LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Gardner	2019	Changes in blood lipid concentrations associated with changes in intake of dietary saturated fat in the context of a healthy low-carbohydrate weight-loss diet: a secondary analysis of the Diet Intervention Examining the Factors Interacting with Treatment Success (DIETFITS) trial	Am J Clin Nutr	Stanford University / National Institute of Diabetes and Digestive and Kidney Diseases, Nutrition Science Initiative, the National Heart, Lung, and Blood Institute	In the DIETFITS trial, 609 generally healthy adults, aged 18-50 years, with BMIs of 28-40 kg/m2 were randomly assigned to a healthy low-fat (HLF) or healthy low carb (HLC) diet for 12 months. Participants consumed an average of 12-18% of calories from SFA. An increase of %SFA, without significant changes in absolute saturated fat intake, over 12 months was associated with a statistically significant decrease in triglycerides in the context of a weight-loss study in which participants simultaneously decreased carbohydrate intake. The association between increase in %SFA and decrease in triglycerides was no longer significant when adjusting for 12-month change in carbohydrate intake, suggesting carbohydrate intake may be a mediator of this relationship.	RCT
Gjuladin-Hellon	2019	Effects of carbohydrate-restricted diets on low-density lipoprotein cholesterol levels in overweight and obese adults: a systematic review and meta-analysis	Nutr Rev	No funding required	A systematic review and meta-analyses were conducted to compare the effects of very low, low, and moderate carbohydrate, higher fat diets versus high-carbohydrate, low-fat diets on low-density lipoprotein cholesterol and other lipid markers in overweight/obese adults. Large randomized controlled trials of at least 6 months duration with carbohydrate restriction appear superior in improving lipid markers when compared with low-fat diets. Dietary guidelines should consider carbohydrate restriction as an alternative dietary strategy for the prevention/management of dyslipidemia for populations with cardiometabolic risk.	Meta-analysis

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Author	Year	Title	Journal	University/Funding	Summary	Type
Harvey	2019	Low-carbohydrate diets differing in carbohydrate restriction improve cardiometabolic and anthropometric markers in healhty adults: A randomised clinical trial	PeerJ	Human Potential Centre, Auckland University	Low-carbohydrate, high-fat diets have a positive effect on markers of health. Adherence to the allocation of carbohydrate was more easily achieved in MCD, and LCD groups compared to VLCKD and there were comparable improvements in weight loss and waist circumference and greater improvements in HDL-c and TG with greater carbohydrate restriction	RCT
LaFountain	2019	Extended Ketogenic Diet and Physical Training Intervention in Military Personnel	Mil Med	University Foundation to support Low-Carbohydrate Nutrition	All KD subjects were in nutritional ketosis during the intervention as assessed by daily capillary beta-hydroxybutyrate (βHB) (mean βHB 1.2 mM reported 97% of all days) and showed higher rates of fat oxidation indicative of keto-adaptation. Despite no instruction regarding caloric intake, the KD group lost 7.7 kg body mass (range -3.5 to -13.6 kg), 5.1% whole-body percent fat (range -0.5 to -9.6%), 43.7% visceral fat (range 3.0 to -66.3%) (all $p < 0.001$), and had a 48% improvement in insulin sensitivity. There were no changes in the mixed diet group. Adaptations in aerobic capacity, maximal strength, power, and military-specific obstacle course were similar between groups ($p > 0.05$).	Nonrandomized Controlled Trial

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Author	Year	Title	Journal	University/Funding	Summary	Type
McArdle	2019	Carbohydrate restriction for glycaemic control in Type 2 diabetes: a systematic review and meta-analysis	Diabet Med	National Insitute for Health Research and Health Education England	A subgroup analysis of diets containing 50-130 g carbohydrate resulted in a pooled effect estimate of -0.49% [95% CI -0.75, -0.23 (P <0.001); I2 0% (P = 0.56)], suggesting a clinically and statistically significant effect on HbA1c in favour of low-carbohydrate diets in studies of ≤6 months' duration. Clinicians should inform people with Type 2 diabetes that there are a number of effective dietary approaches for improving glycaemic control, which may include restricting carbohydrate to 50–130 g per day.	Meta-analysis
Rallis	2019	Optimizing glycemic control in type 2 diabetic patients through the use of a low-carbohydrate, high-fat, keotgenic diet: a review of two patients in primary care	Diabetes Metab Syndr Obes	No funding required	Two diabetic patients, a 65-year-old female and a 52-year-old male, were placed on KDs consisting of 70% fat, 20%–25% protein, and 5%–10% carbohydrates and monitored for 12 weeks. The 65-year-old female demonstrated a 2.4% reduction in HBA1C over 12 weeks while reducing her diabetic medication by 75%. The 52-year-old male demonstrated a 2.5% reduction in HBA1C while eliminating all diabetic medications.	Case series

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Schmidt	2019	Low versus High Carbohydrate Diet in Type 1 Diabetes: A 12-week randomized open-label crossover study	Diabetes Obes Metab	Danish Diabetes Academy, Novo Nordisk Foundation, Danish Diabetes Association, Vissing Fonden, The A.P. Moller Foundation for the Advancement of Medical Science	Compared with an intake of 250 grams of carbohydrate per day, restriction of carbohydrate intake to 100 grams per day in adults with type 1 diabetes reduced time spent in hypoglycaemia, glycaemic variability and weight with no effect on cardiovascular risk factors.	Randomized Crossover Study
Siegmann	2019	Improvement in patient-reported sleep in type 2 diabetes and prediabtes	Sleep Med	Virta Health Corp	This study demonstrates improved sleep quality as assessed by PSQI in patients with T2D and prediabetes undergoing CCI including nutritional ketosis but not in T2D patients receiving UC. The dietary intervention benefited both sleep quality and the severity of T2D symptoms suggesting that nutritional ketosis improves overall health via multiple mechanisms.	Nonrandomized Controlled Trial

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Author	Year	Title	Journal	University/Funding	Summary	Type
Strath	2019	The Effect of Low-Carbohydrate and Low-Fat Diets on Pain in Individuals with Knee Osteoarthritis	Pain Medicine	Translational Nutrition and Aging Research Academic Career Leadership Award (National Insititute of Health)	Participants were asked to follow one of two dietary interventions (low-carbohydrate [LCD], low-fat [LFD]) or continue to eat as usual (control [CTRL]) over 12 weeks. Functional pain, self-reported pain, quality of life, and depression were assessed every three weeks. Over a period of 12 weeks, the LCD reduced pain intensity and unpleasantness in some functional pain tasks, as well as self-reported pain, compared with the LFD and CTRL. The LCD also significantly reduced oxidative stress and the adipokine leptin compared with the LFD and CTRL.	Randomized Controlled Trial
Vilar-Gomez	2019	Post hoc analyses of surrogate markers of non-alcoholic fatty liver disease (NAFLD) and liver fibrosis in patients with type 2 diabetes in a digitally supported continuous care intervention: an open-label, non-randomised controlled study	BMJ Open	Virta Health Corp	ne year of comprehensive continuous care intervention (CCI) through nutritional ketosis improves glycosylated haemoglobin(HbA1c), body weight and liver enzymes among patients with type 2 diabetes (T2D).	Nonrandomized Controlled Trial

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Author	Year	Title	Journal	University/Funding	Summary	Type
Zadeh	2019	Diets along with interval training regimes improves inflammatory & anti-inflammatory condition in obesity with type 2 diabetes subjects	J Diabetes Metab Disord	Facultry of Physical Education and Sports Sciences, Isfahan University	These results demonstrated that HIIT along with low carbohydrate regimes improves overall cardiovascular parameters and reduce pro-inflammatory markers and increase anti-inflammatory markers in type 2 diabetic patients	RCT
Bhanpuri	2018	Cardiovascular disease risk factor responses to a type 2 diabetes care model including nutritional ketosis induced by sustained carbohydrate restriction at 1 year: an open label, non-randomized, controlled study	Cardiovasc Diabetol	Virta Health Corp	The continuous care intervention (CCI) group consisted of 262 participants. Intention-to-treat analysis revealed the following at 1-year: total LDL-particles (LDL-P) (−4.9%, P=0.02), small LDL-P (−20.8%, P=1.2×10−12), LDL-P size (+1.1%, P=6.0×10−10), ApoB (−1.6%, P=0.37), ApoA1 (+9.8%, P<10−16), ApoB/ApoA1 ratio (−9.5%, P=1.9×10−7), triglyceride/HDL-C ratio (−29.1%, P<10−16), large VLDL-P (−38.9%, P=4.2×10−15), and LDL-C (+9.9%, P=4.9×10−5). Additional efects were reductions in blood pressure, high sensitivity C-reactive protein, and white blood cell count. The 10-year atherosclerotic cardiovascular disease (ASCVD) risk score decreased −11.9%. Antihypertensive medication use was discontinued in 11.4% of CCI participants. The usual care (UC) group of 87 participants showed no signifcant changes.	Single-arm Intervention

Author	Year	Title	Journal	University/Funding	Summary	Type
Bock	2018	Ketogenic diets attenuate cyclooxygenase and lipoxygenase gene expression in multiple sclerosis	EBioMedicine	Genzyme GmbH, Myelin Project, and Familie Ernst Wendt Stiftung Stadt Koeln	Ketogenic diets can reduce the expression of enzymes involved in the biosynthesis of proinflammatory eicosanoids. Detailed cross-group analysis revealed a significant positive correlation between expression of pro-inflammatory ALOX5 and COX2 and an inverse correlation of ALOX5 and COX1 expression with the multiple sclerosis quality of life-54 index.	RCT
Cohen	2018	A Ketogenic Diet Reduces Central Obesity and Serum Insulin in Women with Ovarian or Endometrial Cancer	J Nutr	American Institute for Cancer Research, UAB Comprehensive Cancer Center, Nutrition Obesity Research Center	In women with ovarian or endometrial cancer, a ketogenic diet (KD) results in selective loss of fat mass and retention of lean mass. Visceral fat mass and fasting serum insulin also are reduced by the KD, perhaps owing to enhanced insulin sensitivity. Elevated serum β-hydroxybutyrate may reflect a metabolic environment inhospitable to cancer proliferation.	RCT
Cohen	2018	Favorable effects of a ketogenic diet on physical function, perceived energy and food cravings in women with ovarian or endometrial cancer: a randomized controlled trial	Nutrients	American Institute for Cancer Research, UAB Comprehensive Cancer Center, Nutrition Obesity Research Center	Among women with ovarian or endometrial cancer, a ketogenic diet (KD) does not diminish quality of life; indeed, it may improve physical function, increase energy, and diminish specific food cravings. These findings may generalize to other cancers associated with obesity, such as colorectal or post-menopausal breast cancers	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Dahlgren	2018	Ketogenic diet, high intensity interval training (HIIT) and memory training in the treatment of Mild Cognitive Impairment: A case study	Diabetes & Metab Syndrome	No funding required	A 57-year old female previously diagnosed with comorbid mild cognitive impairment (MCI) and metabolic syndrome (MetS) completed a 12-week therapeutic intervention designed to restore memory loss and reverse MetS biomarkers. A nutrition protocol purposed at raising plasma ketones through low a carbohydrate/high fat diet, calorie restriction (fasting) and high intensity interval training was administered by health care professionals for 12 consecutive weeks. This case study of a patient with comorbid MCI and MetS suggests that a ketogenic diet, high intensity interval exercise, and memory training may reverse early stage memory loss (MCI) and improve/normalize MetS biomarkers.	Case study
Ebbeling	2018	Effects of low carbohydrate diet on energy expenditure during weight loss maintenance: randomized trial	BMJ	NuSI, New Balance Foundation, Many Voices Foundation, Blue Cross Blue Shield, NIDDKD	The primary outcome was total energy expenditure, measured with doubly labeled water, by intention-to-treat analysis. Total energy expenditure differed by diet in the intention-to-treat analysis, with a linear trend of 52 kcal/d for every 10% decrease in the contribution of carbohydrate to total energy intake. Change in total energy expenditure was 91 kcal/d greater in participants assigned to the moderate carbohydrate diet and 209 kcal/d greater in those assigned to the low carbohydrate diet compared with the high carbohydrate diet. In the per protocol analysis, the respective differences were 131 kcal/d and 278 kcal/d. Among participants in the highest third of pre-weight loss insulin secretion, the difference between the low and high carbohydrate diet was 308 kcal/d in the intention-to-treat analysis and 478 kcal/d in the per protocol analysis. Ghrelin was significantly lower in participants assigned to the low carbohydrate diet compared with those assigned to the high carbohydrate diet. Leptin was also significantly lower in participants assigned to the low carbohydrate diet.	RCT

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Author	Year	Title	Journal	University/Funding	Summary	Type
Gardner	2018	Effect of Low-Fat vs Low-Carbohydrate Diet on 12-Month Weight Loss in Overweight Adults and the Association with Genotype Pattern of Insulin Secretion	JAMA	Stanford University / National Institute of Diabetes and Digestive and Kidney Diseases, Nutrition Science Initiative, the National Heart, Lung, and Blood Institute	In this 12-month weight loss diet study, there was no significant difference in weight change between a healthy low-fat diet vs a healthy low-carbohydrate diet, and neither genotype pattern nor baseline insulin secretion was associated with the dietary effects on weight loss. In the context of these 2 common weight loss diet approaches, neither of the 2 hypothesized predisposing factors was helpful in identifying which diet was better for whom.	RCT
Halikas	2018	AMPK induced memory improvements in the diabetic population: A case study	Diabetes & Metab Syndrome	No funding required	The patient, a 70-year-old male with an extensive history of heart disease, myocardial infarction and diabetes (T2D) since age 55, was recently diagnosed with MCI. This case study effectively demonstrated the role of nutrition status on MetS biomarkers and memory function. Statistically significant improvements were observed in fasting insulin, HgA1c, triglycerides, VLDL, HOMA-IR, weight and the MoCA. Interestingly, the patient's HDL also increased substantially from 52 mg/dL to 70 mg/dL during the intervention reflecting improved cerebral vascular health Focused treatment on AMPK induction and mTOR suppression through ketogenic protocol and high intensity interval training (HIIT) designed to restore GLUT3 and GLUT4 translocase in the brain and peripheral tissues, respectively, may functionally halt neurological disease progression and restore early stage memory loss.	Case study

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Author	Year	Title	Journal	University/Funding	Summary	Type
Hallberg	2018	Effectiveness and Safety of a Novel Care Model for the Management of Type 2 Diabetes at 1 Year: An Open-Label, Non-Randomized, Controlled Study	Diabetes Ther	Medically Supervised Weight Loss, Virta Health, University of Southern California, Purdue University, Washington University, Ohio State University / Virta Health	262 adults with T2D volunteered to participate in the continuous care invervent (CCI) group which consistent of very low dietary carbohydrate intake and continuous supervision by a health coach and doctor. 87 adults with T2D participanted in the usual care group. After 1 year, patient in the CCI group, on average, lowered HbA1c from 7.6 to 6.3%, lost 12% of their body weight, and reduced diabetes medicine use. 94% of patients hwo were prescribed insulin reduced or stopped their insulin use, and sulfonylureas were eliminated in all patients. Participants in the UC (usual care) group had no changes to HbA1c, weight or diabetes medicine use over the year. Changes in the CCI participants happened safely while dyslipidemia and markers of inflammation and liver function improved.	Nonrandomized Controlled Trial
Heussinger	2018	10 patients, 10 years--Long term follow-up of cardiovascular risk factors in Glut1 deficiency treated with ketogenic diet therapies: A prospective, multicenter case series	Clinical Nutrition	No funding required	Between August 2001 and January 2016, the authors enrolled Glut1D patients in ketogenic diets (KD) at two hospitals in Germany. The minimal follow-up was 10 years. After 10 years on a KD, cardiovascular risk scores were measured and compared to a healthy reference population. No significant differences were observed with respect to BMI, carotid intima-media thickness, or blood pressure. Prior to the initiation of the KD one child had dyslipidaemia, but no child had such after 10 years of KD	Longitudinal cohort study

