

LeanMR™ Balanced Nutrition Shake Mix

Goal

To support weight/body fat reduction and maintenance by delivering better, satisfying nutrition in fewer calories throughout the day. LeanMR (meal replacement) is designed to accomplish this goal by: 1) delivering energy and nutrients with low calories to help increase voluntary daily activities; 2) increasing meal frequency within the necessary calorie allotment for weight/fat reduction or maintenance to support satiety, energy and activities; 3) delivering accurate portion sizes to help correct the otherwise common underreporting of calorie intake that often sabotages weight control; 4) incorporating a high whey protein and unique fiber formula to total calorie ratio to assist in maintaining lean body mass (LBM) and appetite control. Therefore, LeanMR is designed to provide maximum support for lean body mass (LBM), a steady supply of energy, and optimal fullness (satiety) within the fewest calories in order to improve the dieting experience, avoid typical plateaus, and accelerate results when compared to mass market meal replacements (MRs) or dieting without MRs.

Rationale

Dieting (calorie restriction) for weight loss and maintenance is difficult at best.¹ During normal energy restriction, 25% of weight loss is from lean body mass/fat free mass, (LBM/FFM)^{2,3} and more depending on the magnitude of the deficit.^{4,5,6} Although exercise helps protect LBM losses, by itself exercise is not a weight loss solution.⁷ Weight regain is all but inevitable for the majority of dieters based on the following energy restriction and weight reduction induced variables: 1) need to continuously decrease calorie intake to overcome obligatory plateaus caused by overall weight/LBM reduction and exercise induced fitness improvements (both conditions can lead to a slower metabolism);^{8,9,10,11} 2) energy level decreases (e.g. daily fatigue); 3) increases in appetite/cravings;¹² 4) environmental obstacles and influences (e.g. easy access to palatable foods, advertising,^{5,13} time constraints, inability to increase daily/exercise activities, etc.);^{5,13} 5) as mentioned above, exercise alone has been consistently shown to not be a weight loss solution deeming it essentially powerless due to the amount needed to achieve and sustain weight loss.^{14,15,16}

Meal replacements (MRs) have become a modern day viable solution for many of the challenges and barriers to successful weight control.¹⁷ Therefore LeanMR has been designed to be a better MR than competitors by incorporating ingredients and macronutrient ratios (high protein, low fat) that best address obstacles to success including mood disturbance, fatigue, stress and/or diet dissatisfaction.¹⁸ Used individually, meal replacements, low carbohydrate-low glycemic index (GI) diets, high protein intake and types of proteins used, and moderate fat consumption have all shown positive effects on diet and weight maintenance outcomes and therefore all methods have been incorporated in the LeanMR formula.¹⁹

Protein and Weight Loss

High Protein Intake

Higher protein diets (25-50% of total calories or significantly greater than the RDA) which include low/moderate fat and/or low carbohydrate are generally more successful for weight loss than lower protein diets, at least in the short term.²⁰ The basic mechanisms of action include greater satiety, increase in daily energy expenditure and fat oxidation,^{21,22} and preservation of LBM.^{5,23,24} Of all these actions of protein, whey protein compared to other sources appear to deliver superior outcomes when integrated into daily meal planning.^{21,25,26}

Protein and Satiety

Of the three macronutrients, it is well known that protein is the most satiating, followed by carbohydrates, (CHO) and fats.²⁷ Increased satiety has been demonstrated after meals with a protein content in the range of 25-81% of total calories and up to a point, at least in the short term, is relatively dose dependent.²⁸

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High protein diets decrease postprandial hunger and increase postprandial satiety.²¹ One reason for protein's superior effect on satisfying hunger may be protein's (amino acid content) modulation activity of MU-opioid receptors (MORs) which is similar to morphine. This signal goes to the brain to tell the intestines to release glucose and glucose suppresses appetite.^{21,29} Other protein satiety mechanisms include the following: 1) the direct effect of high amino acid circulation induces a vagal feedback to the satiety center of the nucleus tractus solitarius in the brainstem and the hypothalamus to suppress hunger;³⁰ 2) stimulation of cholecystokinin (CCK) release into the gut to slow gastric emptying;³¹ 3) postprandial thermogenesis described below (increased oxygen demand);³² 4) alterations in gluconeogenesis including hepatic and intestinal gluconeogenesis to better maintain glucose homeostasis.^{33,34} Clinical trials comparing protein sources suggest that whey protein has a greater effect in suppressing appetite through the aforementioned mechanisms.^{21,25}

Protein, Energy Expenditure and Lean Body/Fat Free Mass

The thermic effect of food, also called diet-induced thermogenesis (DIT), is a metabolic response to food. Food intake transiently increases energy expenditure (EE) because of the work involved in nutrient digestion, absorption, transport, metabolism and storage. The DIT is generally expressed as a percentage increase in EE over the resting energy expenditure (REE) or basic metabolic rate (BMR). DIT values are greatest for protein (~15-30%), followed by carbohydrates, (~5-10%) and fat (~0-3%).³⁵ Shown in a meta-analysis, the thermic effect of food (or DIT) increases ~7 calories of every 1,000 calories of ingested food for each 10% increase in the percentage of energy from protein.³⁶ Example: someone consumes a 2,000-calorie diet with 30% protein; the thermic effect of food would be ~14 calories higher than if protein was 20% of the dietary energy. Together (higher DIT protein values and higher protein percentage of energy in the diet) it's been shown that subjects consuming diets consisting of 30-36% protein vs. 11-15% protein increased 24 hour EE by 213 calories/day (increase in REE against an equal calorie 11% protein diet) and 71 calories/day, respectively.^{37,38} Protein's DIT increase in EE is also related to its greater satiating properties because of the increase in oxygen demand to metabolize protein (particularly the high postprandial amino acid oxidation rate) which may also suppress appetite.^{32,39} And finally, Bray et al. compared overfeeding calories (all subjects consumed 40% excess energy) from fat in a low protein diet to overfeeding calories from protein in a high protein diet. Protein overfeeding resulted in significant increases in 24-hour EE, sleep EE and fat oxidation whereas the low protein diet did not, suggesting not only an increase in calories burned but also repartitioning of energy usage shifting to fat.⁴⁰ The muscle sparing action of high protein diets, especially during energy restriction helps to maintain EE during weight reduction.^{5,23,24} Gordon et al. demonstrated that protein intake at twice the RDA reduced muscle loss by 300% during 20 weeks of an energy restricted diet (3.0 vs 9.5 lb loss in the low protein diet).⁴¹ Regardless if the energy deficit is created by exercise or food, high protein diets defend the obligatory muscle loss, thus total daily energy expenditure.^{42,43} For more information on high protein/amino acids mechanisms in defending LBM during energy restriction the reader is referred to *The Assessment of Skeletal Muscle Proteolysis and the Regulatory Response to Nutrition and Exercise* by Stefan M. Pasiakos and John W. Carbone et al.⁴⁴ When considering skeletal muscle at rest burns ~6 calories/day and adipose tissue ~2.2 calories/day, the loss of both significantly lowers REE during prolonged weight reduction,⁴⁵ contributing to common weight loss plateaus. Therefore the ability to preserve LBM during weight loss is paramount to not just maintaining energy expenditure but also physical performance, including injury prevention.^{5,43} Similar to whey protein's "better effect" on satiety compared to other proteins, whey protein has also been shown to be superior in enhancing muscle protein synthesis (MPS) during energy restriction, suggesting greater preservation in LBM during dieting.⁴⁶

Whey Protein

All the above demonstrates protein's favorable weight control mechanisms. Furthermore, it's been demonstrated that whey protein appears to have greater influence on satiety,^{21,25,47} MPS, LBM preservation,^{26,46,47,48,49} fat oxidation, and body composition,^{21,26,47,50} when compared to other protein sources. Much of whey's added value may be due to its high leucine content and rapid amino acid absorption rate.^{26, 49,51} Whey protein compared to other protein sources

