweight women. *J Am Coll Nutr.* 2004 Apr; 23(2): 177-184. PMID: 15047685.	Does not answer question; examined the relationship between macronutrient proportion and cardiovascular disease risk factors.
Wadden TA, West DS, Neiberg RH, Wing RR, Ryan DH, Johnson KC, Foreyt JP, Hill JO, Trence DL, Vitolins MZ; Look AHEAD Research Group. One-year weight losses in the Look AHEAD study: Factors associated with success. *Obesity (Silver Spring).* 2009 Apr; 17(4): 713-722. Epub 2009 Jan 29. PMID: 19180071.	Does not answer question; did not examine relationship between macronutrient proportion and weight.
Weiss EP, Villareal DT, Racette SB, Steger-May K, Premachandra BN, Klein S, Fontana L. Caloric restriction but not exercise-induced reductions in fat mass decrease plasma triiodothyronine concentrations: A randomized controlled trial. *Rejuvenation Res.* 2008 Jun; 11(3): 605-609. PMID: 18593278; PMCID: PMC2649744.	Sample size less than inclusion criteria.
Williams PG, Grafenauer SJ, O'Shea JE. Cereal grains, legumes, and weight management: A comprehensive review of the scientific evidence. *Nutr Rev.* 2008 Apr; 66(4): 171-182. Review. PMID: 18366531.	Study is a narrative review.
Wilkinson DL, McCargar L. Is there an optimal macronutrient mix for weight loss and weight maintenance? *Best Pract Res Clin Gastroenterol.* 2004 Dec; 18(6): 1, 031-1, 047. Review. PMID: 15561637. (Study will be reviewed to determine if systematic review.)	Study is a narrative review.
Winham DM, Collins CB, Hutchins AM. Dietary intakes, attitudes toward carbohydrates of postmenopausal women following low carbohydrate diets. *Can J Diet Pract Res.* 2009 Spring; 70(1): 44-47. PMID: 19261206.	Does not include body weight in analyses.

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Wojcik KY, Rechtman DJ, Lee ML, Montoya A, Medo ET. Macronutrient analysis of a nationwide sample of donor breast milk. *J Am Diet Assoc.* 2009 Jan; 109(1): 137-140. PMID: 19103335.	Does not answer question; examined the macronutrient content of breastmilk.
Yackobovitch-Gavan M, Nagelberg N, Demol S, Phillip M, Shalitin S. Influence of weight-loss diets with different macronutrient compositions on health-related quality of life in obese youth. *Appetite.* 2008 Nov; 51(3): 697-703. Epub 2008 Jul 4. PMID: 18652862.	Dropout rate higher than inclusion criteria.
Yancy WS Jr, Olsen MK, Guyton JR, Bakst RP, Westman EC. A low-carbohydrate, ketogenic diet versus a low-fat diet to treat obesity and hyperlipidemia: a randomized, controlled trial. *Ann Intern Med.* 2004 May 18; 140(10): 769-777. PMID: 15148063.	Dropout rate higher than inclusion criteria.

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