Author	Year	Title	Journal	University/Funding	Summary	Type
Kossoff	2018	Optimal clinical management of children receiving dietary therapies for epilepsy: Updated recommendations of the International Ketogenic Diet Study Group	Epilepsia Open	Carson Harris Foundation	In 2009, an expert consensus guideline for the management of children on ketogenic diet therapy (KDT) was published, focusing on topics of patient selection, pre-KDT counseling and evaluation, diet choice and attributes, implementation, supplementation, follow-up, side events, and KDT discontinuation. It has been helpful in outlining a state-of-the-art protocol, standardizing KDT for multicenter clinical trials, and identifying areas of controversy and uncertainty for future research. Now one decade later, the organizers and authors of this guideline present a revised version with additional authors, in order to include recent research, especially regarding other dietary treatments, clarifying indications for use, side effects during initiation and ongoing use, value of supplements, and methods of KDT discontinuation.	Review
Kverneland	2018	Effect of modified Atkins diet in adults with drug-resistant focal epilepsy: A randomized clinical trial	Epilepsia	Norwegian Epilepsy Association's Research Fund, Throne Holst Foundation, Norwegian Extra Foundation for Health and Rehabilitation, South-Eastern Norway Regional Health Authority	In this RCT investigating the effect of an adjunctive modified atkins diet on seizure frequency in adults with difficult to treat focal epilepsy, the authors found a significant reduction in seizure frequency in the diet group compared to the controls, but only for a moderate benefit (>25% seizure reduction) among those who completed the intervention. Seizure response varied considerably between individuals, perhaps negatively influenced by a drop in serum concentrations of antiepileptic drugs.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Lennerz	2018	Management of Type 1 Diabetes With a Very Low-Carbohydrate Diet	Pediatrics	Niational Institute of Health, National Institute of Diabetes and Digestive and Kidney Diseases	The results of an online survey of an international social media group for people with T1DM who follow a VLCD. Respondents included adults and parents of children with T1DM. Participants had a mean daily carbohydrate intake of 36 ± 15 g. Reported mean HbA1c was 5.67% ± 0.66%. Only 7 (2%) respondents reported diabetes-related hospitalizations in the past year, including 4 (1%) for ketoacidosis and 2 (1%) for hypoglycemia.	Restrospective Cohort Study
McDonald	2018	Improving compliance in adults with epilepsy on a modified Atkins diet: A randomized trial	Seizure: European Journal of Epilepsy	Johns Hopkins Institute for Clinical and Translational Research, The National Center for Advancing Translational Sciences, NIH Roadmap for Medical Research, Nutricia, Vitaflo	Although supplementing a modified atkins diet (MAD) with a ketogenic formula in the first month did not increase the likelihood of reducing seizures compared to MAD alone, significantly more adults remained on MAD long-term with this approach. This suggests a potential strategy for encouraging compliance with MAD in adults with drug resistant epilepsy.	Cross-over RCT
Phillips	2018	Low-Fat versus Ketogenic Diet in Parkinson's Disease: A Pilot Randomized Controlled Trial	Movement Disorders	Waikato Hospital Neurology Research Fund	It is plausible and safe for Parkinson's Disease patients to maintain a low-fat or ketogenic diet for 8 weeks. Both diet groups significantly improved in motor and nonmotor symptoms; however, the ketogenic group showed greater improvements in nonmotor symptoms.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Sainsbury	2018	Effect of dietary carbohydrate restriction on glycemic control in adults with diabetes: A systematic review and meta-analysis	Diabetes Res Clin Pract	None	Carbohydrate-restricted diets, in particular those that restrict carbohydrate to < 26% of total energy, produced greater reductions in HbA1c at 3 months (WMD -0.47%, 95% CI: -0.71, -0.23) and 6 months (WMD -0.36%, 95% CI: -0.62, -0.09), with no significant difference at 12 or 24 months. There was no difference between moderately restricted (26-45% of total energy) and high carbohydrate diets at any time point. This review suggests that carbohydrate-restricted diets could be offered to people living with diabetes as part of an individualised management plan.	Systematic review and meta-analysis
Sanada	2018	Efficacy of a Moderately Low Carbohydrate Diet in a 36-Month Observational Study of Japanese Patients with Type 2 Diabetes	Nutrients	Kitasato Institute Hospital Research Grant	The following parameters decreased over the period of study: HbA1c and alanine aminotransferase. Parameters that increased were high-density lipoprotein cholesterol and urea nitrogen. Over 36 months, the mLCD intervention showed sustained effectiveness (without safety concerns) in improving HbA1c, lipid profile, and liver enzymes in Japanese patients with type 2 diabetes.	Single-arm Intervention

Author	Year	Title	Journal	University/Funding	Summary	Type
Saslow	2018	Outcomes of a digitally delivered low-carbohydrate type 2 diabetes self-management program: 1-year results of a single-arm longitudinal study	JMIR Diabetes	National Institute of Health, National Institute of Diabetes and Digestive and Kidney Diseases	Of the 743 participants with a starting HbA1c at or above the type 2 diabetes threshold of 6.5%, 195 (26.2%) reduced their HbA1c to below the threshold while taking no glucose-lowering medications or just metformin. Of the participants who were taking at least one hypoglycemic medication at baseline, 40.4% (289/714) reduced one or more of these medications. Almost half (46.40%, 464/1000) of all participants lost at least 5% of their body weight. Overall, glycemic control and weight loss improved, especially for participants who completed all 10 modules of the program. For example, participants with elevated baseline HbA1c (≥7.5%) who engaged with all 10 weekly modules reduced their HbA1c from 9.2% to 7.1% (P<.001) and lost an average of 6.9% of their body weight (P<.001).	Single-arm Intervention
Schiavo	2018	A 4-week preoperative ketogenic micronutrient-enriched diet is effective in reducing body weight, left hepatic lobe volumea, nd micronutrient deficiencies in patients undergoing bariatric surgery: a prospective pilot study	Obesity Surgery	Naples University, University of Salemo, University of Nice	This study demonstrates that a 4-week preoperative KMED is safe and effective in reducing BW, left hepatic lobe volume, and correcting MD in obese patients scheduled for BS. Decreases in BW, left hepatic lobe volume, and an amelioration of patient micronutrient status were all highly significantly. All patients showed a high frequency of acceptability and compliance in following the diet. No adverse side effect was reported.	Single-arm Intervention

Author	Year	Title	Journal	University/Funding	Summary	Type
Syed-Abdul	2018	Effect of carbohydrate restriction-induced weight loss on aortic pulse wave velocity in overweight men and women	Appl Physiol Nutr Metab	Not listed.	The purpose of this study was to determine whether a reduction in pulse wave velocity would be achieved by dietary carbohydrate (CHO) restriction, shown to bring about weight loss over a shorter timeframe. Men and women with characteristics of insulin resistance and metabolic syndrome consumed a structured carbohydrate restricted diet for 3 wks. Subjects lost 5.4 ± 0.5% of body weight and experienced significant reductions in blood pressure, plasma insulin, and triglycerides. Pulse wave velocity was reduced by 6 ± 2% and fell significantly in women while no significant change was observed in men.	Single-arm Intervention
van Zuuren	2018	Effects of low-carbohydrate-compared with low-fat-diet interventions on metabolic control in people with type 2 diabetes: a systematic review includiing GRADE assessments	Am J Clin Nutr	Dutch Diabetes Foundation, Sanofi	Glycated hemoglobin declined more in people who consumed low carbohydrate food than in those who consumed low-fat food in the short term. There is low to high (majority moderate) certainty for small improvements of unclear clinical importance in plasma glucose, triglycerides, and HDL concentrations favoring low carbohydrate food at half of the prespecified time points. Currently available data provide low- to moderate certainty evidence that dietary carbohydrate restriction to a maximum of 40% yields slightly better metabolic control of than reduction in fat to a maximum of 30% in people with T2D.	Meta-analysis
Westman	2018	Implementing a low carbohydrate, ketogenic diet to manage type 2 diabetes	Expert Rev. Endocrinol. Metab.	No funding required	Type 2 diabetes mellitus (T2DM) has reached epidemic proportions in the modern world. For individuals affected by obesity-related T2DM, clinical studies have shown that carbohydrate restriction and weight loss can improve hyperglycemia, obesity, and T2DM.	Review and Clinical Recommendations

Author	Year	Title	Journal	University/Funding	Summary	Type
Wu	2018	Ketogenic diet effects on 52 children with pharmacoresistant epileptic encephalopathy: A clincial prospective study	Brain and Behavior	Not listed.	Ketogneic Diet (KD) has different effect on different epileptic syndromes, best effect on Doose syndromes of 100%, and better effect on West syndrome with the effect rate of 57.9%, and the total effect number was 22 cases. The reduction of epileptiform discharges in the awake state before KD treatment was correlated with the seizure time after 3 months of KD treatment. The cognitive function of 23 patients was improved, 12 patients had language improvement, and the motor function was improved in 10 patients.	Single-arm Intervention
Barbanti	2017	Ketogenic diet in migraine: rationale, findings and perspectives	Neruol Sci	IRCCS San Raffaele Pisana (Italy)	Ketogenic diet (KD) is an established treatment for refractory pediatric epilepsy and a promising therapy for diverse neurological diseases. Clinical data on KD in migraine-obtained from 150 patients investigated in case reports and prospective studies-suggest that KD may be a rapid onset effective prophylaxis for episodic and chronic migraine. KD would contribute to restore brain excitability and metabolism and to counteract neuroinflammation in migraine, although its precise mechanism is still unclear.	Review
Dehghan	2017	Associations of fats and carbohydrate intake with cardiovascular disease and mortality in 18 countries from five continents (PURE): a prospective cohort study	Lancet	McMaster University, Canada, et al / Heart & Stroke Foundation et al	High carbohydrate intake was associated with higher risk of total mortality, whereas total fat and individual types of fat were related to lower total mortality. Total fat and types of fat were not associated with cardiovascular disease, myocardial infarction, or cardiovascular disease mortality, whereas saturated fat had an inverse association with stroke. Global dietary guidelines should be reconsidered in light of these findings.	Epidemiological

Author	Year	Title	Journal	University/Funding	Summary	Type
Heimowitz	2017	Changes in Food Cravings during Dietary Carbohydrate-restriction	FASEB Journal	Unviersity of Missouri / NIH & Atkins Nutritionals	Conference proceedings abstract from Experimental Biology 2017: These results suggest that cravings for sweets and carbohydrate (CHO) may not increase when these foods were restricted in the diet. Moreover, consumption of a high-fat, low-CHO diet was associated with reductions in cravings for all food categories. Strict dietary control, achieved when commercially-available meals are provided, may improve short-term weight loss by reducing the feeling of disinhibition.	RCT
Islas	2017	The effects of a low-carbohydrate diet on oxygen saturated in heart failure patients: a randomized controlled clinical trial	Nutricion Hospitalaria	Heart Failure Clinic and Clinical Nutrition Department	In a parallel group randomized controlled clinical trial, 88 ambulatory patients were randomly assigned to a low-carbohydrate diet group (40% carbohydrates, 20% protein and 40% fats) or a standard diet group (50% carbohydrates, 20% protein and 30% fats for two months. Diets were normocaloric in both groups. After two months of follow-up, the low-carbohydrate diet group decreased the carbohydrate consumption and had improved oxygen saturation (93.0 ± 4.4 to 94.6 ± 3.2, p = 0.02), while the standard diet group had decreased (94.90 ± 2.4 to 94.0 ± 2.9, p = 0.03).	RCT
Klement	2017	Beneficial effects of ketogenic diets for cancer patients: a realist review with focus on evidence and confirmation	Med Oncol	Leopoldina Hospital Schweinfurt, (Germany)	Feasibility of ketogenic diets (KDs) for cancer patients has been shown in various contexts. The probability of achieving an anti-tumor effect seems greater than that of causing serious side effects when offering KDs to cancer patients.	Review

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Le	2017	Consumption of a 4-Week, Carbohydrate-Restricted Diet Improves Food Intake Motivation in Overweight Subjects	FASEB Journal	Unviersity of Missouri / NIH & Atkins Nutritionals	Conference proceedings abstract: These results suggest 1) that any loss of satiety due to lower insulin concentrations, is balanced by a reduction in hunger on the high-fat diet, and 2) that these two responses are biologically related in some manner such that those subjects who responded to the diet with a greater reduction in insulin were the same individuals who experienced the greatest reductions in hunger. Further, whether the correlation between reduced disinhibition and insulin is causal, or whether these concurrent reductions are driven by a third variable, is unknown.	RCT
Malhotra	2017	Saturated fat does not clog the arteries: coronary heart disease is a chronic inflammatory condition, the risk of which can be effectively reduced from healthy lifestyle interventions	BMJ	No funding required	This editorial explores the research supporting how saturated fat does not clog the arteries: coronary heart disease is a chronic inflammatory condition, the risk of which can be effectively reduced from healthy lifestyle interventions.	Editorial
McKenzie	2017	A Novel Intervention Including Individualized Nutritional Recommendations Reduces Hemoglobin A1c Level, Medication Use, and Weight in Type 2 Diabetes	JMIR Diabetes	Indiana University Health Arnett // Virta Health	This study demonstrates an individualized program delivered and supported remotely that incorporates nutritional ketosis can be highly effective in improving glycemic control and weight loss in adults with T2D while significantly decreasing medication use.	Nonrandomized Controlled Trial

Author	Year	Title	Journal	University/Funding	Summary	Type
Mente	2017	Association of dietary nutrients with blood lipids and blood pressure in 18 countries: a cross-sectional analysis from the PURE study	Lancet	McMaster University, Canada, et al / Heart & Stroke Foundation et al	Reducing saturated fatty acid intake and replacing it with carbohydrate has an adverse effect on blood lipids. Substituting saturated fatty acids with unsaturated fats might improve some risk markers, but might worsen others. Simulations suggest that ApoB-to-ApoA1 ratio probably provides the best overall indication of the effect of saturated fatty acids on cardiovascular disease risk among the markers tested. Focusing on a single lipid marker such as LDL cholesterol alone does not capture the net clinical effects of nutrients on cardiovascular risk.	Epidemiological
Roehl	2017	Practice Paper of the Academy of Nutrition and Dietetics: Classic and Modified Ketogenic Diets for Treatment of Epilepsy	Journal of The Academy of Nutrition and Dietetics	n/a This is a practice paper	Registered dietitian nutritionists are often the first line and the most influential team members when it comes to treating those on ketogenic diet (KD) therapy. This paper offers registered dietitian nutritionists insight into the history of KD therapy, an overview of the various diets, and a brief review of the literature with regard to efficacy; provides basic guidelines for practical implementation and coordination of care across multiple health care and community settings; and describes the role of registered dietitian nutritionists in achieving successful KD therapy.	Review

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Saslow	2017	An Online Intervention Comparing a Very Low-Carbohydrate Ketogenic Diet and Lifestyle Recommendations Versus a Plate Method Diet in Overweight Individuals With Type 2 Diabetes: A Randomized Controlled Trial	Journal of Med Internet Res	Mount Zion Health Fund, National Institutes of Health, William Bowes Jr. Foundation, National Center for Complementary and Integrative health, National Instute of Diabetes, Digestive Kidney Diseases, National Heart, Lung and Blood Institute, National Institue of Mental Health.	A greater percentage of participants lost at least 5% of their body weight in the low carb intervention versus the control group. Participants in the intervention group lowered their triglyceride levels more than participants in the control group Dropout was 8% (1/12) and 46% (6/13) for the intervention and control groups, respectively (P=.07). The online delivery of this approach gives it the potential to have wider impact in the treatment of type 2 diabetes.	RCT
Saslow	2017	Twelve-month outcomes of a randomized trial of moderate-carbohydrate versus very low-carbohydrate diet in overweight adults with type 2 diabetes mellitus or prediabetes	Nutrition and Diabetes	William K Bowes Jr. Foundation, Mount Zion Health Fund, National Institutes of Health, National Center for Complementary and Integrative health, National Instute of Diabetes, Digestive Kidney Diseases, National Heart, Lung and Blood Institute, National Institue of Mental Health.	The low carb ketogenic diet (LCK) participants experienced larger reductions in diabetes-related medication use; of participants who took sulfonylureas or dipeptidyl peptidase-4 inhibitors at baseline, 6/10 in the LCK group discontinued these medications compared with 0/6 in the control group (p = .005). In a 12-month trial, adults with elevated HbA1c and body weight assigned to an LCK diet had greater reductions in HbA1c, lost more weight, and reduced more medications than those instructed to follow a standard-care diet.	RCT