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such as soy, red meat/steak, chicken, etc., has much more leucine.²⁶ Twenty (20) grams of whey protein isolate contains three (3) grams of leucine. Comparatively, soy has only approximately 1.4 grams and most meats contain even less. Scientific data suggests that 2.5 grams and above of leucine may be that extra turning point for benefits when it comes to protein synthesis.^{26,52,53} Xu ZR et al. found that leucine supplementation alone is useful to address the age-related decline in muscle mass in elderly individuals because it increases the muscle protein fractional synthetic rate.⁵⁴

Milk Proteins

The main constituents of milk are considered functional foods, with direct impact on human health.⁴⁹ Milk has two primary ‘fractions’ of proteins: casein and whey. Whey is the liquid portion making up approximately 20% of the total protein content of bovine milk with casein being 80% (human milk is 60/40 respectively).⁵⁵ Processing, such as ultra-filtration and microfiltration create different whey protein products. The most utilized whey proteins include concentrate (about 80-95% of protein, with or without lactose), isolate (~90-95% of protein, normally without carbohydrates or cholesterol), hydrolyzed (smaller peptide fractions that are considered less allergenic but costly), and non-denatured (native protein structures).⁵⁶

Whey Isolate in LeanMR

For all these reasons whey protein isolate is the primary ingredient in the LeanMR formula including the fact that using the isolate form eliminates the normal cholesterol content found in whey fractions of milk proteins, which may be important to some weight loss participants.⁵⁶ The whey isolate protein makes up 42% of the calories in one serving of LeanMR in order to meet the protein to calorie ratio requirements demonstrated in successful weight loss through mechanisms described above such as, but not limited to: 1) increasing daily energy expenditure; 2) delivering greater satiety following each daily usage as opposed to other protein sources and/or equal calories in different macronutrient percentages; and 3) preserving LBM during energy restriction. Additionally, users can adjust the macronutrient percentages to meet their overall daily needs.

Sustained-Release Carbohydrate with Fibersol® Blend

Introduction

Carbohydrates (CHO) are the preferred energy source for the body and along with their fiber content, CHO make its own contributions to satiety.^{27,28} Therefore the CHO, including a patented blend of fiber, are provided in a strategic ratio and form in the LeanMR formula to best assist in weight control. The 20 grams of whey protein is balanced with 24 grams of a low glycemic customized CHO blend, 7 grams of a patented fiber source and 2 grams of a specialized blend of healthy fats. These are all contained in 190 calories per serving, resulting in the desired macronutrient ratio (50% CHO, 42% protein, 8% fats) that best allows a meal replacement to help support daily meal planning for weight reduction as described above.

Carbohydrates in Weight Loss

Carbohydrates are important for energy production, especially for exercisers and athletes who desire to perform at their highest level.^{57,58} Efficient or rapid weight reduction can run counter to performance and therefore athletes/exercisers who desire weight loss must proceed judiciously in order to successfully accomplish both goals.^{5,59,60} Generally speaking, daily carbohydrate intake for athletes and exercisers should not be less than 40% of total daily caloric intake (TDCI)⁶¹ unless weight/fat reduction becomes the primary focus in order to make a weight class or compete in physique competitions where body fat level requirements are extremely low.⁶² For these competitors, as calories continue to lower and fat intake is minimal, carbohydrates are the only dispensable food because the protein is needed to help preserve LBM and it can be converted to energy whereas carbohydrate only performs the later.^{24,62,63} During prolonged calorie restriction the body will decide it's immediate needs and only protein's components (amino acids) can be used for both energy and building/maintaining tissues. The lower the

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calories and body fat, the higher the protein requirement as a percentage to total calories in order to preserve LBM.^{5,24,62}

For most non-competitive adult exercisers (e.g. walkers, gym members exercising one (1) hour, 3-5 times per week recreational biking, etc.) carbohydrate intake is not nearly as important as it is for performance athletes, unless individual exercise sessions last more than an hour.⁵⁸ However, exercisers attempting to lose body fat should also try to keep carbohydrates to no less than 40% of TDCI unless unusual circumstances come into play such as those described above or for medical reasons. For weight reduction, the determining factor is calories in against calories out, (calorie balance)^{64,65,66,67} but the daily calorie intake that allows the desired weight loss rate should be made up of what makes one feel better throughout the day, which can lead to more voluntary activity, thus more calories burned and potentially greater weight loss and maintenance.^{68,69} In other words, up to a point, it sometimes takes calories from carbohydrates to burn more calories because carbohydrates are the body's preferred energy source.⁷⁰ Our general recommendation for dieters (non-athletes), once the dotFIT program establishes how many daily calories allow the desired rate of weight/fat loss, is 40-50% CHO (primarily low glycemic because they're generally healthier and often contains fiber that can add to satiety*), 25-35% protein, (low/non-fat dairy, lean meats, appropriate vegetable proteins, etc.) and 20-35% fat (primarily unsaturated). Most of the carbohydrates would be consumed throughout the day before the last evening meal so that energy levels would be at their highest for exercise and/or daily activities.^{5,62,71,72}

Compared to other daily calorie ratios of macronutrients, this recommendation including meal frequencies^{73,74} would allow the majority of dieters to improve overall daily performance and avoid many unpleasant factors commonly associated with dieting such as hunger, loss of LBM, stress and low energy levels, all while potentially performing better workouts.^{5,18,75} Properly formulated meal replacements can be a big part of this overall equation.

** High glycemic carbohydrates (refined grains/sugars, etc.) break down and enter the body faster than lower glycemic foods (fibrous, whole grains, etc.) and depending on which foods accompany the carbohydrate during a meal, high GI CHO consumption can negatively affect hunger/cravings, satiety, blood sugar and ultimately health.^{76,77} The glycemic index (GI) is defined as the incremental area under the blood glucose curve after ingestion of a test food, expressed as a percentage of the corresponding area following an equivalent load of a reference carbohydrate, either glucose or white (wheat) bread.⁷⁸ Low glycemic diets have been associated with healthier outcomes^{76,77,79} including improved blood sugar control and insulin sensitivity⁸⁰ and a longer feeling of fullness.⁸¹*

LeanMR Carbohydrate Blend

The combination of rice oligodextrins (low glycemic carbohydrate source containing 4-10 units),⁸² Palatinose™ (generic name Isomaltulose), Glucomannan (a soluble fiber) and Fibersol-2™ (functional soluble fiber) may allow users of the LeanMR mix to experience even and prolonged energy levels and greater satiety when compared to an equal caloric load of higher glycemic carbohydrates,^{83,84} and especially when combined with whey protein.⁸⁵

Palatinose™ is a low glycemic functional carbohydrate that delivers prolonged energy due to its unique structure and low insulinemic response.^{86,87} With its slow but complete absorption, Palatinose™ provides constant and extended streams of energy for muscles and the brain. This energy source lasts over a longer period when compared to quickly absorbed carbohydrates.^{83,86,88}

Fibersol-2™ is a soluble fiber and is included in this formula to help deliver dietary fiber's positive impact on health and weight control/appetite.⁸⁹ Fibersol-2, digestion resistant maltodextrin, is a dietary fiber. This classification is consistent with both the American Association of Cereal Chemists' and the Food and Nutrition Board of the National Academy of Sciences' (NAS) definitions of dietary fiber. In both cases, Fibersol-2, digestion resistant maltodextrin, is classified as "resistant maltodextrin," and in both cases, "resistant maltodextrin" is classified as a dietary fiber. Fiber is extremely important in a weight control program because it produces the feeling of fullness sooner and longer when added to a meal.⁹⁰ Fibersol-2™ doesn't affect taste nor does it interfere with mineral or calcium absorption,

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traits that are common among other fibers. Because Fibersol-2™ is fermented slowly, it produces less acid and gas than most soluble fibers. A randomized, double-blind, placebo controlled crossover study demonstrated in healthy subjects that 10 grams of Fibersol-2 with a meal stimulated production of satiety hormones and enhanced satiety.⁹¹ All these traits make Fibersol-2™ the ideal fiber to include in a meal replacement formula and is therefore included in the LeanMR mix.⁹² The user receives the benefits of a “better fiber” in a convenient delivery system without fiber’s sometimes less desirable effects (taste, gas, bloating, etc.).⁹³ Studies have shown Fibersol-2™ to improve bowel regularity,⁹⁴ exert a positive effect on blood glucose,⁹⁵ lower cholesterol and serum triglycerides,⁹⁵ increase probiotic levels (good bacteria) and help keep the digestive tract clean and healthy.⁹⁶ Additionally, Fibersol-2™ has been granted GRAS (generally regarded as safe) status by the Food and Drug Administration (FDA).