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Snorgaard	2017	Systematic review and meta-analysis of dietary carbohydrate restriction in patients with type 2 diabetes	BMJ Open Diabetes Research & Care	Danish Health Authority	Low to moderate carbohydrate diets have greater effect on glycemic control in type 2 diabetes compared with high-carbohydrate diets in the first year of intervention. The greater the carbohydrate restriction, the greater glucose lowering, a relationship that has not been demonstrated earlier. Apart from this lowering of HbA1c over the short term, there is no superiority of low-carbohydrate diets in terms of glycemic control, weight, or LDL cholesterol.	Systematic review and meta-analysis
Taus	2017	A very low calorie ketogenic diet improves weight loss and quality of life in patients with adjustable gastric banding.	Ann Ital Chir.	Not listed.	Ketogenic diets (KD) can improve the weight loss and quality of life in patients who underwent LAGB and failed at losing more weight allowing a weight loss comparable to that obtained with a further calibration and it is useful to avoid drastic calibrations and their collateral effects.	RCT
Tay	2017	Effects of an energy-restricted low-carbohydrate, high unsaturated fat/low saturated fat diet versus a high-carbohydrate, low-fat diet in type 2 diabetes: A 2-year randomized clinical trial	Diabetes Obes Metab	National Health and Medical Research Council of Australia	Both diets achieved comparable weight loss and HbA1c reductions. The low carb (LC) group sustained greater reductions in diabetes medication requirements, and in improvements in diurnal blood glucose stability and blood lipid profile, with no adverse renal effects, suggesting greater optimization of T2D management.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Tsaban	2017	Dynamics of intrapericardial and extrapericardial fat tissues during long-term, dietary-induced, moderate weight loss	Am J Clin Nutr	University of the Negev, Israel et al / n/a	Moderate but persistent dietary-induced weight loss substantially decreased both IPF and EPF volumes. Reduction of pericardial adipose tissues is independently associated with an improved lipid profile. The Mediterranean diet, rich in unsaturated fats and restricted carbohydrates, is superior to an LF diet in terms of the IPF burden reduction.	RCT
Brinkworth	2016	Long-term effects of very low-carbohydrate and high-carbohydrate weight-loss diets on psychological heatlh in obese adults with type 2 diabetes: randomized controlled trial	Journal of Internal Medicine	National Health and Medical Research Council of Australia	In obese adults with T2DM, both diets achieved substantial weight loss and comparable improvements in quality of life mood state and affect. These results suggest that either an low carb (LC) or high carb (HC) diet within a lifestyle modification programme that includes exercise training improves psychological wellbeing.	RCT
Chiu	2016	Comparison of the DASH (Dietary Approaches to Stop Hypertension) diet and a higher-fat DASH diet on blood pressure and lipids and lipoproteins: a randomized controlled trial	American Journal of Clinical Nutrition	Children's Hospital Oakland Research Institute // Dairy Management; National Research Resources	The high fat-DASH diet lowered blood pressure to the same extent as the DASH diet but also reduced plasma triglyceride and VLDL concentrations without significantly increasing LDL cholesterol. LDL cholesterol however tended to be larger (indicative of large fluffy LDL) in the HF-DASH group, though this was not statistically significantly different from controls. DASH resulted in statistically significant changes resulting in a reduction in large LDL. Nonfat and low-fat dairy were replaced with full-fat dairy products, and carbohydrates energy was reduced by 12% from standard DASH diet. This study was performed on a healthy population.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Esposito	2016	Effects of low-carbohydrate diet therapy in overweight subjects with autoimmune thyroiditis: possible synergism with ChREBP	Drug Design, Development and Therapy	University of Foggia	A low-carbohydrate diet also devoid of goitrogenic foods significantly reduced antithyroid, anti-microsomal, and anti-peroxidase antibodies. Untreated patients continued to get worse. With regard to anthropometric measures, in patients who followed the diet, they observed a reduction in boyd weight and BMI.	RCT
Hall	2016	Energy expenditure and body composition changes after an isocaloric ketogenic diet in overweight and obese men	Am J Clin Nutr	Pennington Biomedical Research Center & Columbia University Medical Center // NUSI & NIH	A logical consequence of the carbohydrate–insulin model is that decreasing the proportion of dietary carbohydrate to fat without altering protein or calories will reduce insulin secretion, increase fat mobilization from adipose tissue, and elevate the oxidation of circulating free fatty acids (FFAs). For those participants following the Ketogenic Diet, insulin response was superior to comparative diet.	RCT
Hashimoto	2016	Impact of low-carbohydrate diet on body composition: meta-analysis of randomized controlled studies	Obes Rev	Kyoto Prefectural University of Medicine	Fourteen randomized controlled studies were included in this meta-analysis. Eight studies including very low carb diet (LCD) (50 g carbohydrate or 10% calorie from carbohydrate) and seven studies including mild LCD (about 40% calorie from carbohydrate). Meta-analysis carried out on data of 1416 obese individuals, showed that LCD was associated with decrease in body weight. Subgroup meta-analysis of studies in over 12 months suggested that LCD was not associated with decrease in body weight, but LCD was associated with decrease in fat mass. In addition, very LCD was associated with decrease in fat mass, but mild LCD was not associated with decrease in fat mass. LCD, especially very LCD, might be effective for decrease in fat mass in obese individuals.	Meta-analysis

Author	Year	Title	Journal	University/Funding	Summary	Type
Hu	2016	The effects of a low-carbohydrate diet on appetite: A randomized controlled trial	Nutr Metab Cardiovasc Dis	National Center for Research Resources, National Institute of Health, Tulane University Hypertension and Renal Center	A total of 148 adults with a body mass index 30-45 kg/m(2), who were free of diabetes, cardiovascular disease and chronic kidney disease at baseline were randomly assigned to either a low-carbohydrate diet (carbohydrate [excluding dietary fiber]<40 g/day; N = 75) or a low-fat diet (<30% energy from fat, <7% from saturated fat; N = 73). Appetite and appetite-related hormones were measured at 0, 3, 6 and 12 months of intervention. At 12 months, mean changes (95% CI) in peptide YY were -34.8 pg/mL (-41.0 to -28.6) and in the low-carbohydrate group and -44.2 pg/mL (-50.4 to -38.0) in the low-fat group (net change: 9.54 pg/mL [0.6 to 18.2]; p = 0.036). A low-fat diet reduced peptide YY more than a low-carbohydrate diet. These findings suggest that satiety may be better preserved on a low-carbohydrate diet, as compared to a low fat diet.	RCT
Li	2016	Third Exposure to a Reduced Carbohydrate Meal Lowers Evening Postprandial Insulin and GIP Responses and HOMA-IR Estimate of Insulin Resistance	PLOS One	University of Michigan // NIDDK & BCBS of MI Foundation	Evening postprandial insulin and GIP responses and insulin resistance declined by over 30% after three meals that limited daily carbohydrate intake to 30% compared to no such changes after three 60%-carbohydrate meals, an effect that was independent of pre-meal exercise. The parallel timing and magnitude of postprandial insulin and GIP changes suggest their dependence on a delayed intestinal adaptation to a low-carbohydrate diet.	RCT

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Mansoor	2016	Effects of low-carbohydrate diets v. low-fat diets on body weight and cardiovascular risk factors: a meta-analysis of randomised controlled trials	British Journal of Nutrition	University of Oslo // Throne Holst Foundation for Nutrition Research	This meta-analysis demonstrates opposite change in two important cardiovascular risk factors on low carb (LC) diets – greater weight loss and increased LDL-cholesterol.	Meta-analysis
Tay	2016	A randomized-controlled trial of the effects of very low-carbohdyrate and high-carbohydrate diets on cognitive performance in patients with type 2 diabetes	British Journal of Nutrition	National Health and Medical Research Council of Australia	In obese adults with T2D, both LC and HC weight-loss diets combined with exercise training had similar effects on cognitive performance. This suggests that an LC diet integrated within a lifestyle modification programme can be used as a strategy for weight and diabetes management without the concern of negatively affecting cognitive function.	RCT
Truby	2016	A Randomized Controlled Trial of Two Different Macronutrient Profiles on Weight, Body Composition, and Metabolic Parameters in Obese Adolescents Seeking Weight Loss	PLOS One	National Heart Foundation, the Royal Childrens Hosptial Foundation, University of Queensland, ANZ Trustees	Both dietary patterns resulted in similar changes in weight, body composition and metabolic improvements compared to control. The use of a structured eating system which allows flexibility but limited choices can assist in weight change and the rigid application of a low fat eating pattern is not exclusive in its efficacy.	RCT
Wycherley	2016	Long-term effects of weight loss with a very-low carbohydrate, low saturated fat diet on flow mediated dilatation in patients with type 2 diabetes: A randomised controlled trial	Atherosclerosis	Sansom Institute for Health Research, University of South Australia (Australia)	In patients with obesity and T2DM, High carbohydrate (CHO) diet and Low CHO diet have similar effects on endothelial function.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Cicero	2015	Middle and Long-Term Impact of a Very Low-Carbohydrate Ketogenic Diet on Cardiometabolic Factors: A Multi-Center, Cross-Sectional, Clinical Study	High Blood Press Cardiovasc Prev	Not listed.	All the predetermined goals—namely safety, reduction of body weight and cardiovascular risk factors were reached with a significant reduction of body weight, waistline, fatty mass, SBP. The tested very low carbohdyrate diet suggested by trained general physicians in the setting of clinical practice seems to be able to significantly improve on the middle-term a number of anthropometric, haemodynamic and laboratory with an overall good tolerability	Single-arm Intervention
DeSouza	2015	Intake of saturated and trans unsaturated fatty acids and risk of all cause mortality, cardiovascular disease, and type 2 diabetes: Systematic review and meta-analysis of observational studies	BMJ	McMaster University, Canada / WHO	To systematically review associations between intake of saturated fat and trans unsaturated fat and all cause mortality, cardiovascular disease (CVD) and associated mortality, coronary heart disease (CHD) and associated mortality, ischemic stroke, and type 2 diabetes.	Meta-analysis
Gardner	2015	Weight Loss on Low-Fat vs. Low-Carbohydrate Diets by Insulin Resistance Status Among Overweight Adultsand Adults With Obesity: A Randomized Pilot Trial	Obesity	Stanford University // Haas Avocado Board, NIH	Both diets demonstrated significant weight loss, as well as improved biomarkers for many disease risk factors.	RCT

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Gibson	2015	Do Ketogenic Diets Really Suppress Appetite? A Systematic Review and Meta-Analysis	Obesity Reviews	Australian Research Council, National Healtha nd Medical Research Council of Australia, Endocrine Society of Australia	Individuals adhering to ketogenic low carb diet (KLCD) were less hungry and had a reduced desire to eat. Although these absolute changes in appetite were small, they occurred within the context of energy restriction, which is known to increase appetite in obese people. Thus, the clinical benefit of a ketogenic diet is in preventing an increase in appetite, despite weight loss, although individuals may indeed feel slightly less hungry (or more full or satisfied). Ketosis appears to provide a plausible explanation for this suppression of appetite.	Meta-analysis
Harcombe	2015	Evidence from randomised controlled trials did not support the introduction of dietary fat guidelines in 1977 and 1983: a systematic review and meta-analysis	BMJ	University of West Scotland // Funding not listed	Dietary recommendations were introduced for 220 million US and 56 million UK citizens by 1983, in the absence of supporting evidence from RCTs.	Meta-analysis
Hu	2015	The Effects of a Low-Carbohydrate Diet vs. a Low-Fat Diet on Novel Cardiovascular Risk Factors: A Randomized Controlled Trial	Nutrients	National Center for Research Resources, National Institute of Health, Tulane University Hypertension and Renal Center	The authors examined the effects of a low-carbohydrate diet (<40 g/day; n = 75) versus a low-fat diet (<30% kcal/day from total fat, <7% saturated fat; n = 73) on biomarkers representing inflammation, adipocyte dysfunction, and endothelial dysfunction in a 12 month clinical trial among 148 obese adults free of diabetes and CVD. At 12 months, participants on the low-carbohydrate diet had significantly greater increases in adiponectin (mean difference in change, 1336 ng/mL (95% CI, 342 to 2330 ng/mL); p = 0.009) and greater decreases in intercellular adhesion molecule-1 concentrations (16.8 ng/mL (32.0 to 1.6 ng/mL); p = 0.031) than those on the low-fat diet.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Sackner-Bernstein	2015	Dietary Intervention for Overweight and Obese Adults: Comparison of Low-Carbohydrate and Low-Fat Diets. A Meta-Analysis	PlosOne	ExVivos // Atkins Nutritionals	This trial-level meta-analysis of randomized controlled trials comparing low carbohydrate diets with low fat diets in strictly adherent populations demonstrates that each diet was associated with significant weight loss and reduction in predicted risk of adverse serious cardiovascular disease (ASCVD) events. However, low carb diets were associated with modest but significantly greater improvements in weight loss and predicted ASCVD risk in studies from 8 weeks to 24 months in duration. These results suggest that future evaluations of dietary guidelines should consider low carbohydrate diets as effective and safe intervention for weight management in the overweight and obese, although long-term effects require further investigation.	Meta-analysis
Tay	2015	Comparison of low- and high-carbohydrate diets for type 2 diabetes management: a randomized trial	Am J Clin Nutr	University of Adelaide / National Health and Medical Research Council	Authors compared the effects of a very-low-carbohydrate, high–unsaturated fat, low–saturated fat (LC) diet with a high carbohydrate, low-fat (HC) diet on glycemic control and cardiovascular disease risk factors in T2D after 52 wk.	RCT
Throning	2015	Diets with high-fat cheese, high-fat meat, or carbohydrate on cardiovascular risk markers in overweight postmenopausal women: a randomized crossover trial	Am J Clin Nutr	University of Copenhagen (Denmark)	Diets with cheese and meat as primary sources of SFAs cause higher HDL cholesterol and apo A-I and, therefore, appear to be less atherogenic than is a low-fat, high-carbohydrate diet. Also, our findings confirm that cheese increases fecal fat excretion.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Amari	2014	Exploring the relationship between preferences for high fat foods and efficacy of the ketogenic and modified Atkins diets among children with seizure disorders	Seizure	Johns Hopkins University / Funding not listed.	Findings provide preliminary evidence that fat preference, when directly assessed, may be a useful predictor of treatment efficacy for the ketogenic and modified Atkins diets.	Prospective Study
Bazzano	2014	Effects of Low-Carbohydrate and Low-Fat Diets	Annals of Internal Medicine	Tulane University, Kaiser Permanente, Johns Hopkins / NIH	The low-carbohydrate diet was more effective for weight loss (at 3, 6, and 12 months, total loss of -3.5 kgs more than low-fat), fat mass loss, lean mass increase and cardiovascular risk factor reduction (HDL, Chol:HDL ratio, triglycerides, CRP) than the low-fat diet. Restricting carbohydrate may be an option for persons seeking to lose weight and reduce cardiovascular risk factors. The authors used the CHD risk score generated from the Framingham study to predict CHD risk and found the estimated reduction in 10-year risk was significantly greater in the low-carbohydrate group.	RCT
Botros	2014	Effect of carbohydrate restriction in patients with hyperinsulinemic hypoglycemia after Roux-en-Y gastric bypass	Obes Surg	Rijnstate Hospital (Netherlands)	A 30-g carb-restricted meal may help to prevent post-prandial hypoglycemia in patients with post-RYGB hypoglycemia. The use of a liquid, low GI, supplement offers no additional advantage.	Case Series
Caraballo	2014	Ketogenic diet in pediatric patients with refractory focal status epilepticus	Epilepsy Research	Hospital de pediatrica, Buenos Aires, Argentina / Funding not listed	The ketogenic diet (KD) is an effective and well-tolerated treatment option for patients with refractory epilepsy. In patients with focal status epliepticus secondary to inflammatory or probably inflammatory diseases,the KD should be considered earlier in the course of the treatment.	Case series

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Chowdhury	2014	Association of Dietary, Circulating, and Supplement Fatty Acids With Coronary Risk	Annals of Internal Medicine	University of Cambridge, Harvard University, Univeristy of Oxford / British Heart Foundation, Medical Research Council, Cambridge National Institute for Health Research Biomedical Research Centre, and Gates Cambridge	Current evidence does not clearly support cardiovascular guidelines that encourage high consumption of polyunsaturated fatty acids and low consumption of total saturated fats. Based off of this meta-analysis, there was no correlation between intake of saturated fats, monounsaturated fats, alpha-linoleic acid, or omega-6 fats and the likelihood of a coronary event. There was a increased relative risk related to consumption of trans-fats, and a decreased relative risk due to consumption of long-chain omega-3 fatty acids.	Systematic review and meta-analysis
DiLorenzo	2014	Migraine improvement during short lasting ketogenesis: a proof-of concept study	European Journal of Neurology	University of Rome / Funding not listed (Italy)	The underlying mechanisms of ketogenic diet (KD) efficacy could be related to its ability to enhance mitochondrial energy metabolism and counteract neural inflammation.	RCT
DiNicolantonio	2014	The cardiometabolic consequences of replacing saturated fats with carbohydrates or Ω-6 polyunsaturated fats: Do the dietary guidelines have it wrong?	BMJ, Open Heart	Saint Luke's Mid America Heart Institute / n/a	A recent publication by Malhotra was refreshing, inspiring and hit on an important topic that has been heavily debated for over 50 years, that is, are saturated fats as bad as we have been led to believe? This editorial discusses the data.	Editorial
Feinman	2014	Dietary Carbohydrate restriction as the first approach in diabetes management. Critical review and evidence base	Nutrition	SUNY Downstate Medical Center / n/a	Authors present 12 points of evidence supporting the use of low-carbohydrate diets as the first approach to treating type 2 diabetes and as the most effective adjunct to pharmacology in type 1.	Meta-analysis

Author	Year	Title	Journal	University/Funding	Summary	Type
Fine	2014	Insulin, carbohydrate restriction, metabolic syndrome and cancer	Expert Rev. Endocrinol. Metab.	Albert Einstein School of Medicine, SUNY Health Sciences Ctr / Atkins Foundation and SUNY	We propose that dietary carbohydrate restriction, particularly ketogenic diets, may provide benefit as a therapeutic or preventive strategy in cancer, alone or as an adjunct to pharmacology.	Review
Haberlandt	2014	Glucose transporter type 1 deficiency syndrome effectively treated with modified atkins diet.	Neuropediatrics	Innsbruck Medical University / Funding not listed. (Austria)	Treatment with MAD, a variant of KD, for an observation period of 17 months resulted in improvement of seizures, alertness, cognitive abilities, and electroencephalography in this patient.	Case study
Hu	2014	The low-carbohydrate diet and cardiovascular risk factors: Evidence from epidemiologic studies	Nutrition, Metabolism & Cardiovascular Diseases	Tulane University / n/a	Recent randomized controlled trials document that low-carbohydrate diets not only decrease body weight but also improve cardiovascular risk factors. In light of this evidence from randomized controlled trials, dietary guidelines should be re-visited advocating a healthy low carbohydrate dietary pattern as an alternative dietary strategy for the prevention of obesity and cardiovascular disease risk factors.	Editorial
Johnston	2014	Comparison of Weight Loss Among Named Diet Programs in Overweight and Obese Adults	JAMA	Stanford Univ. / Canadian Institute of Health	Low-carbohydrate and low-fat dietary programs were associated with more weight loss than no dietary intervention over a 12-month period; behavioral support and exercise enhanced weight loss. This supports the practice of recommending any diet that a patient will adhere to in order to lose weight.	Meta-analysis

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Jonasson	2014	Advice to follow a low-carbohydrate diet has a favourable impact on low-grade inflammation in type 2 diabetes compared with advice to follow a low-fat diet	Annals of Medicine	Linkoping University, Sweden / Funding not listed.	A Low Carbohydrate Diet was found to significantly improve the subclinical inflammatory state in type 2 diabetes.	RCT
Klein	2014	Dietary treatment in adults with refractory epilepsy: A review	Neurology	George Washington Univ / funding not listed	This review paper discusses the benefits of a ketogenic diet (or Modified Atkins Diet) as a treatment of epilepsy.	Review
Maekwa	2014	Retrospective Study on the Efficacy of a Low-Carbohydrate Diet for Impaired Glucose Tolerance	Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy	Japan Labor Health and Welfare Organization / Funding not listed (Japan)	The low carbohydrate diet (LCD) is effective for normalizing blood glucose and preventing progression to type-2 diabetes in patients with IGT.	Retrospective
Moreno	2014	Comparison of a very low-calorie-ketogenic diet with a standard low-calorie diet in the treatment of obesity	Endocrine	Universitario Gregorio Maranon (Spain), Universitat Autonoma de Barcelona, (Spain) // Pronokal Protein Supplies Spain	In a group of obese patients, the very low carbohydrate ketogenic diet (VLCK) was significantly more effective than a standard LC diet. At one year followup in the group with VLCK diet, most of the patients loss more than 10 % of their initial weight and lean mass was well preserved.	RCT
Saslow	2014	A Randomized Pilot Trial of a Moderate Carbohydrate Diet Compared to a Very Low Carbohydrate Diet in Overweight or Obese Individuals with Type 2 Diabetes Mellitus or Prediabetes	PlosOne	University of California / NIH	Results suggest that a very low carbohydrate diet coupled with skills to promote behavior change may improve glycemic control in type 2 diabetes while allowing decreases in diabetes medications.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Setler	2014	Dietary and Medication Adjustments to Improve Seizure Control in Patients Treated With the Ketogenic Diet	Journal of Child Neurology	Johns Hopkins School of Medicine / NIH	''Fine-tuning'' the ketogenic diet by researchers series led to significant additional improvement for 1 in 5 patients, even after up to 14 months on the diet.	Retrospective
Sharma	2014	The Modified Atkins Diet in Refractory Epilepsy	Epilepsy Res Treat	Lady Hardinge Medical College and Associated Kalawati Saran Children's Hospital / Funding not listed (India)	In this review, we discuss the use of the modified Atkins diet in refractory epilepsy.	Review
Tay	2014	A Very Low Carbohydrate, Low Saturated Fat Diet for Type 2 Diabetes Management: A Randomized Trial	Diabetes Care	University of Adelaide / National Health and Medical Research Council	Both diets achieved substantial improvements for several clinical glycemic control and CVD risk markers. These improvements and reductions in GV and antiglycemic medication requirements were greatest with the low carb (LC) compared with high carb (HC). This suggests an LC diet with low saturated fat may be an effective dietary approach for T2DM management if effects are sustained beyond 24 weeks.	RCT
Volk	2014	Effects of Step-Wise Increases in Dietary Carbohydrate on Circulating Saturated Fatty Acids and Palmitoleic Acid in Adults with Metabolic Syndrome	PlosOne	University of Con. / Dairy Research Institute, The Beef Checkoff, Egg Nutrition Center, Atkins Foundation	The results show that dietary and plasma saturated fat are not related, and that increasing dietary carbohydrate across a range of intakes promotes incremental increases in plasma palmitoleic acid, a biomarker consistently associated with adverse health outcomes.	RCT

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Yamada	2014	A Non-calorie-restricted Low-carbohydrate Diet is Effective as an Alternative Therapy for Patients with Type 2 Diabetes	Internal Medicine	Diabetes Center, Kitasato Institute Hospital, Japan / Funding not listed	Findings suggest that a low-carbohydrate diet is effective in lowering the HbA1c and triglyceride levels in patients with type 2 diabetes who are unable to adhere to a calorie-restricted diet.	RCT
Ajala	2013	Systematic review and meta-analysis of different dietary approaches to the management of type 2 diabetes	Am J Clin Nutr	Peninsula College of Medicine, UK / No funding for this study	Low-carbohydrate are as effective as low-GI, Mediterranean, and high protein diets in improving various markers of cardiovascular risk in people with diabetes and should be considered in the overall strategy of diabetes management.	Meta-analysis
Ballard	2013	Dietary carbohydrate restriction improves insulin sensitivity, blood pressure, microvascular function, and cellular adhesion markers in individuals taking statins	Nutrition Research	University of Connecticut / University of Connecticut	The results of this study suggest that a carbohydrate restricted diet could be a sustainable lifestyle that complements statin treatment to improve overall cardiometabolic risk, particularly for individuals with other risk factors indicative of metabolic syndrome, but future research is needed to determine the effects over a longer period of time.	Case Series
Bueno	2013	Very-low-carbohydrate ketogenic diet v. low-fat diet for long-term weight loss: a meta-analysis of randomised controlled trials	British Journal of Nutrition	Universidade Federal de Alagoas, Brazil / CNPq	Individuals assigned to a very low carbohdyrate ketogenic diet (VLCKD) achieve a greater weight loss than those assigned to a low fat diet (LFD) in the long term; hence, a VLCKD may be an alternative tool against obesity. This meta-analysis included a total of 1577 individuals (randomized to 787 low fat and 790 VLCKD). Other factors shown to be improved by VLCKD included: HDL-C, TAG, Blood pressure (Diastollic, no change systolic).	Meta-analysis

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
DiLorenzo	2013	Diet transiently improves migraine in two twin sisters: possible role of ketogenesis?	Funct Neurol.	University of Rome / Funding not listed (Italy)	The case of a pair of twin sisters, whose high-frequency migraine improved during a ketogenic diet they followed in order to lose weight. The observed time-lock between ketogenesis and migraine improvement provides some insight into how ketones act to improve migraine.	Case study
El-Rashidy	2013	Modified Atkins diet vs classic ketogenic formula in intractable epilepsy	Acta Neurol Scand	Ain Shams University / Ain Shams University (Egypt)	The ketogenic diet (KD) whether classic 4:1 or modified Atkins diet (MAD) is a tolerable, safe, and effective adjuvant therapy for intractable symptomatic childhood epilepsy with limited adverse effects on the growth parameters and accepted changes in the lipid profile. The liquid ketogenic formula patients showed better growth pattern and significantly more seizure control.	Pilot study
Kossoff	2013	Efficacy of dietary therapy for juvenile myoclonic epilepsy	Epilepsy & Behavior	Johns Hopkins Medical Institutions / Carson Harris Foundation	The modified Atkins diet was an efficacious adjunctive therapy for young adults with very medically resistant Juvenile Myoclonic Epilepsy. After 1 month, 6 (75%) patients had >50% seizure reduction, and after 3 months, 5 (63%) patients had >50% improvement.	Case study
Kossoff	2013	Transitioning pediatric patients receiving ketogenic diets for epilepsy into adulthood	Seizure	Johns Hopkins University / NIH	It is important for adolescents with epilepsy receiving ketogenic diets to have transition plans in place for when they become adults. Adult epilepsy diet centers are the ideal option when possible.	Case study

Author	Year	Title	Journal	University/Funding	Summary	Type
Kossoff	2013	Dietary Therapies for Epilepsy	Biomedical Journal	Johns Hopkins University / Review article - no funding.	The two major nonpharmacologic treatments for patients with epilepsy are neurostimulation devices (e.g. vagus nerve stimulators) and dietary treatments (ketogenic). In this review, we will cover the latter treatments, namely, using diets.	Review
Kossoff	2013	A decade of the modified Atkins diet (2003–2013): Results, insights, and future directions	Epilepsy and Behavior	Johns Hopkins University	The modified Atkins diet has been used since 2003 for the treatment of children and adults with refractory epilepsy. Now after 10 years of continued use, approximately 400 patients have been reported in over 30 studies of the modified Atkins diet as treatment for intractable seizures, with results demonstrating similar efficacy to the ketogenic diet and improved tolerability. This review will discuss the past decade of experience with the modified Atkins diet as well as predictions for its role in the treatment of epilepsy a decade from now.	Review
Leen	2013	Movement disorders in GLUT1 deficiency syndrome respond to the modified Atkins diet.	Mov Disord	Radboud University Medical Centre / Funding not listed (Netherlands)	The modified Atkins diet is an effective and feasible alternative to the ketogenic diet for the treatment of GLUT1DS-related paroxysmal movement disorders in adolescence and adulthood.	Case study
Malhotra	2013	Saturated fat is not the major issue	BMJ	Croydon University Hospital, London	It is time to bust the myth of the role of saturated fat in heart disease and wind back the harms of dietary advice that has contributed to obesity.	Opinion

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
McClain	2013	Adherence to a Low-Fat versus Low-Carbohydrate Diet Differs by Insulin Resistance Status	Diabetes Obes Metab	Standford University, Arizona State University // NIH	The results suggest insulin resistance status may affect dietary adherence to weight loss diets, resulting in higher recidivism and diminished weight loss success of IR-participants advised to follow low fat-diets or low carb-diets for weight loss.	RCT
Paoli	2013	Long Term Successful Weight Loss with a Combination Biphasic Ketogenic Mediterranean Diet and Mediterranean Diet Maintenance Protocol	Nutrients	University of Padova / Gianluca Mech SpA; University of Padova	The data from this study demonstrate that the majority of subjects showed significant weight loss (10%) as a result of a two-phase very low carbohydrate ketogenic diet (VLCKD) and were compliant both during the six month weight loss phase and the six month normocaloric maintenance phase, with no weight regain. We can suggest that the proposed protocol was generally successful because of (a) the protein mass protective effects of a VLCKD and (b) the prescription of a traditional Mediterranean diet in the post weight-loss phase was especially important for achieving “weight loss success”, i.e., continued weight loss for at least one year.	RCT
Paoli	2013	Beyond weight loss: a review of the therapeutic uses of very-low-carbohydrate (ketogenic) diets.	European Journal of Clinical Nutrition	University of Padova / Funding not listed	This review revisits the meaning of physiological ketosis in the light of this evidence and considers possible mechanisms for the therapeutic actions of the ketogenic diet on different diseases. The present review also questions whether there are still some preconceived ideas about ketogenic diets, which may be presenting unnecessary barriers to their use as therapeutic tools in the physician's hand.	Review

Author	Year	Title	Journal	University/Funding	Summary	Type
Paoli	2013	Long term successful weight loss with a combination biphasic ketogenic Mediterranean diet and Mediterranean diet maintenance protocol.	Nutrients	University of Padova, (Italy)	The combination of a biphasic KEMEPHY diet separated by longer periods of maintenance nutrition, based on the traditional Mediterranean diet, led to successful long term weight loss and improvements in health risk factors in a majority of subjects; compliance was very high which was a key determinant of the results seen.	RCT
Ruth	2013	Consuming a hypocaloric high fat low carbohydrate diet for 12 weeks lowers C-reactive protein, and raises serum adiponectin and high density lipoprotein-cholesterol in obese subjects	Metabolism: Clinical and Experimental	Boston University / Atkins Foundation	Relative to the Low Fat/High Carb group, the High Fat/Low Carb group had greater improvements in blood lipids and systemic inflammation with similar changes in body weight and composition. This small-scale study suggests that HFLC diets may be more beneficial to cardiovascular health and inflammation in free-living obese adults compared to LFHC diets.	RCT
Sharma	2013	Use of the modified Atkins diet for treatment of refractory childhood epilepsy: A randomized controlled trial	Epilepsia	All India Institute of Medical Sciences	The modified Atkins diet was found to be effective and well tolerated in children with drug-refractory epilepsy.	RCT
Tirosh	2013	Renal Function Following Three Distinct Weight Loss Dietary Strategies During 2 Years of a Randomized Controlled Trial	Diabetes Care	Harvard Medical School / Israeli Ministry of Healthy & Atkins Foundation	A low-carbohydrate diet is as safe as Mediterranean or low-fat diets in preserving/improving renal function among moderately obese participants with or without type 2 diabetes, with baseline serum creatinine <176 µmol/L. Potential improvement is likely to be mediated by weight loss-induced improvements in insulin sensitivity and blood pressure.	RCT