Glucmannan (GM) is a soluble fiber added to LeanMR because it has been clinically shown to beneficially affect total cholesterol, LDL cholesterol, body weight and fasting blood glucose.⁹⁷ Glucmannan has been used within fiber mixtures successfully in clinical trials related to improved weight loss, satiety and decreases in LDL-cholesterol.^{98,99,100} While a study using 1.33 grams of GM showed no benefits in body composition or weight loss,¹⁰¹ there is evidence that GM exerts its beneficial effects at 2-4 grams a day by promoting satiety and fecal energy loss.¹⁰² Additionally, GM has been shown to improve lipid and lipoprotein parameters and glycemic status.¹⁰²

Healthy Dietary Fat Blend

As mentioned above, although fats make the least contribution to satiety, they do make a unique necessary contribution.²⁷ Therefore to complete the desired percentages of total calories with 8% from fats,¹⁸ LeanMR includes a combination of healthy polyunsaturated fats including flaxseed powder,^{103,104} high oleic sunflower oil and conjugated linoleic acid (CLA) supplied by Tonalin.^{105,106,107}

Meal Replacements for Weight Control

Early studies demonstrated the use of meal replacements (MRs) to be an effective aid to weight reduction^{108,109,110,111} and in almost all cases are more effective than conventional methods of dietary restriction.^{112,113,114,115} (Figure 1) Additionally, MRs were shown to be just as effective as dietary restriction combined with pharmacological therapy¹¹⁶ and an important continuing protocol for maintaining weight loss.^{108,117,118,119} (Figure 2). By 2009, meal replacements had risen to the “evidence-based” category as a weight loss and maintenance treatment.^{120,121}

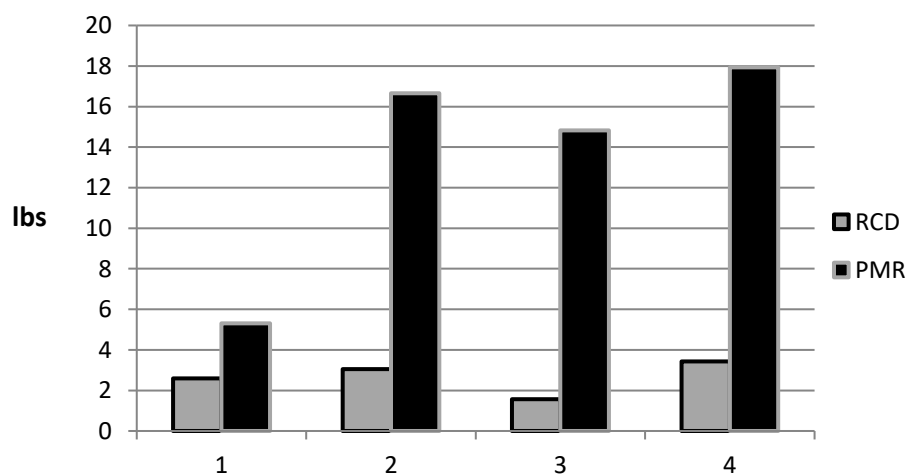


Figure 1: In a 1-year follow-up in the groups that were tracked, the subjects still using meal replacements maintained significantly more weight loss than the RCD group.¹⁰⁸

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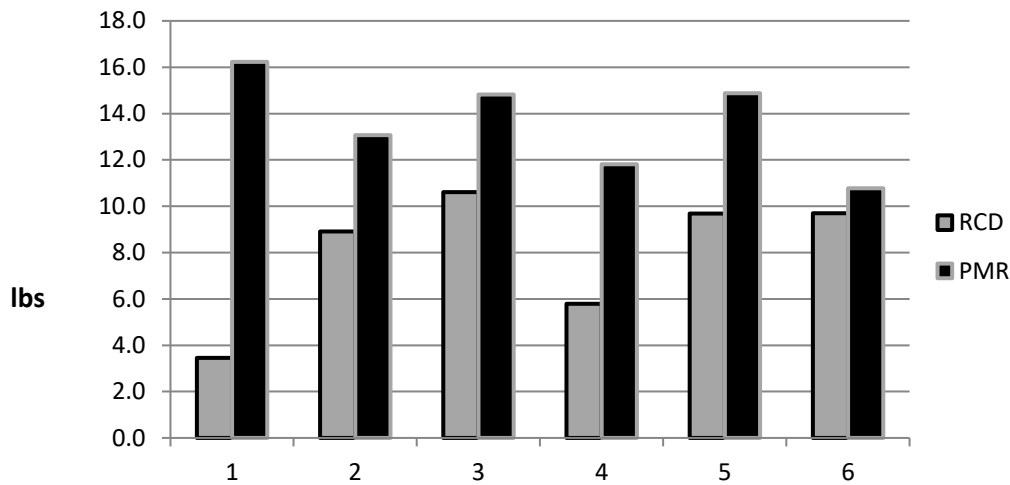


Figure 2: In all six studies the groups that were using meal replacements (PMR) as part of their overall calorie intake lost significantly more weight than the reduced calorie diet (RCD) group.¹⁰⁸

As was shown in 2005 by Johansson et al. MRs were the among the most successful diet and maintenance therapies.¹⁷ The researchers compared anti-obesity drugs, high protein diets and MRs in weight loss and maintenance and found a 26 pound loss was maintained for 22 months, 22 lbs lost for 6 months, and 28 lbs lost for 18 months respectively, demonstrating MRs greater efficacy.¹⁷

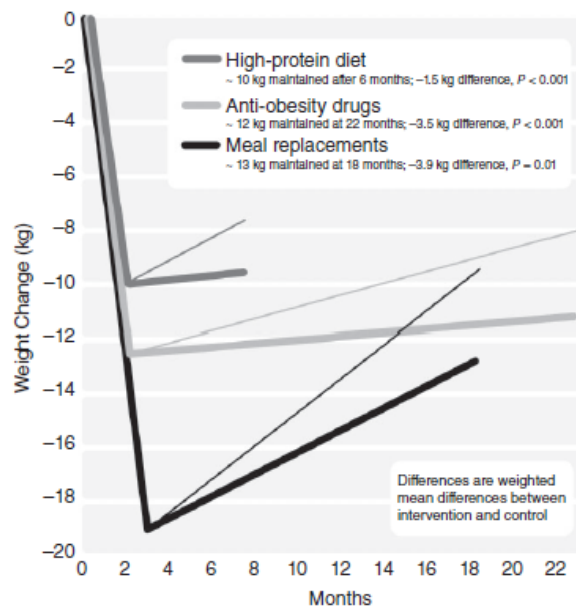


Figure 3 - Bodyweight change during the very low-calorie diet or low-calorie diet period followed by the weight loss maintenance period. The thin lines represent the control subjects in each category while the thick lines represent the active intervention. (Adapted from Johansson et. al. 2013)¹⁷