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Walsh	2013	Effects of Diet Composition on Postprandial Energy Availability during Weight Loss Maintenance	PlosOne	Children's Hospital Boston/National Institute of Diabetes and Digestive and Kidney Diseases	These findings suggest that a low fat diet may adversely affect postprandial energy availability and risk for weight regain during weight loss maintenance.	RCT
Chen	2012	Long-term follow-up of children treated with the modified Atkins diet.	J Child Neurol	Johns Hopkins University / Johns Hopkins Univeristy, National Center for Research Resources/NIH, Dr Robert Atkins Foundation, and Nutricia, Inc.	At their most recent point during the modified Atkins diet (mean 19.9 months), 30 of 54 (55%) children with diet durations of more than 6 months achieved >50% improvement; 19 (35%) were seizure-free.	Retrospective Case Series
Ebbeling	2012	Effects of Dietary Composition on Energy Expenditure During Weight-Loss Maintenance	JAMA	Children's Hospital Boston/National Institute of Diabetes and Digestive and Kidney Diseases	Individuals on the very low carb diet had the highest resting metabolism.	RCT
Fine	2012	Targeting insulin inhibition as a metabolic therapy in advanced cancer: A pilot safety and feasibility dietary trial in 10 patients	Nutrition	Albert Einstein College of Medicine/SUNY Research Foundation & Atkins Foundation	Insulin inhibition effected by dietary carbohydrate restriction was found safe and feasible in 10 patients with advanced cancer.	Pilot study
Friedman	2012	Comparative Effects of Low-Carbohydrate High-Protein Versus Low-Fat Diets on the Kidney	Clin J Am Soc Nephrol	Indiana University School of Medicine, Temple University Center for Obesity Research and Education, Washington University School of Medicine/National Institute of Health	In healthy obese individuals, a low-carbohydrate high-protein weight-loss diet over 2 years was not associated with noticeably harmful effects on glumular filtration rate albuminuria, or fluid and electrolyte balance compared with a low-fat diet.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Gardner	2012	Tailoring dietary approaches for weight loss	International Journal of Obesity Supplements	Stanford University/Funding not listed	After decades of health professionals promoting a Low-Fat dietary approach for weight loss and weight control, a series of studies conducted in the past decade pitting Low-Fat vs Low-Carb diets have provided evidence that the Low-Fat diet is not a superior approach; a Low-Carb, and possibly a High-Protein, diet is equally, if not modestly more, effective.	Opinion
Gulbrand	2012	In type 2 diabetes, randomisation to advice to follow a low-carbohydrate diet transiently improves glycaemic control compared with advice to follow a low-fat diet producing a similar weight loss	Diabetologia	University Hospital of Linkoping Research Funds, Linkoping University, County Council of Ostergotland, The Diabetes Research Centre of Linkoping University	Weight changes did not differ between the diet groups, while insulin doses were reduced significantly more with the LCD at 6 months, when compliance was good. Thus, aiming for 20% of energy intake from carbohydrates is safe with respect to cardiovascular risk compared with the traditional LFD and this approach could constitute a treatment alternative.	RCT
Hussain	2012	Effect of low-calorie versus low-carbohydrate ketogenic diet in type 2 diabetes	Nutrition	Al Shaab Family Medicine Medical Center, Kuwait/Funding not listed	This study shows the beneficial effects of a ketogenic diet over the conventional low carb diets in obese diabetic subjects. The ketogenic diet appears to improve glycemic control. Therefore, diabetic patients on a ketogenic diet should be under strict medical supervision because the low carb ketogenic diet can significantly lower blood glucose levels.	RCT
Meyerhardt	2012	Dietary Glycemic Load and Cancer Recurrence and Survival in Patients with Stage III Colon Cancer: Findings From CALGB 89803	J Natl Cancer Inst	Dana Farber Cancer Institute / NIH	Higher dietary glycemic load and total carbohydrate intake were statistically significant associated with an increased risk of recurrence and mortality in stage III colon cancer patients. These findings support the role of energy balance factors in colon cancer progression and may offer potential opportunities to improve patient survival.	Cohort Study

Author	Year	Title	Journal	University/Funding	Summary	Type
Paoli	2012	Ketogenic diet does not affect strength performance in elite artistic gymnasts	Journal of the International Society of Sports Nutrition	University of Padova, Italy/Gianluca Mech SpA, Orgiano (VI), Italy	Data suggest that athletes who underwent a very low carb ketogenic diet (VLCKD) with adequate protein intake lost weight and improved body composition without any negative changes in strength and power performance. Taken together these results suggest that a properly monitored and programmed ketogenic diet could be a useful, and safe, method to allow the athletes to reach their desired weight categories.	RCT
Paoli	2012	Nutrition and Acne: Therapeutic Potential of Ketogenic Diets	Skin Pharmacology and Physiology	Unviersity of Padova, University of Athens, University of Palermo/Funding not listed	This review examines the evidence supporting an influence of various dietary components, such as ketogenic diet, on the development of acne particularly focusing on the role played by carbohydrates.	Review
Roberts	2012	Relative Intake of Macronutrients Impacts Risk of Mild Cognitive Impairment or Dementia	Journal of Alzheimer's Disease	Mayo Clinic / National Institute of Health	A dietary pattern with relatively high caloric intake from carbohydrates and low caloric intake from fat and proteins may increase the risk of mild cognitive impairment or dementia in elderly persons.	Cohort Study
Santos	2012	Systematic review and meta-analysis of clinical trials of the effects of low carbohydrate diets on cardiovascular risk factors	Obesity Reviews	Universidade do Porto, Porto, Portugal, Veteran Affairs Medical Center, Durham, NC, Duke University Medical Center/Funding not listed	A low carb diet was shown to have favourable effects on body weight and major cardiovascular risk factors.	Meta-analysis

Author	Year	Title	Journal	University/Funding	Summary	Type
Volek	2012	The twisted tale of saturated fat	Lipid Technology	Univeristy of Connecticut / Funding not listed.	Increased circulating levels of saturated fat are associated with increased risks for insulin resistance, type 2 diabetes, and heart attack. Instead of telling everyone to restrict dietary saturated fat, a more rational and effective strategy would be to focus on ways to help people find their, 'right' level of carbohydrate.	Review
Hite	2011	Low-Carbohydrate Diet Review: Shifting the Paradigm	Nutr Clin Pract	University of North Carolina/Funding not listed.	This review examines and compares the safety and the effectiveness of a low carb (LC) approach as an alternative to a low-fat (LF), highcarbohydrate diet, the current standard for weight loss and/or chronic disease prevention. The metabolic, hormonal, and appetite signaling effects of carbohydrate reduction suggest an underlying scientific basis for considering it as an alternative approach to LF, high-carbohydrate recommendations in addressing overweight/obesity and chronic disease in America.	Review
Ito	2011	A modified Atkins diet is promising as a treatment for glucose transporter type 1 deficiency syndrome.	Dev Med Child Neurol	Tokyo Women's Medical University /Funding not listed. (Japan)	For the treatment of GLUT1-DS, the modified Atkins diet (MAD) is less restrictive, more palatable, and easier to maintain than the conventional ketogenic diet, but its effectiveness was similar. Thus, MAD treatment is promising for individuals with GLUT1-DS and their families.	Case study
Kima	2011	Various Indications For a Modified Atkins Diet in Intractable Childhood Epilepsy	Brain and Development	Yonsei University College of Medicine, Korea/Funding not listed	A long-term treatment with the modified Atkins diet (MAD) was well tolerated. Moreover, the MAD can successfully substitute the classic KD in patients who showed improvement in seizure outcomes by the ketogenic diet (KD). 9 patients maintained the MAD with favorable seizure outcomes (a reduction of seizure frequency by over 50%) or successfully completed the diet therapy.	Retrospective

Author	Year	Title	Journal	University/Funding	Summary	Type
Kossoff	2011	Prospective Study of the Modified Atkins Diet in Combination With a Ketogenic Liquid Supplement During the Initial Month	Journal of Child Neurology	Johns Hopkins Medical Insitution/Johns Hopkins Medical Institution	This study analyzed the combination of the Modified Atkins Diet and the supplement KetoCal in the treatment of intractible childhood epilepsy. The use of this ketogenic supplement increased daily fat intake and thus the ketogenic ratio but did not change urinary or serum ketosis. The addition of a ketogenic supplement to the modified Atkins diet during its initial month appears to be beneficial.	Prospective Controlled Study
Kumada	2011	Efficacy and Tolerability of Modified Atkins Diet in Japanese Children With Medication-Resistant Epilepsy	Brain and Development	Shiga Medical Center for Children, Japan/Funding not listed.	Seven Japanese patients aged 1.5–17 years with medication-resistant epilepsy were placed on the modified Atkins diet (MAD) for 3 weeks during admission to our hospital. Dietary carbohydrate was restricted to 10 g per day. Among the patients who could continue the diet for 3 weeks, 3 achieved the seizure reduction; 2 became seizure-free and 1 showed about 75% reduction in the seizure frequency within 10 days on the diet. The MAD was effective and well-tolerated in children with medication-resistant epilepsy in Japan.	Retrospective
Martin	2011	Change in Food Cravings, Food Preferences, and Appetite During a Low-Carbohydrate and Low-Fat Diet	Obesity	Temple University, Washington University-St. Louis, University of Colorado/National Institute of Health	The study objective was to evaluate the effect of prescribing a low-carbohydrate diet (LCD) and a low-fat diet (LFD) on food cravings, food preferences, and appetite. The LCD group reported being less bothered by hunger compared to the LFD group. Compared to the LCD group, the LFD group had significantly larger decreases in cravings for high-fat foods and preference for low-carbohydrate/high-protein foods. Men had larger decreases in appetite ratings compared to women. The results also indicate that the LCD group was less bothered by hunger compared to the LFD group and that men had larger reductions in appetite compared to women.	RCT

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Miranda	2011	Danish Study of a Modified Atkins Diet For Medically Intractable Epilepsy in Children: Can We Achieve The Same Results as With The Classical Ketogenic Diet	Seizure	Danish Epilepsy Center/Funding not listed.	The author's experience suggests that the MAD is similarly effective as the KD in reducing seizure frequency in children with medically resistant epilepsy.	Opinion
Saskabe	2011	Effects of a moderate low-carbohydrate diet on preferential abdominal fat loss and cardiovascular risk factors in patients with type 2 diabetes	Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy	Haimoto Clinic, Japan/Funding not listed.	Six months of a moderate low carb diet (LCD) resulted in preferential VAT (visceral adipose tissue) loss only in women, with significant correlations between % change SAT (subcutaneous adipose tissue) and both change HDL and change FBG (fasting blood glucose), as well as between % change VAT and change TG. Authors results suggest that an LCD has the potential to reduce abdominal fat in patients with T2DM and deterioration of serum lipid profiles.	RCT
Sharma	2011	Use of the Modified Atkins Diet in Infantile Spasms Refractory to First-line Treatment	Seizure	Department of Pediatrics, All India Institute of Medical Sciences, New Delhi, India	The modified Atkins diet was found to be effective and well tolerated in children with refractory infantile spasms.	Prospective Study
Smith	2011	Efficacy and Tolerability of the Modified Atkins Diet in Adults With Pharmacoresistant Epilepsy: A Prospective Observational Study	Epilepsia	Schulick School of Medicine/ University of Ontario	The Modified Atkins Diet demonstrates modest efficacy as cotherapy for some adults with pharmacoresistant epilepsy and may be also helpful for weight loss. Financial and logistical barriers were significant factors for those who declined enrollment and for those who discontinued the study.	Prospective Observational

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Stewart	2011	Losing 10 Lbs With A Low-CHO Diet Plus Exercise Does Not Impair Vascular Function	Medicine & Science in Sports & Exercise	Johns Hopkins University/Funding not listed	A low-carb diet plus exercise achieved a 10 lb weight loss sooner than a low-fat diet plus exercise, with no detectable impairment of vascular function.	RCT
Arvio	2010	Modified Atkins Diet Brought Back The Joy of Life to a Developmentally Severely Disabled Youth	Duodecim	Paijat-Hame Central Hospital, Neurology and Internal Medicine Clinics/Funding not listed.	Authors describe a developmentally severely disabled man, whose epilepsy settled, autistic features were alleviated, behavioral problems disappeared and whose weight and blood lipid and glucose values have remained normal for one year during a modified Atkins diet.	Case study
Foster	2010	Weight and Metabolic Outcomes After 2 Years on a Low-Carbohydrate Versus Low-Fat Diet: A Randomized Trial	Annals of Internal Medicine	Temple University/National Institutes of Health	Successful weight loss can be achieved with either a low-fat or low-carbohydrate diet when coupled with behavioral treatment. A low-carbohydrate diet is associated with favorable changes in cardiovascular disease risk factors at 2 years. Weight loss was approximately 11 kg (11%) at 1 year and 7 kg (7%) at 2 years. During the first 6 months, the low-carbohydrate diet group had greater reductions in diastolic blood pressure, triglyceride levels, and very-low-density lipoprotein cholesterol levels, lesser reductions in low-density lipoprotein cholesterol levels, and more adverse symptoms than did the low-fat diet group. The low-carbohydrate diet group had greater increases in high-density lipoprotein cholesterol levels at all time points, approximating a 23% increase at 2 years.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Iqbal	2010	Effects of a Low-intensity Intervention That Prescribed a Low-carbohydrate vs. a Low-fat Diet in Obese, Diabetic Participants	Obesity	University of Pennsylvania Medical Center / Veterans Affairs Medical Center	Participants in the low-carbohydrate group lost 1.5 kg, compared to 0.2 kg in the low-fat group (P = 0.147). Lipids, glycemic indexes, and dietary intake did not differ between groups at month 24 (or at months 6 or 12).	RCT
Kossoff	2010	Will Seizure Control Improve By Switching From The Modified Atkins Diet to The Traditional Ketogenic Diet?	Epilepsia	Johns Hopkins University/Funding not listed.	A higher incidence of improvement with the ketogenic diet occurred for those with myoclonic-astatic epilepsy including all who became seizure-free.	Opinion
Kossoff	2010	A Pilot Study of The Modified Atkins Diet For Sturge–Weber Syndrome	Epilepsy Research	Johns Hopkins Medical Insitutions/Funding not listed.	The modified Atkins diet (MAD) is a dietary treatment for epilepsy which does not restrict fluids or calories. This theoretically makes the MAD safer than the ketogenic diet for children with Sturge–Weber syndrome (SWS). Five children aged 4–18 years with SWS and at least monthly intractable seizures were started prospectively on the MAD for 6 months. All children had urinary ketosis and seizure improvement, including 3 with >50% seizure reduction.	Pilot study
Krebs	2010	Efficacy and Safety of a High Protein, Low Carbohydrate Diet for Weight Loss in Severely Obese Adolescents	J Pediatr	University of Colorado/Pediatric Clinical Translational Research Center & National Cattleman's Beef Association	Significant reduction in BMI-Z-score was achieved in both groups during intervention, and was significantly greater for the HPLC (high protein low carbohydrate) group. Both groups maintained significant BMI-Z reduction at follow-up; changes were not significantly different between groups. The HPLC diet is a safe and effective option for medically supervised weight loss in severely obese adolescents.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Kumada	2010	Modified Atkins Diet for the Treatment of Nonconvulsive Status Epilepticus in Children	Journal of Child Neurology	Shiga Medical Center for Children, Japan/Funding not listed	The authors describe the use of a modified Atkins diet for the treatment of 2 children with nonconvulsive status epilepticus. The nonconvulsive status epilepticus disappeared 5 and 10 days after the initiation of the diet treatment, respectively. They have been on the diet treatment and free from nonconvulsive status epilepticus for 19 and 4 months, respectively. The modified Atkins diet appears to be very effective for the treatment of nonconvulsive status epilepticus.	Case study
Shai	2010	Dietary Intervention to Reverse Carotid Atherosclerosis	CIRCULATION AHA	S. Daniel Abraham Center for Health & Nutrition/Atkins Foundation; Israeli Ministry of Health; Canadian Institutes of Health and Heart and Stroke of Canada	Two-year weight loss diets can induce a significant regression of measurable carotid VWV. The effect is similar in low-fat, Mediterranean, or low-carbohydrate strategies and appears to be mediated mainly by the weight loss-induced decline in blood pressure.	RCT
Siri-Tarino	2010	Meta-analysis of Prospective Cohort Studies Evaluating The Association of Saturated Fat With Cardiovascular Disease	American Journal of Clinical Nutrition	Children's Hospital Oakland Research Institute, Harvard School of Public Health/National Dairy Council and National Institutes of Health	A meta-analysis of prospective epidemiologic studies showed that there is no significant evidence for concluding that dietary saturated fat is associated with an increased risk of CHD or CVD. More data are needed to elucidate whether CVD risks are likely to be influenced by the specific nutrients used to replace saturated fat.	Meta-analysis