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Meal replacements may be especially important in maintaining weight loss from low (800-1,200) or very low (400-800) calorie diets.¹²² They have also been used successfully as a weight loss therapy in subjects who eventually returned to traditional foods during a year-long program where most participants maintained the weight lost within guidelines.¹²³ In the same vein, Basciani et al. started subjects on 4 MRs/day and weaned them to one/day after 60 days. Subjects lost 15% of body weight and improved metabolic parameters; deeming the protocol effective, safe and well tolerated for weight control.¹²⁴

- Frestedt et al. used a MR mix twice daily within a 500-calorie deficit diet and found the MR aided weight loss by curbing hunger.¹²⁵
- Whitham C et al. found that structured support using MRs for 24 weeks followed by 28 weeks of self-care can result in weight maintenance.¹²⁶
- Ames GE et al. determined that subjects who lost 18% of body weight on a liquid MR program also recorded self-selected maintenance behaviors. The most commonly reported daily behaviors were self-weighing, use of meal replacements and step counting.¹²⁷
- Theim KR et al. found the use of MRs during weight loss improved use of weight control behaviors, increased weight lost, and hedonic (susceptibility to environmental cues) hunger decreased.¹²⁸
- Khoo J et al. had obese men with lower urinary tract symptoms (LUTS) use either restricted diet alone or restricted diet with MRs and found weight loss and relief of LUTS similar, but the MR group produced greater reduction in fat intake, adiposity and storage of LUTS.¹²⁹

Finally, meal replacements appear to be a viable solution in everyday life not only as an initial weight loss and weight maintenance aid but continued use appears to improve overall diet quality.¹³⁰ During a one year follow up to weight loss, Raynor et al. found that a greater percentage of participants consuming two or more meal replacements per day than participants consuming less than one meal replacement per day met most fat-related and food group recommendations. They also consumed more servings of fruits and vegetables. The conclusion was that the partial meal replacement plan was related to superior diet quality.¹³⁰

Summary of Mechanisms of Action for Meal Replacements

- **Portion control:** people generally attempt to consume meals to completion,^{131,132,133} therefore meal portion size significantly impacts a person's total calorie intake.^{131,134,135} Overwhelming evidence validates that the smaller the portions, the fewer daily calories consumed and vice-versa.¹³⁴ Use of portion-controlled meals has proven to yield greater weight loss than conventional diet therapy alone,^{130,136,137,138,139} and accurate calorie counts of total daily food intake when compared to having to estimate the calories of self-prepared or unmarked meals.^{140,141,142}
- **Satiety:** use of a properly formulated MR such as the LeanMR™ mix allows the user to increase the frequency of daily meals necessary to assist weight reduction while managing calories.^{73,74,120,130} This along with whey protein, fiber, and low GI carbohydrate content would help satisfy appetite and increase daily energy levels.^{21,25,83,84,91,125,128} Proper use throughout the day can deliver good nutrition while helping to save calories, allowing the user to partake in larger meals or favorite foods at desired times (e.g. higher calorie lunches and/or dinners).
- **Preserve LBM and energy expenditure:** frequent feedings of higher whey protein to total daily calorie ratio protects lean body mass losses from dieting to help maintain total daily energy expenditure and performance, which is otherwise compromised when consuming only a restricted conventional diet.^{5,18,21,22,23,24,109,110}

Successful use of Meal Replacements Within the Daily Meal Planning

Extrapolated from the successful trials described above, the following is the suggested MR usage to safely and effectively aid in weight loss and maintenance.

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Overall diet

For weight loss, at least initially, we generally recommend the overall daily diet (traditional foods and MRs combined) to contain ~40-50% CHO, 25-35% protein and 20-35% fat. Individuals can then adjust for personal satisfaction as long as total daily calories remain in proper amounts for desired weight loss. Use the dotFIT program sample menus to get started and adjust to preferences and performance.

Meal Replacement Integration

Weight loss phase:

- Except in the early stage of diets where MRs may be used extensively in daily meal planning (often physician monitored and sole/predominant food source), MRs are generally used to replace two meals a day and allow freedom of choice from traditional foods for the remaining allotted meals and calories.
- MRs may supply two small meals within any calorie restricted meal plan of 4-5 meals since it's been shown that frequent small meals are better for weight loss than fewer larger ones especially as it relates to satiety, preservation of LBM and energy levels.^{73,74,120,121,130,143}

Maintenance phase

- Consume 4-5 small meals daily that include two (2) MRs for convenience and to help ensure overall diet quality while reducing food costs.^{130,143}

LeanMR Formulation

This formula is based on all the scientific data presented above. The specific macronutrient ingredients and ratios were selected in accordance with best potential weight control outcomes shown in clinical trials such as but not limited to: 1) protein type (whey isolate) and amount (~42%), 2) CHO source (low GI sustained release) and amounts (~50%), and 3) dietary fat sources (unsaturated) and amounts (~8%, which allows users to add daily fats as necessary). As an addition to the daily diet, these ingredients and their ratios along with usage recommendations would give the user best chances of improved satiety, preservation of LBM and energy expenditure while ameliorating the common discomforts of dieting when compared to other MRs formulas, restricted calorie diets alone, or diet-drug therapies.

190 calories per serving supplies:

- 21 grams of the highest-quality whey isolate protein to protect LBM and energy expenditure and improve satiety.
- 24 grams of a Sustained Release Patented Carbohydrate Blend with 6-7 grams of fiber (Fibersol-2® and Glucomannan) and no sugar to deliver immediate and long-lasting energy and fullness.
- 2 grams of healthy fats with only 10 mg of cholesterol.
- 108-115 mg of calcium.

Summary

Purpose

The LeanMR™ mix is designed to be used primarily as a satisfying and healthy meal replacement that supports body fat/weight loss goals and weight maintenance more effectively than competitive products. It is designed to deliver high satiety and nutrition in fewer calories:

- Supplies nutrient-rich, convenient snacks between meals to boost energy, curb hunger and assist in weight control by controlling calories and protecting LBM and energy expenditure (calorie burning).

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- Can also be used for “snacking,” which may decrease the amount of food consumed in the subsequent meal or prevent one from making an inappropriate food choice or binging (e.g. high-calorie meal driven by an uncontrolled craving) as often happens when overly hungry, particularly during weight loss.

Unique Features

- Contains the highest quality whey protein isolate
- Proprietary blend of carbohydrates, including functional fibers, deliver a “better lasting” energy and satiety to support aggressive weight loss goals.
- Contains no aspartame or sugar and relatively low sodium.
- 6-7 grams of fiber for satiety and health (including helping to maintain the integrity of the digestive track and bowel regularity).
- Healthy blend of essential fats.
- Designed in a synergistic relationship with all dotFIT products and a person’s traditional food intake. It is not spiked with unnecessary nutrients. Most other products in this space (e.g. bars, shakes, etc.) are heavily spiked with many nutrients, leading to undesirable levels within the body when combining multiple manufacturers, products and normal food intake.
- When consuming only dotFIT products as directed with one’s normal daily food intake, the recipient is assured of keeping the body at a safe and optimal nutrient level.
- Formulated and manufactured for great taste and pleasing texture in a regularly inspected NSF certified facility, in compliance with Good Manufacturing Practices (GMPs) exclusively for dotFIT, LLC

Supplement Facts

Supplement Facts		
Serving Size: 2 scoops (50g)		
Serving Per Container: 20		
	Amount Per Serving	% DV
Calories	190	
Calories from Fat	15	
Total Fat	2 g	3%
Saturated Fat	0.5 g	3%
Trans Fat	0 g	**
Cholesterol	10 mg	3%
Total Carbohydrate	24 g	8%
Dietary Fiber	7 g	28%
Sugars	0 g	**
Protein	21 g	40%
Calcium	115 mg	12%
Iron	2 mg	11%
Sodium	180 mg	8%
Sustained Release Carbohydrates Blend	19.5 g	**
Rice Oligodextrins, Digestion Resistant Maltodextrin (Fibersol-2), Isomaltulose, Glucomannan		
Lean Fats Blend	2.5 g	**
Flaxseed Powder, High Oleic Sunflower Oil, Conjugated Linoleic Acid		

* Percent Daily Value based on a 2,000 Calorie Diet
** Daily Value Not Established

References

- ¹ Kraschnewski JL, Boan J, Esposito J. Long-term weight loss maintenance in the United States. *Int J bes (Lond)* 2010; 34: 1644–1654
- ² John W. Carbone, James P. McClung, and Stefan M. Pasiakos. Skeletal Muscle Responses to Negative Energy Balance: Effects of Dietary Protein. 2012 American Society for Nutrition. *Adv. Nutr.* 3: 119–126, 2012; doi:10.3945/an.111.001792. 119
- ³ Weinheimer EM, Sands LP, Campbell WW. A systematic review of the separate and combined effects of energy restriction and exercise on fat free mass in middle-aged and older adults: implications for sarcopenic obesity. *Nutr Rev.* 2010;68:375–88
- ⁴ Stiegler P, Cunliffe A. The role of diet and exercise for the maintenance of fat-free mass and resting metabolic rate during weight loss. *Sports Med.* 2006;36(3):239–62
- ⁵ Eric T Trexler¹, Abbie E Smith-Ryan^{1*} and Layne E Norton. Metabolic adaptation to weight loss: implications for the athlete. Trexler et al. *Journal of the International Society of Sports Nutrition* 2014, 11:7 <http://www.jissn.com/content/11/1/7>
- ⁶ Garthe I, Raastad T, Refsnes PE, Koivisto A, Sundgot-Borgen J: Effect of two different weight-loss rates on body composition and strength and power-related performance in elite athletes. *Int J Sport Nutr Exerc Metab* 2011, 21:97–104
- ⁷ John M. Jakicic, Ph.D., Amy D. Otto, Ph.D., RD, LDN, Wei Lang, Ph.D., Linda Semler, MS, RD, LDN, Carena Winters, Ph.D., MPH, Kristen Polzien, Ph.D., and Kara I. Mohr, Ph.D. The Effect of Physical Activity on 18-Month Weight Change in Overweight Adults. *Obesity (Silver Spring)*. 2011 January; 19(1): 100–109. doi:10.1038/oby.2010.122.
- ⁸ Thomas DM, Ivanescu AE , Martin CK , Heymsfield SB , Marshall K , Bodrato VE , Williamson DA , Anton SD , Sacks FM , Ryan D , Bray GA. Predicting successful long-term weight loss from short-term weight-loss outcomes: new insights from a dynamic energy balance model (the POUNDS Lost study). *Am J Clin Nutr.* 2015 Mar;101(3):449-54. doi: 10.3945/ajcn.114.091520. Epub 2014 Dec 24
- ⁹ Hall KD. Predicting metabolic adaptation, body weight change, and energy intake in humans. *Am J Physiol Endocrinol Metab.* 2010; 298(3): E449-66.
- ¹⁰ Jastroch M, Divakaruni AS, Mookerjee S, Treberg JR, Brand MD: Mitochondrial proton and electron leaks. *Essays Biochem* 2010, 47:53–67.
- ¹¹ Kim B: Thyroid hormone as a determinant of energy expenditure and the basal metabolic rate. *Thyroid* 2008, 18:141–144.
- ¹² Strohacker K, McCaffery JM, Maclean PS, Wing RR: Adaptations of leptin, ghrelin or insulin during weight loss as predictors of weight regain: a review of current literature. *Int J Obes* 2013:1–9. <http://www.nature.com/ijo/journal/vaop/ncurrent/full/ijo2013118a.html>.
- ¹³ Himanshu Gupta. Barriers to and Facilitators of Long Term Weight Loss Maintenance in Adult UK People: A Thematic Analysis. *Int J Prev Med.* 2014 Dec; 5(12): 1512–1520
- ¹⁴ I-Min Lee, MBBS, ScD; Luc Djoussé, MD, DSc; Howard D. Sesso, ScD; Lu Wang, MD, PhD; Julie E. Buring, ScD. Physical Activity and Weight Gain Prevention *JAMA.* 2010;303(12):1173-1179. doi:10.1001/jama.2010.312
- ¹⁵ Fredrik Bertz, Hilde K Brekke, Lars Ellegård, Kathleen M Rasmussen, Margareta Wennergren, and Anna Winkvist. Diet and exercise weight-loss trial in lactating overweight and obese women. *Am J Clin Nutr* 2012;96:698–705. Printed in USA. _ 2012 American Society for Nutrition
- ¹⁶ Nicklas BJ, Chmelo E , Delbono O , Carr JJ , Lyles MF , Marsh AP. Effects of resistance training with and without caloric restriction on physical function and mobility in overweight and obese older adults: a randomized controlled trial. *Am J Clin Nutr.* 2015 May;101(5):991-9. doi: 10.3945/ajcn.114.105270. Epub 2015 Mar 11
- ¹⁷ Kari Johansson, Martin Neovius, and Erik Hemmingsson Effects of anti-obesity drugs, diet, and exercise on weight-loss maintenance after a very-low-calorie diet or low-calorie diet: a systematic review and meta-analysis of randomized controlled trials. *Am J Clin Nutr* 2014;99:14–23. Printed in USA. _ 2014 American Society for Nutrition
- ¹⁸ Helms ER, Zinn C, Rowlands DS, Naidoo R, Cronin J. High-protein, low-fat, short-term diet results in less stress and fatigue than moderate-protein moderate-fat diet during weight loss in male weightlifters: a pilot study. *Int J Sport Nutr Exerc Metab.* 2015 Apr;25(2):163-70. doi: 10.1123/ijsnem.2014-0056. Epub 2014 Jul 14
- ¹⁹ Fatemeh Azizi Soeliman and Leila Azadbakht. Weight loss maintenance: A review on dietary related strategies. *J Res Med Sci.* 2014 Mar; 19(3): 268–275.
- ²⁰ Johnston BC, Kanters S , Bandayrel K , Wu P , Naji F , Siemieniuk RA , Ball GD, et al. Comparison of weight loss among named diet programs in overweight and obese adults: a meta-analysis. *JAMA.* 2014 Sep 3;312(9):923-33. doi: 10.1001/jama.2014.10397