Author	Year	Title	Journal	University/Funding	Summary	Type
Siri-Tarino	2010	Saturated Fat, Carbohydrate, and Cardiovascular Disease	American Journal of Clinical Nutrition	Children's Hospital Oakland Research Institute, University of California at Davis, Harvard School of Public Health/National Institutes of Health	The substitution of dietary polyunsaturated fat for saturated fat has been shown to lower CVD risk, there are few epidemiologic or clinical trial data to support a benefit of replacing saturated fat with carbohydrate. Furthermore, particularly given the differential effects of dietary saturated fats and carbohydrates on concentrations of larger and smaller LDL particles, respectively, dietary efforts to improve the increasing burden of CVD risk associated with atherogenic dyslipidemia should primarily emphasize the limitation of refined carbohydrate intakes and a reduction in excess adiposity.	Opinion
Thomson	2010	Changes in Body Weight and Metabolic Indexes in Overweight Breast Cancer Survivors Enrolled in a Randomized Trial of Low-Fat vs. Reduced Carbohydrate Diets	Nutrition and Cancer	University of Arizona / Atkins Foundation	A group of overweight female breast cancer survivors were assigned either a low-fat diet or Modified Atkins Diet. All subjects demonstrated improvements in total/HDL cholesterol ratio, and significant reductions inHbA1c, insulin, and HOMA. Triglycerides levels were significantly reduced only in the low-carbohydrate diet group. Significant improvements in weight and metabolic indexes can be demonstrated among overweight breast cancer survivors adherent to either the Modified Atkins Diet or fat restricted diet.	RCT
Tonekaboni	2010	Efficacy of the Atkins Diet as Therapy for Intractable Epilepsy in Children	Archives of Iranian Medicine	Research Institute of Endocrine Sciences, Shahid Beheshti Medical University/Funding not listed.	Following three months of treatment with the Atkins diet, 16 patients (67%) had >50% decrease in seizure frequency, and 6 (25%) had >90% improvement, of whom 5 were seizure-free. Mean seizure frequency after the first, second and third months of treatment were significantly lower than at baseline. The Atkins diet can be considered as a safe and effective alternative therapy for intractable childhood epilepsy. Atkins diet was well tolerated in our patients with rare complications and it appears to demonstrate preliminary efficacy in childhood refractory epilepsy.	RCT

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Veldhorst	2010	Presence or absence of carbohydrates and the proportion of fat in a high protein diet affect appetite suppression but not energy expenditure in normal weight human subjects fed in energy balance	British Journal of Nutrition	Maastricht University / Top Institute Food and Nutrition (Netherlands)	Appetite suppression and fat oxidation were higher on a high-protein diet without than with carbohydrates exchanged for fat. Energy expenditure was not affected by the carbohydrate content of a high-protein diet.	RCT
Volek Forsythe	2010	Limited Effect of Dietary Saturated Fat on Plasma Saturated Fat in the Context of a Low Carbohydrate Diet	Lipids	University of Connecticut/American Egg Board Egg-Dissertation Fellowship in Nutrition	Authors showed that a hypocaloric carbohydrate restricted diet (CRD) had two striking effects: (1) a reduction in plasma saturated fatty acids (SFA) despite higher intake than a low fat diet, and (2) a decrease in inflammation despite a significant increase in arachidonic acid (ARA). These findings are consistent with the concept that dietary saturated fat is efficiently metabolize in the presence of low carbohydrate, and that a CRD results in better preservation of plasma ARA.	RCT
Yancy	2010	A randomized trial of a low-carbohydrate diet vs orlistat plus a low-fat diet for weight loss.	Arch Intern Med	Department of Veterans Affairs, North Carolina/Department of Veterans Affairs and Atkins Foundation	Obese and overweight outpatients were assigned to either a low-carbohydrate ketogenic diet (LCKD) or Orlistat therapy combined with a low fat diet (O + LFD). In a sample of medical outpatients, an LCKD led to similar improvements as O + LFD for weight, serum lipid, and glycemic parameters and was more effective for lowering blood pressure.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Austin	2009	A Very Low-carbohydrate Diet Improves Symptoms and Quality of Life in Diarrhea-Predominant Irritable Bowel Syndrome	Clin Gastroenterol Hepatol	UNC General Clinical Research Center/Atkins Foundation	Participants with moderate to severe IBS-D were provided a 2-week standard diet, then 4 weeks of a very low carb diet (VLCD) (20 g carb/day). All participants reported adequate relief of their IBS-D symptoms for at least 2 of the 4 weeks. 10 of 13 (77%) participants experienced adequate relief for all 4 weeks, improved abdominal pain, stool habits and quality of life regarding IBS-D as a result of VLCD.	Case Series
Ben-Avraham	2009	Dietary Strategies For Patients With Type 2 Diabetes in the Era of Multi-approaches; Review and Results From the Dietary Intervention Randomized Controlled Trial (DIRECT)	Diabetes Research and Clinical Practice	Ben-Gurion University of the Negev, Israel/Atkins Foundation	Patients who were randomized to the low-carbohydrate diet achieved a significant reduction of hemoglobin A1C. The authors also review recent trials that have shown that low carbohydrate diets are as efficient in inducing weight loss and in some metabolic measures such as serum triglycerides and HDL-cholesterol may be even superior to low fat diets.	RCT/Review
Brinkworth	2009	Long-term effects of a very-low-carbohydrate weight loss diet compared with an isocaloric low-fat diet after 12 mo	Am J Clin Nutr.	Preventative Health National Research Flagship (Adelaide, Australia) / National Heart Foundation of Australia	The Low Carb (LC) group (over a isocaloric low fat diet) had greater decreases in triglycerides, increases in HDL cholesterol, and LDL cholesterol, and a greater but nonsignificant increase in apolipoprotein B. The low carbohydrate group lost more weight, though this was not statistically significant, and both dietary pattersn resulted in similar changes in body composition. The LC diet may offer clinical benefits to obese persons with insulin resistance. By forcing the diets to be isocaloric, the investigators may have counfounded the benefit of low carbohydrate diets being more satiating and slowed weight loss.	RCT

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Davis	2009	Comparative Study of the Effects of a 1-Year Dietary Intervention of a Low-Carbohydrate Diet Versus a Low-Fat Diet on Weight and Glycemic Control in Type 2 Diabetes	Diabetes Care	Albert Einstein College of Medicine of Yeshiva University & North Bronx Healthcare Network/Robert C. Atkins Foundation and the Diabetes Research and Training Center	Among patients with type 2 diabetes, after 1 year a low-carbohydrate diet had effects on weight and A1C similar to those seen with a low-fat diet. There was no significant effect on blood pressure, but the low-carbohydrate diet produced a greater increase in HDL cholesterol. Weight loss occurred faster in the low-carbohydrate group than in the low-fat group in the first 3 months.	RCT
Kossoff	2009	Ketogenic Diets: Evidence For Short- and Long-term Efficacy	Neurotherapeutics	Johns Hopkins Hospital, Baltimore, Maryland/The Atkins Foundation	This review discusses the animal and human evidence for both short- and long-term benefits of dietary therapies.	Review
Porta	2009	Comparison of Seizure Reduction and Serum Fatty Acid Levels After Receiving the Ketogenic and Modified Atkins Diet	Seizure	Lille University Hospital / AEAC Association	Authors compared retrospectively the ketogenic diet (KD) and modified Atkins diet in 27 children and also assessed serum long chain fatty acid profiles. We observed a preventive effect of both diets on the occurrence of status epilepticus. After 1 and 3 months of either diet, responders experienced a significant decrease in serum arachidonic acid concentration compared to non-responders. The KD and modified Atkins diet led to seizure reduction in this small pilot series, with slightly better results after 3 months with the KD, but not after 6 months.	Retrospective
Rosedale	2009	Clinical Experience of a Diet Designed to Reduce Aging	The Journal of Applied Research	Duke University & University of Arizona/Funding not listed.	A high-fat, adequate-protein, low-carbohydrate diet with nutritional supplementation led to improvements in serum factors related to the aging process.	Retrospective

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Siegel	2009	A 6-Month, Office-Based, Low-Carbohydrate Diet Intervention in Obese Teens	Clinical Pediatrics	Cincinnati Pediatric Research Group, Division of General and Community Pediatrics, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio/The Atkins Foundation	The low carb diet (LCD) appears to an effective and practical office-based intervention in obese teenagers.	Case study
Volek	2009	Effects of Dietary Carbohydrate Restriction Versus Low-fat Diet on Flow-mediated Dilation.	Metabolism	University of Connecticut/University of Connecticut, US; Department of Agriculture Hatch, Atkins Foundation, Egg Nutrition Center, and the Research Foundation of the State University of New York.	These findings show that a 12-week low-carbohydrate diet improves postprandial vascular function more than a low fat diet in individuals with atherogenic dyslipidemia.	RCT
Weber	2009	Modified Atkins Diet to Children and Adolescents With Medically Intractable Epilepsy	Seizure	Clinic of Child Neurology	After 3 months six out of the fifteen children (40%) had a seizure reduction of more than 50%, which was seen in different epileptic syndromes and different age groups. The responders reported an increase in quality of life and cognition. At 12 months follow-up 3 (20%) continued the diet with an unchanged marked seizure reduction. The present study confirms the high tolerability and effect of the modified Atkins diet on seizure control in AED treatment resistant epilepsy.	Pilot study

Author	Year	Title	Journal	University/Funding	Summary	Type
Yancy	2009	Effects of Two Weight-loss Diets on Health-related Quality of Life.	Qual Life Res	Duke University/Atkins Foundation	Mental aspects of HRQOL (health related quality of life) improved more in participants following an LCKD (low calorie ketogenic diet) than an LFD (low fat diet), possibly resulting from the LCKD's composition, lack of explicit energy restriction, higher levels of satiety or metabolic effects. The factors analyzed were: Physical Functioning, Role-Physical, General Health, Vitality, Social Functioning. The Physical Component Summary score improved similarly in both diet groups. Bodily Pain improved in the LFD group only, whereas the Role-Emotional and Mental Health subscales and the Mental Component Summary (MCS) score improved in the LCKD group only.	RCT
Accurso	2008	Dietary Carbohydrate Restriction in Type 2 Diabetes Mellitus and Metabolic Syndrome: Time For a Critical Appraisal	Nutrition & Metabolism	n/a This is a review article.	Experiments are summarized showing that carbohydrate-restricted diets are at least as effective for weight loss as low-fat diets and that substitution of fat for carbohydrate is generally beneficial for risk of cardiovascular disease. These beneficial effects of carbohydrate restriction do not require weight loss. Finally, the point is reiterated that carbohydrate restriction improves all of the features of metabolic syndrome.	Review
Carrette	2008	A Pilot Trial With Modified Atkins' Diet in Adult Patients With Refractory Epilepsy	Clinical Neurology and Neurosurgery	Ghent University Hospital/Ghent University Hospital	This pilot study shows that the modified Atkins' diet is feasible in an adult population, and that seizure frequency reduction is possible. The results need to be confirmed in larger prospective, controlled studies with comparison groups.	Pilot Study/Case series

Author	Year	Title	Journal	University/Funding	Summary	Type
Forsythe	2008	Comparison of Low Fat and Low Carbohydrate Diets on Circulating Fatty Acid Composition and Markers of Inflammation	Lipids	University of Connecticut/Atkins Foundation	Overweight men and women with atherogenic dyslipidemia consumed ad libitum diets very low in carbohydrate (VLCKD) or low in fat (LFD) for 12 weeks. Both diets significantly decreased the concentration of several serum inflammatory markers, but there was an overall greater anti-inflammatory effect associated with the very low carbohydrate ketogenic diet (VLCKD). In summary, a very low carbohydrate diet resulted in profound alterations in fatty acid composition and reduced inflammation compared to a low fat diet.	RCT
Ito	2008	Modified Atkins Diet Therapy For a Case With Glucose Transporter Type 1 Deficiency Syndrome	Brain and Development	Tokyo Women's Medical University, Asahikawa Medical College/Funding not listed.	The modified Atkins diet should be considered for patients with GLUT-1 DS as an alternative to the traditional ketogenic diet.	Case study
Keogh	2008	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	National Heart Foundation of Australia and the National Health and Medical Research Council of Australia	Mean flow mediated dilation (FMD) did not change significantly with either diet. Pulse wave velocity improved with both diets. Endothelial markers, E- and P selectin, intracellular and cellular-adhesion molecule-1, tissue-type plasminogen activator, and plasminogen activator inhibitor-1 decreased. More weight and more abdominal fat mass were lost with the LC than with the HC.	Nonrandomized Controlled Trial

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Kossoff	2008	When Do Seizures Usually Improve With The Ketogenic Diet?	Epilepsia	The Johns Hopkins Medical Institutions/Johns Hopkins University School of Medicine, The Atkins Foundation	The ketogenic diet (KD) works quickly when effective, typically within the first 1–2 weeks. Starting the KD after a fasting periodmay lead to a more rapid, but equivalent long-term seizure reduction, confirming prior reports. If the KD has not led to seizure reduction after 2 months, it can probably be discontinued.	Retrospective
Morgan	2008	Comparison of the Effects of Four Commercially Available Weight-loss Programmes on Lipid-based Cardiovascular Risk Factors	Public Health Nutrition	Surrey University, Bristol University, Nottingham University, Ulster (Coleraine) University, and Queen Margaret University College, Edinburgh / BBC	The Atkins (low-carbohydrate) diet was followed by marked reductions in plasma TAG (–38.2% 6 months). This diet was associated with an increase in LDL particle size, a change that has been linked to reduced CVD risk.	RCT
Nielsen	2008	Low-Carbohydrate Diet in Type 2 Diabetes: Stable Improvement of Bodyweight and Glycemic Control During 44 Months Follow-up	Nutrition and Metabolism	Department of Medicine, Blekingesjukhuset, Sweden/Funding not listed	Advice to obese patients with type 2 diabetes to follow a 20% carbohydrate diet with some caloric restriction has lasting effects on bodyweight and glycemic control.	Retrospective
Shai	2008	Weight Loss with a Low-Carbohydrate, Mediterranean, or Low-Fat Diet	The New England Journal of Medicine	S. Daniel Abraham Center for Health & Nutrition/Atkins Foundation & S Daniel Abraham Center for Health & Nutrition	Mediterranean and low-carbohydrate diets may be effective alternatives to low-fat diets. The more favorable effects on lipids (with the low-carbohydrate diet) and on glycemic control (with the Mediterranean diet) suggest that personal preferences and metabolic considerations might inform individualized tailoring of dietary interventions.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Tay	2008	Metabolic Effects of Weight Loss on a Very-Low-Carbohydrate Diet Compared With an Isocaloric High-Carbohydrate Diet in Abdominally Obese Subjects	Journal of the American College of Cardiology	Department of Nutrition and Dietetics, Flinders University, Adelaide, Australia/National Heart Foundation of Australia and the National Health and Medical Research Council of Australia	Weight loss was similar in both groups (VLCHF & HCLF). Blood pressure, CRP, fasting glucose, and insulin reduced similarly with weight loss in both diets. The VLCHF diet produced greater decreases in triacylglycerols and increases in high-density lipoprotein cholesterol (HDL-C). Low-density lipoprotein cholesterol (LDL-C) remained unchanged in the VLCHF diet.	RCT
Volek	2008	Carbohydrate Restriction has a More Favorable Impact on the Metabolic Syndrome than a Low Fat Diet	Lipids	University of Connecticut/University of Connecticut, US; Department of Agriculture Hatch, Atkins Foundation, Egg Nutrition Center, and the Research Foundation of the State University of New York	Both interventions led to improvements in several metabolic markers, but subjects following the CRD had consistently reduced glucose (-12%) and insulin (-50%) concentrations, insulin sensitivity (-55%), weight loss (-10%), decreased adiposity (-14%), and more favorable triacylglycerol (TAG) (-51%), HDL-C (13%) and total cholesterol/HDL-C ratio (-14%) responses. In addition to these markers for MetS, the CRD subjects showed more favorable responses to alternative indicators of cardiovascular risk: postprandial lipemia (-47%), the Apo B/Apo A-1 ratio (-16%), and LDL particle distribution. The results support the use of dietary carbohydrate restriction as an effective approach to improve features of MetS and cardiovascular risk.	RCT