Practitioner Dietary Supplement Reference Guide – 3rd Edition

- ²¹ Bendtsen LQ, Lorenzen JK, Gomes S, Liaset B, Holst JJ, Ritz C, Reitelseder S, Sjödin A, Astrup A. Effects of hydrolysed casein, intact casein and intact whey protein on energy expenditure and appetite regulation: a randomised, controlled, cross-over study. *Br J Nutr*. 2014 Oct 28;112(8):1412-22. doi: 10.1017/S000711451400213X. Epub 2014 Sep 5
- ²² Dominik H Pesta, and Varman T Samuel. A high-protein diet for reducing body fat: mechanisms and possible caveats. *Pesta and Samuel Nutrition & Metabolism* 2014, 11:53
<http://www.nutritionandmetabolism.com/content/11/1/53>
- ²³ Kim JE, Sands L, Slebodnik M, O'Connor L, Campbell W: Effects of high-protein weight loss diets on fat-free mass changes in older adults: a systematic review. *FASEB J* 2014, 28(1 Suppl):371.5
- ²⁴ Mettler S, Mitchell N, Tipton KD: Increased protein intake reduces lean body mass loss during weight loss in athletes. *Med Sci Sports Exerc* 2010, 42:326–337.
- ²⁵ Pal S, Radavelli-Bagatini S Hagger M, Ellis V. Comparative effects of whey and casein proteins on satiety in overweight and obese individuals: a randomized controlled trial. *Eur J Clin Nutr*. 2014 Sep;68(9):980-6. doi: 10.1038/ejcn.2014.84. Epub 2014 May 7.
- ²⁶ Tang JE¹, Moore DR, Kujbida GW, Tarnopolsky MA, Phillips SM. Ingestion of whey hydrolysate, casein, or soy protein isolate: effects on mixed muscle protein synthesis at rest and following resistance exercise in young men. *J Appl Physiol* (1985). 2009 Sep;107(3):987-92. doi: 10.1152/jappphysiol.00076.2009. Epub 2009 Jul 9.
- ²⁷ Soenen S, Westerterp-Plantenga MS: Proteins and satiety: implications for weight management. *Curr Opin Clin Nutr Metab Care* 2008, 11:747–751.
- ²⁸ Veldhorst M, Smeets A, Soenen S, Hochstenbach-Waelen A, Hursel R, Diepvens K, Lejeune M, Luscombe-Marsh N, Westerterp-Plantenga M: Protein-induced satiety: effects and mechanisms of different proteins. *Physiol Behav* 2008, 94:300–307.
- ²⁹ Campbell JE, Drucker DJ: Pharmacology, physiology, and mechanisms of incretin hormone action. *Cell Metab* 2013, 17:819–837.
- ³⁰ Nefti W, Darcel N, Fromentin G, Tomé D: Long term exposure to high protein diet or high fat diet have opposite effects on vagal afferent sensitivity to lumenal macronutrients and ip cholecystokinin. *FASEB J* 2007, 21:367.7.
- ³¹ Moran TH, Kinzig KP: Gastrointestinal satiety signals II. Cholecystokinin. *Am J Physiol Gastrointest Liver Physiol* 2004, 286:G183–G188.
- ³² Westerterp-Plantenga MS, Rolland V, Wilson SA, Westerterp KR: Satiety related to 24 h diet-induced thermogenesis during high protein/carbohydrate vs high fat diets measured in a respiration chamber. *Eur J Clin Nutr* 1999, 53:495–502.
- ³³ Potier M, Darcel N, Tome D: Protein, amino acids and the control of food intake. *Curr Opin Clin Nutr Metab Care* 2009, 12:54–58.
- ³⁴ Veldhorst MA, Westerterp-Plantenga MS, Westerterp KR: Gluconeogenesis and energy expenditure after a high-protein, carbohydrate-free diet. *Am J Clin Nutr* 2009, 90:519–526.
- ³⁵ Westerterp KR: Diet induced thermogenesis. *Nutr Metab (Lond)* 2004, 1:5.
- ³⁶ Eisenstein J, Roberts SB, Dallal G, Saltzman E: High-protein weight-loss diets: are they safe and do they work? A review of the experimental and epidemiologic data. *Nutr Rev* 2002, 60:189–200.
- ³⁷ Whitehead JM, McNeill G, Smith JS: The effect of protein intake on 24-h energy expenditure during energy restriction. *Int J Obes Relat Metab Disord* 1996, 20:727–732
- ³⁸ Mikkelsen PB, Toubro S, Astrup A: Effect of fat-reduced diets on 24-h energy expenditure: comparisons between animal protein, vegetable protein, and carbohydrate. *Am J Clin Nutr* 2000, 72:1135–1141.
- ³⁹ Lippel FJ, Neubauer S, Schipfer S, Lichter N, Tufman A, Otto B, Fischer R: Hypobaric hypoxia causes body weight reduction in obese subjects. *Obesity (Silver Spring)* 2010, 18:675–681.
- ⁴⁰ Bray GA, Redman LM, de Jonge L, Covington J, Rood J, Brock C, Mancuso S, Martin CK, Smith SR. Effect of protein overfeeding on energy expenditure measured in a metabolic chamber. *Am J Clin Nutr*. 2015 Mar;101(3):496-505. doi: 10.3945/ajcn.114.091769. Epub 2015 Jan 14.
- Over feeding of protein increases 24HR EE but fat doesn't
- ⁴¹ Gordon MM, Bopp MJ, Easter L, Miller GD, Lyles MF, Houston DK, Nicklas BJ, Kritchevsky SB. Effects of dietary protein on the composition of weight loss in post-menopausal women. *J Nutr Health Aging*. 2008;12:505–9
- ⁴² Pasiakos SM, Mettel JB, West K, Lofgren IE, Fernandez ML, Koo SI, Rodriguez NR. Maintenance of resting energy expenditure after weight loss in premenopausal women: potential benefits of a high-protein, reduced-calorie diet. *Metabolism*. 2008;57:458–64.
- ⁴³ John W. Carbone, James P. McClung, and Stefan M. Pasiakos. Skeletal Muscle Responses to Negative Energy Balance: Effects of Dietary Protein. *2012 American Society for Nutrition. Adv. Nutr.* 3: 119–126, 2012; doi:10.3945/an.111.001792

Practitioner Dietary Supplement Reference Guide – 3rd Edition

- ⁴⁴ Stefan M. Pasiakos, John W. Carbone. Assessment of Skeletal Muscle Proteolysis and the Regulatory Response to Nutrition and Exercise. 2014 International Union of Biochemistry and Molecular Biology Volume 66, Number 7, July 2014, Pages 478–484
- ⁴⁵ Wang Z¹, Ying Z, Bosy-Westphal A, Zhang J, Schautz B, Later W, Heymsfield SB, Müller MJ. Specific metabolic rates of major organs and tissues across adulthood: evaluation by mechanistic model of resting energy expenditure. *Am J Clin Nutr*. 2010 Dec;92(6):1369-77. doi: 10.3945/ajcn.2010.29885. Epub 2010 Oct 20
- ⁴⁶ Hector AJ, Marcotte GR, Churchward-Venne TA, Murphy CH, Breen L, von Allmen M, Baker SK, Phillips SM. Whey protein supplementation preserves postprandial myofibrillar protein synthesis during short-term energy restriction in overweight and obese adults. *J Nutr*. 2015 Feb;145(2):246-52. doi: 10.3945/jn.114.200832. Epub 2014 Dec 17
- ⁴⁷ Tahavorgar A, Vafa M, Shidfar F, Gohari M, Heydari, Whey protein preloads are more beneficial than soy protein preloads in regulating appetite, calorie intake, anthropometry, and body composition of overweight and obese men. *Nutr Res*. 2014 Oct;34(10):856-61. doi: 10.1016/j.nutres.2014.08.015. Epub 2014 Sep 2.
- ⁴⁸ Verreijen AM, Verlaan S, Engberink MF Swinkels S, de Vogel-van den Bosch J, Weijts PJ. A high whey protein-, leucine-, and vitamin D-enriched supplement preserves muscle mass during intentional weight loss in obese older adults: a double-blind randomized controlled trial. *Am J Clin Nutr*. 2015 Feb;101(2):279-86. doi: 10.3945/ajcn.114.090290. Epub 2014 Nov 26
- ⁴⁹ Vinicius Fernandes Cruzat, Maurício Krause, Philip Newsholme. Amino acid supplementation and impact on immune function in the context of exercise. *Journal of the International Society of Sports Nutrition* 2014, 11:61 doi:10.1186/s12970-014-0061-8
- ⁵⁰ Robert H Coker, Sharon Miller, Scott Schutzler, Nicolaas Deutz, and Robert R Wolfe. Whey protein and essential amino acids promote the reduction of adipose tissue and increased muscle protein synthesis during caloric restriction-induced weight loss in elderly, obese individuals. *Nutr J*. 2012; 11: 105. Published online 2012 December 11. doi: 10.1186/1475-2891-11-105PMCID: PMC3546025
- ⁵¹ B. Komar, L. Schwingshackl, Georg Hoffmann. Effects of leucine-rich protein supplements on anthropometric parameter and muscle strength in the elderly: A systematic review and meta-analysis. *The journal of nutrition, health & aging*. December 2014
- ⁵² Tyler A. Churchward-Venne¹, Nicholas A. Burd¹, Cameron J. Et al. Supplementation of a suboptimal protein dose with leucine or essential amino acids: effects on myofibrillar protein synthesis at rest and following resistance exercise in men. *Physiol* 590.11 (2012) pp 2751–2765
- ⁵³ Churchward-Venne TA, Breen L, Di Donato DM, Hector AJ, Mitchell CJ, Moore DR, Stellingwerff T, Breuille D, Offord EA, Baker SK, Phillips SM Leucine supplementation of a low-protein mixed macronutrient beverage enhances myofibrillar protein synthesis in young men: a double-blind, randomized trial. *Am J Clin Nutr*. 2014 Feb;99(2):276-86. doi: 10.3945/ajcn.113.068775. Epub 2013 Nov 27
- ⁵⁴ Xu ZR, Tan ZJ, Zhang Q, Gui QF, Yang YM. The effectiveness of leucine on muscle protein synthesis, lean body mass and leg lean mass accretion in older people: a systematic review and meta-analysis. *Br J Nutr*. 2014 Sep 19:1-10. [Epub ahead of print]
- ⁵⁵ Ranchordas MK, Burd NA, Godfrey RJ, Senchina DS, Stear SJ, Burke LM, Castell LM: A-Z of nutritional supplements: dietary supplements, sports nutrition foods and ergogenic aids for health and performance: Part 43. *Br J Sports Med* 2013, 47:399–400
- ⁵⁶ Marshall K: Therapeutic applications of whey protein. *Altern Med Rev* 2004, 9:136–156.
- ⁵⁷ Beelen M, Cermak NM, van Loon LJ. Performance enhancement by carbohydrate intake during sport: effects of carbohydrates during and after high-intensity exercise. *Ned Tijdschr Geneesk*. 2015;159(0):A7465
- ⁵⁸ Burke LM¹, Hawley JA, Wong SH, Jeukendrup AE. Carbohydrates for training and competition. *J Sports Sci*. 2011;29 Suppl 1:S17-27. doi: 10.1080/02640414.2011.585473. Epub 2011 Jun 9.
- ⁵⁹ American Dietetic A, Dietitians of C, American College of Sports M, Rodriguez NR, Di Marco NM, Langley S: American College of Sports Medicine position stand. Nutrition and athletic performance. *Med Sci Sports Exerc* 2009, 41:709–731
- ⁶⁰ Rossow LM, Fukuda DH, Fahs CA, Loenneke JP, Stout JR. Natural bodybuilding competition preparation and recovery: a 12-month case study. *Int J Sports Physiol Perform*.2013;8:582–92
- ⁶¹ Burke LM, Loucks AB, Broad N: Energy and carbohydrate for training and recovery. *J Sports Sci* 2006, 24:675–685.
- ⁶² Scott Lloyd Robinson, Anneliese Lambeth-Mansell, Gavin Gillibrand, et al, A nutrition and conditioning intervention for natural Bodybuilding contest preparation: case study. *Journal of the International Society of Sports Nutrition* doi:10.1186/s12970-015-0083-x
- ⁶³ Phillips SM, Van Loon LJC. Dietary protein for athletes: from requirements to optimum adaptation. *J Sports Sci*. 2011;29:29–38.
- ⁶⁴ Guggenheim, E.A. (1985). *Thermodynamics. An Advanced Treatment for Chemists and Physicists*, seventh edition, North Holland, Amsterdam, ISBN 0-444-86951-4.

Practitioner Dietary Supplement Reference Guide – 3rd Edition

- ⁶⁵ Frank M. Sacks, M.D., George A. Bray, M.D., Vincent J. Carey, Ph.D., et al, Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates. *N Engl J Med* 2009;360:859-73.
- ⁶⁶ Lilian de Jonge, James P DeLany, Tuong Nguyen, Jennifer Howard, Evan C Hadley, Leanne M Redman, and Eric Ravussin. Validation study of energy expenditure and intake during calorie restriction using doubly labeled water and changes in body composition. *Am J Clin Nutr* 2007;85:73–9.
- ⁶⁷ Redman LM¹, Heilbronn LK, Martin CK, Alfonso A, Smith SR, Ravussin E. Effect of calorie restriction with or without exercise on body composition and fat distribution. *J Clin Endocrinol Metab.* 2007 Mar;92(3):865-72. Epub 2007 Jan 2.
- ⁶⁸ Jensen MD, Ryan DH, Apovian CM, Ard JD, Comuzzie AG, Donato KA, Hu FB, Hubbard VS, Jakicic JM, Kushner RF, Loria CM, Millen BE, Nonas CA, Pi-Sunyer FX, Stevens J, Stevens VJ, Wadden TA, Wolfe BM, Yanovski SZ. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. *J Am Coll Cardiol* 2014;63:2985–3023
- ⁶⁹ Matarese LE, Pories WJ. Adult weight loss diets: metabolic effects and outcomes. *Nutr Clin Pract.* 2014 Dec;29(6):759-67. doi: 10.1177/0884533614550251. Epub 2014 Oct 7.
- ⁷⁰ Dirlwanger M, di Vetta V, Guenat E, Battilana P, Seematter G, Schneiter P, Jequier E, Tappy L: Effects of short-term carbohydrate or fat overfeeding on energy expenditure and plasma leptin concentrations in healthy female subjects. *Int J Obes Relat Metab Disord* 2000, 24:1413–1418.
- ⁷¹ Schoenfeld BJ, Aragon AA, Wilborn CD, Krieger JW, Sonmez GT. Body composition changes associated with fasted versus non-fasted aerobic exercise. *J Int Soc Sports Nutr.* 2014 Nov 18;11(1):54. doi: 10.1186/s12970-014-0054-7. eCollection 2014
- ⁷² Reid KJ, Baron KG, Zee PC. Meal timing influences daily caloric intake in healthy adults. *Nutr Res.* 2014 Nov;34(11):930-5. doi: 10.1016/j.nutres.2014.09.010. Epub 2014 Oct 2.
- ⁷³ Murphy CH, Churchward-Venne TA, Mitchell CJ, Kolar NM, Kassis A, Karagounis LG, Burke LM, Hawley JA, Phillips SM. Hypoenergetic diet-induced reductions in myofibrillar protein synthesis are restored with resistance training and balanced daily protein ingestion in older men. *Am J Physiol Endocrinol Metab.* 2015 Mar 3;ajpendo.00550.2014. doi: 10.1152/ajpendo.00550.2014
- ⁷⁴ Madonna Mamerow, Joni A. Mettler, Kirk L. English. Dietary Protein Distribution Positively Influences 24-h Muscle Protein Synthesis in Healthy Adults. *The Journal of Nutrition.* First published ahead of print January 29, 2014 as doi: 10.3945/jn.113.185280
- ⁷⁵ Areta JL, Burke LM, Ross ML, Camera DM, West DW, Broad EM, et al. Timing and distribution of protein ingestion during prolonged recovery from resistance exercise alters myofibrillar protein synthesis. *J Physiol.* 2013;591:2319–31
- ⁷⁶ Te Morenga LA, Howatson AJ, Jones RM, Mann J. Dietary sugars and cardiometabolic risk: systematic review and meta-analyses of randomized controlled trials of the effects on blood pressure and lipids. *Am J Clin Nutr.* 2014 Jul;100(1):65-79. doi: 10.3945/ajcn.113.081521. Epub 2014 May 7.
- ⁷⁷ Bazzano LA, Hu T, Reynolds K, Yao L, Bunol C, Liu Y, Chen CS, Klag MJ, Whelton PK, He J. Effects of low-carbohydrate and low-fat diets: a randomized trial. *Ann Intern Med.* 2014 Sep 2;161(5):309-18. doi: 10.7326/M14-0180
- ⁷⁸ Food and Agriculture Organization, World Health Organization: Carbohydrates in Human Nutrition: Report of a Joint FAO/WHO Report. FAO Food and Nutrition paper 1998, 66:1-140.
- ⁷⁹ Barclay AW, Petocz P, McMillan-Price J, Flood VM, Prvan T, Mitchell P, Brand-Miller JC. Glycemic index, glycemic load, and chronic disease risk--a meta-analysis of observational studies. *Am J Clin Nutr.* 2008 Mar;87(3):627-37. Review.
- ⁸⁰ Brand-Miller J, Hayne S, Petocz P, Colagiuri S. Low-glycemic index diets in the management of diabetes: a meta-analysis of randomized controlled trials. *Diabetes Care.* 2003 Aug;26(8):2261-7.
- ⁸¹ Roberts SB. Glycemic index and satiety. *Nutr Clin Care.* 2003 Jan-Apr;6(1):20-6. Review.
- ⁸² Tungland, B.C.; Meyer, D. 2002. Nondigestible oligo- and polysaccharides (dietary fiber): Their physiology and role in human health and food. *Compr Rev Food Sci Food Safety* 3:73-92
- ⁸³ Young H, Benton D. The effect of using isomaltulose (Palatinose™) to modulate the glycemic properties of breakfast on the cognitive performance of children. *Eur J Nutr.* 2014 Oct 14. [Epub ahead of print]
- ⁸⁴ Ang M¹, Linn T¹. Comparison of the effects of slowly and rapidly absorbed carbohydrates on postprandial glucose metabolism in type 2 diabetes mellitus patients: a randomized trial. *Am J Clin Nutr.* 2014 Oct;100(4):1059-68. doi: 10.3945/ajcn.113.076638. Epub 2014 Jul 16.
- ⁸⁵ Kraemer WJ, Hooper DR, Szivak TK, Kupchak BR, Dunn-Lewis C, Comstock BA, Flanagan SD, Looney, et al, The Addition of Beta-hydroxy-beta-methylbutyrate and Isomaltulose to Whey Protein Improves Recovery from Highly Demanding Resistance Exercise. *J Am Coll Nutr.* 2015 Mar-Apr;34(2):91-9. doi: 10.1080/07315724.2014.938790. Epub 2015 Mar 11