LOW-CARB SUPPORTING STUDIES

Author	Year	Title	Journal	University/Funding	Summary	Type
Westman	2008	The Effect of a Low-carbohydrate, Ketogenic Diet Versus a Low-glycemic Index Diet on Glycemic Control in Type 2 Diabetes Mellitus	Nutrition & Metabolism	Duke University Medical Center/Atkins Foundation	Dietary modification led to improvements in glycemic control and medication reduction/elimination in motivated volunteers with type 2 diabetes. The diet lower in carbohydrate led to greater improvements in glycemic control, and more frequent medication reduction/elimination than the low glycemic index diet. Lifestyle modification using low carbohydrate interventions is effective for improving and reversing type 2 diabetes.	RCT
Gardner	2007	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	Stanford University Medical School/National Institutes of Health	In this study, premenopausal overweight and obese women assigned to follow the Atkins diet, which had the lowest carbohydrate intake, lost more weight at 12 months than women assigned to follow the Zone diet, and had experienced comparable or more favorable metabolic effects than those assigned to the Zone, Ornish, or LEARN diets.	RCT
Hallbook	2007	Effects of ketogenic diet on epileptiform activity in children with therapy resistant epilepsy	Epilepsy Research	Linnea and Josef Carlson Foundation, The Margaretahemmets Foundation, The Stiftelsen Samaritens Foundation, The Segerfalk Foundation, the Swedesih Research Council	This study shows that KD reduces the number of IEDs, especially during sleep. It shows a correlation between reduction in epileptiform activity and clinical seizures. There were no correlations between reduction in epileptiform activity and clinical seizures and improvement in QOL or attention. The increase in OHb correlated with improvement in attention.	Single-arm Intervention

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Author	Year	Title	Journal	University/Funding	Summary	Type
Kang	2007	Use of a Modified Atkins Diet in Intractable Childhood Epilepsy	Epilepsia	Inje University College of Medicine, Korea/Funding not listed	Six months after diet initiation, seven (50%) remained on the diet, five (36%) had >50% seizure reduction, and three (21%) were seizure free. The diet was well tolerated by 12 (86%) patients.	Prospective Study
Daly	2006	Short-Term Effects of Severe Dietary Carbohydrate-Restriction Advice in Type 2 Diabetes--a Randomized Controlled Trial	Diabet Med	Diabetes and Vascular Health Center/Diabetes UK	Weight loss and total cholestersol:high-density lipoprotein (HDL) ratio improved was greater in the low-carbohydrate (LC) group over low fat group. HbA1c was reduced by a greater extent in the LC group, but was not significant, likely due ot the study being under-powered to detect a 0.5% change. Insulin use was reduced in 85% of the LC patients but only in 22% of the LF subjects. Carbohydrate restriction was an effective method of achieving short-term weight loss compared with standard advice.	RCT
Boden	2005	Effect of a Low-Carbohydrate Diet on Appetite, Blood Glucose Levels, and Insulin Resistance in Obese Patients with Type 2 Diabetes	Annals of Internal Medicine	Temple University & University of Medicine and Dentistry of New Jersey School of Osteopathic Medicine/National Institutes of Health, National Center for Resarch Resources & American Diabetes Association	In a small group of obese patients with type 2 diabetes, a low-carbohydrate diet followed for 2 weeks resulted in spontaneous reduction in energy intake to a level appropriate to their height; weight loss that was completely accounted for by reduced caloric intake; much improved 24-hour blood glucose profiles, insulin sensitivity, and hemoglobin A1c; and decreased plasma triglyceride and cholesterol levels.	Case Series

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Brehm	2005	The Role of Energy Expenditure in the Differential Weight Loss in Obese Women on Low-fat and Low-carbohydrate Diets	J Clin Endocrinol Metab	University of Cincinnati/American Heart Association, National Institutes of Health	These results confirm that short-term weight loss is greater in obese women on a low-carbohydrate diet than in those on a low-fat diet even when reported food intake is similar. Fat mass decreased significantly more in the low-carbohydrate group compared to the low-fat group, indicating it was not water weight nor lean mass catabolism.	RCT
Coleman	2005	Urinary Ketones Reflect Serum Ketone Concentration But Do Not Relate to Weight Loss in Overweight Premenopausal Women Following a Low-carbohydrate/High-protein Diet	J Am Diet Assoc	Virginia Polytechnic Institute, Virginia State University/Funding not listed.	Thirteen overweight premenopausal women aged 32 to 45 years consumed <20 g carbohydrate/day with liberal intakes of protein and fat for 2 weeks; thereafter, carbohydrate intake increased 5 g/week for 10 weeks. Serum-hydroxybutyrate was correlated with presence of urinary ketones, but no relationship was found between weekly weight change and serum ketone production. Urinary ketones are detected in premenopausal women complying with a low-carbohydrate/high-protein diet and are associated with serum ketone concentration.	Case Series
Dansinger	2005	Comparison of the Atkins, Ornish, Weight Watchers, and Zone Diets for Weight Loss and Heart Disease Risk Reduction	Journal of the American Medical Association	Tufts-New England Medical Center/National Institutes of Health	Each popular diet modestly reduced body weight and several cardiac risk factors at 1 year. Overall dietary adherence rates were low, although increased adherence was associated with greater weight loss and cardiac risk factor reductions for each diet group.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Mavropoulos	2005	The Effects of a Low-Carbohydrate, Ketogenic Diet on The Polycystic Ovary Syndrome: a Pilot Study	Nutrition and Metabolism	Duke University/Atkins Foundation & Veterans Affairs	In this pilot study, a low carbohydrate ketogenic diet (LCKD) led to significant improvement in weight, percent free testosterone, LH/FSH ratio, and fasting insulin in women with obesity and PCOS over a 24 week period.	Pilot study
McAuley	2005	Comparison of High-Fat and High-Protein Diets With a High-Carbohydrate Diet in Insulin-Resistant Obese Women	Diabetologia	Edgar National Center for Diabetes Research, Medical and Surgical Sciences, University of Otago/Health Research Council of New Zealand	In routine practice a reduced-carbohydrate, higher protein diet may be the most appropriate overall approach to reducing the risk of cardiovascular disease and type 2 diabetes. To achieve similar benefits on a HC diet, it may be necessary to increase fibre-rich wholegrains, legumes, vegetables and fruits, and to reduce saturated fatty acids to a greater extent than appears to be achieved by implementing current guidelines.	RCT
Nickols-Richardson	2005	Premenopausal Women Following a Low-carbohydrate/High-protein Diet Experience Greater Weight Loss and Less Hunger Compared to a High-carbohydrate/Low-fat diet	Journal of the American Dietetic Association	Virginia Polytechnic Institute and Virginia State University/Funding not listed.	This study examined the effects of a low-carbohydrate/high-protein (LC/HP) diet versus a high-carbohydrate/low-fat (HC/LF) diet on scores of eating restraint and hunger. Percent change in body weight was significant for both groups over time, although relative weight loss was greater in the LC/HP group (14.8%) compared to the HC/LF (4.3%) group at wk 6. The LC/HP group had a significant decrease in hunger score from baseline to wk 6, while the HC/LF group did not. While women in both diet groups experienced weight loss, the LC/HP group had a greater percent change in body weight over time with lower scores for hunger compared to the HC/LF group. A LC/HP diet may facilitate weight loss without extreme restraint or hunger.	RCT

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O'Brien	2005	Diet-Induced Weight Loss Is Associated with Decreases in Plasma Serum Amyloid A and C-Reactive Protein Independent of Dietary Macronutrient Composition in Obese Subjects	The Journal of Clinical Endocrinology & Metabolism	University of WA & University of Cincinnati/American Heart Association, National Institute of Health	The very low-carbohydrate dieters had a significantly greater decrease in serum amyloid A (SAA), but their weight loss also was significantly greater. In this study, the decreases in inflammatory markers correlated significantly with weight loss. Also, change in LogSAA correlated with change in insulin resistance. Thus, in otherwise healthy, obese women, weight loss was associated with significant decreases in both SAA and CRP. These effects were proportional to the amount of weight lost but independent of dietary macronutrient composition.	RCT
Yancy	2005	A Low-carbohydrate, Ketogenic Diet to Treat Type 2 Diabetes	Nutrition and Metabolism	Center for Health Services Research in Primary Care, Department of Veterans' Affairs Medical Center (152)/Atkins Foundation	In a study of overweight individuals with type 2 diabetes, the LCKD (low carbohydrate ketogenic diet) improved glycemic control in patients with type 2 diabetes such that diabetes medications were discontinued or reduced in most participants. Other results include: mean body weight decreased by 6.6% and fasting serum triglyceride decreased 42%.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Aude	2004	The National Cholesterol Education Program Diet vs a Diet Lower in Carbohydrates and Higher in Protein and Monounsaturated Fat	Arch Intern Med	Agatston Research Institute/Agaston Research Institute	Compared with the National Cholesterol Education Program (NCEP) diet, the modified low carb (MLC) diet, which is lower in total carbohydrates but higher in complex carbohydrates, protein, and monounsaturated fat, caused significantly greater weight loss over 12 weeks. Weight loss was significantly greater in the Modified Low Carbohydrate (13.6 lb) than in the National Cholesterol Education Program group (7.5 lb), a difference of 6.1 lb. There were significantly favorable changes in all lipid levels within the MLC but not within the NCEP group. Waist-to-hip ratio was significantly decreased within the MLC group. LDL particle size was significantly increased in MLC and not increased in NCEP though NCEP was not different from MLC. Similarly, significant changes in small dense LDL subclasses was also recorded in MLC but not NCEP.	RCT
Dashti	2004	Long Term Effects of a Ketogenic Diet in Obese Patients	Clinical Cardiology	Kuwait University/Funding not listed.	The present study shows the beneficial effects of a long-term ketogenic diet. It significantly reduced the body weight and body mass index of the patients. Furthermore, it decreased the level of triglycerides, LDL cholesterol and blood glucose, and increased the level of HDL cholesterol. Administering a ketogenic diet for a relatively longer period of time did not produce any significant side effects in the patients. Therefore, the present study confirms that it is safe to use a ketogenic diet for a longer period of time than previously demonstrated.	Case Series

Author	Year	Title	Journal	University/Funding	Summary	Type
Gann	2004	A Low-carbohydrate Diet in Overweight Patients Undergoing Stable Statin Therapy Raises High-density Lipoprotein and Lowers Triglycerides Substantially	Clin Cardiol	University of Arizona/Funding not listed.	This study was undertaken to evaluate the effect of a low-carbohydrate diet on the lipid levels in obese patients with known arteriosclerotic heart disease on chronic statin therapy. Triglyceride levels were lowered by 29.5%, HDL raised by 17.6%, and cholesterol decreased by 8.4%. The cholesterol/ HDL ratio changed from 5.31 to 3.78 and LDL cholesterol decreased by 5%. The addition of a low-carbohydrate diet for overweight patients with known coronary artery disease undergoing stable statin therapy causes significant weight loss and a favorable change in the lipid panel.	RCT
Gannon	2004	Effect of a High-Protein, Low-Carbohydrate Diet on Blood Glucose Control in People With Type 2 Diabetes	Diabetes	Department of Veterans Affairs Medical Center/Americans Diabetes Association	A LoBAG (low-biologically-available-glucose) diet ingested for 5 weeks dramatically reduced the circulating glucose concentration in people with untreated type 2 diabetes. Potentially, this could be a patient-empowering way to ameliorate hyperglycemia without pharmacological intervention.	RCT
Goldstein	2004	Influence of a Modified Atkins Diet on Weight Loss and Glucose Metabolism in Obese Type 2 Diabetic Patients	Israel Medical Association Journal	Hebrew University - Hadassah Medical School, Israel/Hadassah University Hospital	In this randomized controlled clinical trial authors found no statistical difference in weight loss and HbA1c between the Atkins and ADA diets, although the results slightly favored the Atkins diet. Furthermore, there was no evidence of deleterious effects on cardiovascular risk factors or renal function due to the high fat high protein diet after 3 months of follow-up. Based on our results, some patients who are unable to adhere to the ADA diet might find the Atkins diet useful for a short period.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Husain	2004	Diet Therapy For Narcolepsy	Neurology	Duke University Medical Center/Narcolepsy Network	The effects of a low-carbohydrate, ketogenic diet (LCKD) on sleepiness and other narcolepsy symptoms were studied. Nine patients with narcolepsy were asked to adhere to the Atkins' diet plan, and their symptoms were assessed using the Narcolepsy Symptom Status Questionnaire (NSSQ). The NSSQ-Total score decreased by 18% from 161.9 to 133.5 (p = 0.0019) over 8 weeks. Patients with narcolepsy experienced modest improvements in daytime sleepiness on an LCKD.	Case study
Kossoff	2004	More Fat and Fewer Seizures: Dietary Therapies For Epilepsy	Lancet Neurol	Review Article	This is a review article on the topic of ketogenic diet as treatment for epilepsy.	Review
Meckling	2004	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	University of Guelph, Ontario, Canada/Natural Sciences Engineering Research Council of Canada	Both groups of subjects had significant weight loss over the 10 wk of diet intervention and nearly identical improvements in body weight and fat mass. Only the LC group had a significant decrease in circulating insulin concentrations. Group results indicated that the diets were equally effective in reducing systolic blood pressure by about 10 mm Hg and diastolic pressure by 5 mm Hg and decreasing plasminogen activator inhibitor-1 bioactivity. These data suggest that energy restriction achieved by a very LC diet is equally effective as a LF diet strategy for weight loss and decreasing body fat in overweight and obese adults.	RCT

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Segal-Isaacson	2004	One Year Data From A Prospective Cohort of Low Carbohydrate Dieters	2004 North American Society for the Study of Obesity Conference	Albert Einstein College of Medicine/Atkins Foundation	Most CCARBS participants reported they had: More stable moods on a low carb diet, Better appetite control than with a conventional weight loss diet, Preferred food choices on a lower carb diet compared to a conventional weight loss diet. One year weight changes in CCARBS participants were: 26.5% lost weight; 39.0% maintained their weight; 34.5% gained weight. At one year, 75% of CCARBS participants reported they were still on a low or controlled carbohydrate diet. At baseline, 412 CCARBS participants (16.5%) had kept at least 30lbs off for at least one year.	Cohort Study
Seshadri	2004	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	Philadelphia Veterans Affairs Medical Center, University of Pennsylvania Medical Center, Drexel University College of Medicine/Veteran Affairs Healthcare Network	In this 6-month study involving severely obese subjects, we found an overall favorable effect of a low-carbohydrate diet on lipoprotein subfractions, and on inflammation in high-risk subjects. Both diets had similar effects on LDL and HDL subfractions.	RCT

Author	Year	Title	Journal	University/Funding	Summary	Type
Sharman	2004	Very Low-carbohydrate and Low-fat Diets Affect Fasting Lipids and Postprandial Lipemia Differently in Overweight Men	J Nutr	University of Connecticut/Atkins Foundation	The primary purpose of this study was to compare the effects of a very low-carbohydrate and a low-fat diet on fasting blood lipids and postprandial lipemia in overweight men. In a balanced, randomized, crossover design, overweight men consumed 2 experimental diets for 2 consecutive 6-wk periods. One was a very low-carbohydrate (<10% energy as carbohydrate) diet and the other a low-fat (<30% energy as fat) diet. Both diets had the same effect on serum total cholesterol, serum insulin, and homeostasis model analysis-insulin resistance (HOMA-IR). Neither diet affected serum HDL cholesterol (HDL-C) or oxidized LDL (oxLDL) concentrations. The very low-carbohydrate diet was more effective at improving characteristics of the metabolic syndrome as shown by a decrease in fasting serum TAG, the TAG/HDL-C ratio, postprandial lipemia, serum glucose, an increase in LDL particle size, and also greater weight loss.	RCT
Sharman	2004	Weight Loss Leads to Reductions in Inflammatory Biomarkers After a Very Low-carbohydrate and Low-fat Diet in Overweight Men	Clinical Science (London)	University of Connecticut/Atkins Foundation	The primary purpose of this study was to compare a very low-carbohydrate and a low-fat weight loss diet on inflammatory biomarkers in overweight men. Both the low-fat and the very low-carbohydrate diet resulted in significant decreases in absolute concentrations of hsTNF-alpha, hsIL-6, hs-CRP and sICAM-1. There was no significant change in absolute sP-selectin concentrations after either diet. In summary, energy-restricted low-fat and very low-carbohydrate diets both significantly decreased several biomarkers of inflammation. These data suggest that in the short-term weight loss is primarily the driving force underlying the reductions in most of the inflammatory biomarkers.	RCT

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Stern	2004	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	Philadelphia Veterans Affairs Medical Center, University of Pennsylvania Medical Center, Drexel University College of Medicine/Veteran Affairs Healthcare Network	Participants on a low-carbohydrate diet had more favorable overall outcomes at 1 year than did those on a conventional diet. Weight loss was similar between groups, but effects on atherogenic dyslipidemia and glycemic control were still more favorable with a low-carbohydrate diet after adjustment for differences in weight loss.	RCT
Vernon	2004	Clinical Experience of a Carbohydrate-Restricted Diet for the Metabolic Syndrome	Metabolic Syndrome and Related Disorders	Duke University Medical Center/Atkins Foundation	In this outpatient program, a carbohydrate-restricted diet and a low-fat/low-calorie plus medication led to weigh loss, but the carbohydrate-restricted diet had a more favorable effect on triglycerides and HDL. Because of the side effects on weight, triglycerides, and HDL, a carbohydrate-restricted diet may be useful for the treatment of metabolic syndrome.	Case study
Volek	2004	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	University of Connecticut/Atkins Foundation	Compared to a low-fat weight loss diet, a short-term very low-carbohydrate diet did not lower LDL-C but did prevent the decline in HDL-C and resulted in improved insulin sensitivity in overweight and obese, but otherwise healthy women. Small decreases in body mass improved postprandial lipemia, and therefore cardiovascular risk, independent of diet composition.	RCT
Volek	2004	Comparison of Energy-Restricted Very Low-Carbohydrate and Low-Fat Diets on Weight Loss and Body Composition in Overweight Men and Women	Nutr Metab (Lond)	University of Connecticut/Atkins Foundation	This study shows a clear benefit of a very low carbohydrate ketogenic diet (VLCKD) over low fat (LF) diet for short-term body weight and fat loss, especially in men. A preferential loss of fat in the trunk region with a VLCK diet is novel and potentially clinically significant but requires further validation.	RCT

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Author	Year	Title	Journal	University/Funding	Summary	Type
Westman	2004	A Pilot Study of a Low-Carbohydrate, Ketogenic Diet for Obesity-Related Polycystic Ovary Syndrome	Journal of General Internal Medicine	Duke University/Funding not listed.	Polycystic ovary syndrome (PCOS) is the most common endocrine disorder among women of reproductive age, and is frequently associated with central obesity, insulin resistance, and dyslipidemia. Because recent evidence demonstrates that a low carbohydrate ketogenic diet (LCKD) leads to weight loss and improvements in insulin sensitivity, we conducted this uncontrolled trial of the diet for PCOS.	Pilot study
Yancy	2004	A Low-Carbohydrate, Ketogenic Diet versus a Low-Fat Diet To Treat Obesity and Hyperlipidemia: A Randomized, Controlled Trial	Ann Intern Med	Department of Veterans Affairs, North Carolina/Atkins Foundation	Compared with a low-fat diet, a low-carbohydrate diet program had better participant retention and greater weight loss. During active weight loss, serum triglyceride levels decreased more and high-density lipoprotein cholesterol level increased more with the low-carbohydrate diet than with the low-fat diet.	RCT
Yancy	2004	A Low-Carbohydrate, Ketogenic Diet for Type 2 Diabetes Mellitus	Journal of General Internal Medicine	Durham Veterans Affairs Medical Center, North Carolina & Duke University/Funding not listed.	The low carbohydrate ketogenic diet (LCKD) reduced glycemia, body weight and serum triglycerides in type 2 diabetic patients but close medical supervision was required to adjust diabetic and blood pressure medications.	RCT

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Author	Year	Title	Journal	University/Funding	Summary	Type
Bailes	2003	Effect of Low-Carbohydrate, Unlimited Calorie Diet on the Treatment of Childhood Obesity: A Prospective Controlled Study	Metabolic Syndrome and Related Disorders	Marshall University/Funding not listed	Obese children following a high protein, low CHO diet (<30g/day) lost an average of 5.21 ± 3.44 kg and decreased their BMI by 2.42 ± 1.3 points, compared to the children in the Low Cal Diet (calorie restricted) who gained an average of 2.36 ± 2.54 kg and 1.00 point on the BMI value. A high protein, low carbohydrate, unlimited calorie diet was superior to a restricted calorie protocol for weight loss in obese school age children. The authors conlcude that because of improved weight loss in the High Protein Low Carbohydrate diet, compliance was better than the Low Cal Diet, though this may overlook metabolic changes induced by High Protein Low Carbohydrate diets.	Nonrandomized Controlled Trial
Brehm	2003	A Randomized Trial Comparing a Very Low Carbohydrate Diet and a Calorie-Restricted Low Fat Diet on Body Weight and Cardiovascular Risk Factors in Healthy Women	J Clin Endocrinol Metab	University of Cincinnati/American Heart Association, National Institutes of Health	Based on these data, a very low carbohydrate diet is more effective than a low fat diet for short-term weight loss and, over 6 months, is not associated with deleterious effects on important cardiovascular risk factors in healthy women.	RCT
Dashti	2003	Ketogenic Diet Modifies The Risk Factors of Heart Disease in Obese Patients	Nutrition	Kuwait University/Funding not listed.	The level of total cholesterol decreased from week 1 to week 12. HDL cholesterol increased significantly, whereas LDL cholesterol decreased significantly. The purpose of this study was to investigate the long-term effect of a ketogenic diet on the activation and modification of heart disease risk factors in obese patients.	Case Series

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Feinman	2003	Metabolic Syndrome and Low-Carbohydrate Ketogenic Diets in the Medical School Biochemistry Curriculum	Metabolic Syndrome and Related Disorders	State University of New York Downstate Medical Center / Funding not listed.	The ideal diet for weight loss and treatment of metabolic syndrome, if it exists, remains to be determined, but presenting metabolism in the context of questions raised by the Atkins regimen prepares future physicians for critical analysis of clinical and basic metabolic information.	Review
Foster	2003	A Randomized Trial of a Low-carbohydrate Diet For Obesity	N Engl J Med	University of Pennsylvania/National Institutes of Health	The low-carbohydrate diet produced a greater weight loss (4%) than did the conventional diet for the first six months, but the differences were not significant at one year. The low-carbohydrate diet was associated with a greater improvement in some risk factors for coronary heart disease.	RCT
Hays	2003	Effect of a High Saturated Fat and No-starch Diet on Serum Lipid Subfractions in Patients With Documented Atherosclerotic Cardiovascular Disease	Mayo Clin Proc	University of Delaware/Christiana Care Health Services, Inc. Cardiology Services	To determine whether a diet of high saturated fat and avoidance of starch (HSF-SA) results in weight loss without adverse effects on serum lipids in obese nondiabetic patients. HSF-SA diet results in weight loss after 6 weeks without adverse effects on serum lipid levels verified by nuclear magnetic resonance, and further weight loss with a lipid-neutral effect may persist for up to 52 weeks.	RCT
Hickey	2003	Clinical Use of a Carbohydrate-Restricted Diet to Treat the Dyslipidemia of the Metabolic Syndrome	Metabolic Syndrome and Related Disorders	Heritage Medical Pertners, South Carolina/Duke University	A carbohydrate-restricted diet recommendation led to improvements in lipid profiles and lipoprotein subclass traits of the metabolic syndrome in a clinical outpatient setting, and should be considered as a treatment for the metabolic syndrome.	Case study

Author	Year	Title	Journal	University/Funding	Summary	Type
Kossoff	2003	Efficacy of the Atkins Diet as Therapy For Intractable Epilepsy	Neurology	The Johns Hopkins Medical Institutions/Atkins Foundation	Six patients were started on the Atkins diet for the treatment of intractable focal and multifocal epilepsy. Five patients maintained moderate to large ketosis for periods of 6 weeks to 24 months; three patients had seizure reduction and were able to reduce antiepileptic medications. This provides preliminary evidence that the Atkins diet may have a role as therapy for patients with medically resistant epilepsy.	Case study
Samaha	2003	A Low-Carbohydrate as Compared With a Low-Fat Diet in Severe Obesity	N Engl J Med	Philadelphia Veterans Affairs Medical Center, University of Pennsylvania medical Center, Drexel University of Medicine/Veteran Affairs Healthcare Network	Severely obese subjects with a high prevalence of diabetes or the metabolic syndrome lost more weight during six months on a carbohydrate-restricted diet than on a calorie- and fat-restricted diet, with a relative improvement in insulin sensitivity and triglyceride levels, even after adjustment for the amount of weight lost.	RCT
Sondike	2003	Effects of a Low-Carbohydrate Diet on Weight Loss and Cardiovascular Risk Factor in Overweight Adolescents	J Pediatr	Schneider Children's, New York/Funding not listed.	To compare the effects of a low-carbohydrate (LC) diet with those of a low-fat (LF) diet on weight loss and serum lipids in overweight adolescents. The LC group lost more weight (mean, 9.9 +/- 9.3 kg vs 4.1 +/- 4.9 kg) and had improvement in non-HDL cholesterol levels. There were no adverse effects on the lipid profiles of participants in either group. The LC diet appears to be an effective method for short-term weight loss in overweight adolescents and does not harm the lipid profile.	RCT
Vernon	2003	Clinical Experience of a Carbohydrate-Restricted Diet: Effect on Diabetes Mellitus	Metabolic Syndrome and Related Disorders	University of Kansas School of Medicine and Duke University Medical Center/Funding not listed.	Low carbohydrate diets lead to a marked improvement in glucose homeostasis in association with a reduction in antidiabetic therapy and weight loss.	Case study

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Volek	2003	An Isoenergetic Very Low Carbohydrate Diet Improves Serum HDL Cholesterol and Triacylglycerol Concentrations, the Total Cholesterol to HDL Cholesterol Ratio and Postprandial Pipemic Responses Compared With a Low Fat Diet in Normal Weight, Normolipidemic Women	J Nutr	University of Connecticut/Atkins Foundation	In normal weight, normolipidemic women, a short-term very low carbohydrate diet modestly increased LDL-C, yet there were favorable effects on cardiovascular disease risk status by virtue of a relatively larger increase in HDL-C and a decrease in fasting and postprandial triaclyglycerols.	RCT
Westman	2003	A Review of Low-Carbohydrate Ketogenic Diets	Curr Atheroscler Rep	Duke University/Atkins Center for Complementary Medicine	In response to the emerging epidemic of obesity in the United States, a renewal of interest in alternative diets has occurred, especially in diets that limit carbohydrate intake. Recent research has demonstrated that low-carbohydrate ketogenic diets can lead to weight loss and favorable changes in serum triglycerides and high-density lipoprotein cholesterol. This review summarizes the physiology and recent clinical studies regarding this type of diet.	Review
Yancy	2003	A Pilot Trial of a Low-Carbohydrate, Ketogenic Diet in Patients with Type 2 Diabetes	Metabolic Syndrome and Related Disorders	Durham Veterans Affairs Medical Center, North Carolina/Funding not listed.	The study focused on overweight individuals with BMI >25 and being treated with OHA (oral hypoglycemic agents) or insulin that were placed on a LCKD (low carbohydrate ketogenic diet) for 16 weeks. Anthropometric changes include: Body weight = -10%, BMI = -10%, Waist circumference = -7%, Body fat % = -3%, Systolic BP = -9%, Diastolic BP = -15%, Heart Rate = -12%, HDL = no change.	Pilot study
Hays	2002	Results of Use of Metformin and Replacement of Starch With Saturated Fat in Diets of Patients With Type 2 Diabetes	Endocr Pract	University of Delaware/Christiana Care Health Services, Inc. Cardiology Services	Addition of saturated fat and removal of starch from a high-monounsaturated fat and starch-restricted diet improved glycemic control and were associated with weight loss without detectable adverse effects on serum lipids.	RCT

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Sharman	2002	A Ketogenic Diet Favorably Affects Serum Biomarkers for Cardiovascular Disease in Normal-weight Men	J Nutr	University of Connecticut/Atkins Foundation	The results suggest that a short-term ketogenic diet does not have a deleterious effect on CVD risk profile and may improve the lipid disorders characteristic of atherogenic dyslipidemia.	RCT
Volek	2002	Body Composition and Hormonal Responses to a Carbohydrate-restricted Diet	Metabolism	University of Connecticut/Atkins Foundation	Authors conclude that a carbohydrate-restricted diet resulted in a significant reduction in fat mass and a concomitant increase in lean body mass in normal-weight men, which may be partially mediated by the reduction in circulating insulin concentrations.	RCT
Volek	2002	Very-low-carbohydrate Weight-loss Diets Revisited	Cleve Clin J Med	University of Connecticut/Atkins Foundation	This review demonstrates that much scientific and anecdotal data demonstrate favorable metabolic responses to very-low-carbohydrate diets.	Review
Westman	2002	Effect of 6-month Adherence to a Very Low Carbohydrate Diet Program	Am J Med	Duke University/Atkins Center for Complementary Medicine	In these subjects, the mean body weight decreased 10.3% +/- 5.9% from baseline to 6 months. The mean percentage of body weight that was fat decreased 2.9% +/- 3.2% from baseline to 6 months. Serum total cholesterol level decreased 11 +/- 26 mg/dL, low-density lipoprotein cholesterol level decreased 10 +/- 25 mg/dL, triglyceride level decreased 56 +/- 45 mg/dL, high-density lipoprotein (HDL) cholesterol level increased 10 +/- 8 mg/dL, and the cholesterol/HDL cholesterol ratio decreased 0.9 +/- 0.6 units. A very low carbohydrate diet program led to sustained weight loss during a 6-month period.	RCT

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Yancy	2001	Improvement of Gastroesophageal Reflux Disease After Initiation of a Low-carbohydrate Diet: Five Brief Case Reports	Altern Ther Health Med	Department of Veterans Affairs, North Carolina/Funding not listed.	Observations from some of these individuals suggest that carbohydrates may be a precipitating factor for GERD symptoms and that other classic exacerbating foods such as coffee and fat may be less pertinent when a low-carbohydrate diet is followed.	Case study
Volek	2000	Fasting Lipoprotein and Postprandial Triacylglycerol Responses to a Low-carbohydrate Diet Supplemented With n-3 Fatty Acids	J Am Coll Nutr	Ball State University, Indiana/Funding not listed.	A hypocaloric low-carbohydrate diet rich in MUFA and supplemented with n-3 fatty acids significantly reduced postabsorptive and postprandial TG in men that were not hypertriglyceridemic as a group before the diet. This may be viewed as a clinically significant positive adaptation in terms of cardiovascular risk status.	RCT
Gutierrez	1998	Utility of a short-term 25% carbohydrate diet on improving glycemic control in type 2 diabetes mellitus	J Am Coll Nutr	Sansum Medical Research Foundation/Funding not listed.	To determine if introduction of a low carbohydrate diet might be a useful option for type 2 diabetic patients who do not achieve glucose target levels despite conventional treatment. A low carbohydrate, caloricly-restricted diet has beneficial short-term effects in subjects with type 2 who have failed either diet or sulfonylurea therapy and may obviate the necessity for insulin.	RCT
Phinney	1983	The Human Metabolic Response to Chronic Ketosis Without Caloric Restriction: Physical and Biochemical Adaptation	Metabolism	Massachusetts Institute of Technology, Harvard Medical School/National Institutes of Health	These findings indicate that the ketotic state induced by the EKD was well tolerated in lean subjects; nitrogen balance was regained after brief adaptation, serum lipids were not pathologically elevated, and blood glucose oxidation at rest was measurably reduced while the subjects remained euglycemic.	RCT