Practitioner Dietary Supplement Reference Guide – 3rd Edition

- ⁸⁶ Lina BA, Jonker D, Kozianowski G. Isomaltulose (Palatinose): a review of biological and toxicological studies. *Food Chem Toxicol*. 2002 Oct;40(10):1375-81.
- ⁸⁷ Maeda A, Miyagawa J, Miuchi M, Nagai E, Konishi K, Matsuo T, et al, Effects of the naturally-occurring disaccharides, palatinose and sucrose, on incretin secretion in healthy non-obese subjects. *Diabetes Investig*. 2013 May 6;4(3):281-6. doi: 10.1111/jdi.12045. Epub 2013 Feb 13.
- ⁸⁸ "PALATINOSE™ - The New Carbohydrate from BENEOPalatin." Beneo Palatin. 2008. Beneo Palatin. 6 Nov. 2008 <http://www.beneo-palatin.com/en/Food_Ingredients/Palatinose/What_is_PALATINOSE_/>.
- ⁸⁹ Liu S, Willett WC, Manson JE, Hu FB, Rosner B, Colditz G. Relation between changes in intakes of dietary fiber and grain products and changes in weight and development of obesity among middle-aged women. *Am J Clin Nutr*. 2003 Nov;78(5):920-7.
- ⁹⁰ Slavin JL. Position of the American Dietetic Association: health implications of dietary fiber. *J Am Diet Assoc*. 2008 Oct;108(10):1716-31.
- ⁹¹ Ye Z, Arumugam V, Haugabrooks E, Williamson P, Hendrich S. Soluble dietary fiber (Fibersol-2) decreased hunger and increased satiety hormones in humans when ingested with a meal. *Nutr Res*. 2015 May;35(5):393-400. doi: 10.1016/j.nutres.2015.03.004. Epub 2015 Mar 18.
- ⁹² H Sonoki. Effects of Dietary Fiber Enriched Liquid Formula on Postprandial Glycemic Parameters ILSI Japan, 2008, 95, 10-17
- ⁹³ Kishimoto Y¹, Kanahori S, Sakano K, Ebihara S. The maximum single dose of resistant maltodextrin that does not cause diarrhea in humans. *J Nutr Sci Vitaminol (Tokyo)*. 2013;59(4):352-7
- ⁹⁴ Satouchi M et al, "Effects of indigestible dextrin on bowel movements," *Japanese J Nutr*, 51:31-37, 1993.
- ⁹⁵ Tokunaga K and Matsuoka A, "Effects of a [FOSHU] which contains indigestible dextrin as an effective ingredient on glucose and lipid metabolism," *J Japanese Diabetes Society*, 42:61-65, 1999.
- ⁹⁶ Fasting ND, Karr-Lilienthal LK, Spears JK, Swanson KS, Zinn KE, Nava GM, Ohkuma K, Kanahori S, Gordon DT, Fahey GC Jr. A novel resistant maltodextrin alters gastrointestinal tolerance factors, fecal characteristics, and fecal microbiota in healthy adult humans. *J Am Coll Nutr*. 2008 Apr;27(2):356-66.
- ⁹⁷ Sood N, Baker WL, Coleman CI. Effect of glucomannan on plasma lipid and glucose concentrations, body weight, and blood pressure: systematic review and meta-analysis. *Am J Clin Nutr*. 2008 Oct;88(4):1167-75. Review.
- ⁹⁸ Salas-Salvadó J, Farrés X, Luque X, Narejos S, Borrell M, Basora J, Anguera A, Torres F, Bulló M, Balanza R; Fiber in Obesity-Study Group. Effect of two doses of a mixture of soluble fibres on body weight and metabolic variables in overweight or obese patients: a randomised trial. *Br J Nutr*. 2008 Jun;99(6):1380-7. Epub 2007 Nov 22.
- ⁹⁹ Rogovik AL, Chanoine JP, Goldman RD. Pharmacotherapy and weight-loss supplements for treatment of paediatric obesity. *Drugs*. 2010 Feb 12;70(3):335-46. doi: 10.2165/11319210-000000000-00000. Review.
- ¹⁰⁰ Lyon MR, Reichert RG. The effect of a novel viscous polysaccharide along with lifestyle changes on short-term weight loss and associated risk factors in overweight and obese adults: an observational retrospective clinical program analysis. *Altern Med Rev*. 2010 Apr;15(1):68-75.
- ¹⁰¹ Keithley JK¹, Swanson B¹, Mikolaitis SL², DeMeo M³, Zeller JM⁴, Fogg L⁵, Adamji J Safety and efficacy of glucomannan for weight loss in overweight and moderately obese adults. *J Obes*. 2013;2013:610908. doi: 10.1155/2013/610908. Epub 2013 Dec 30
- ¹⁰² Keithley J, Swanson B. Glucomannan and obesity: a critical review. *Altern Ther Health Med*. 2005 Nov-Dec;11(6):30-4.
- ¹⁰³ Kajla P, Sharma A, Sood DR. Flaxseed-a potential functional food source. *J Food Sci Technol*. 2015 Apr;52(4):1857-71. doi: 10.1007/s13197-014-1293-y. Epub 2014 Feb 28.
- ¹⁰⁴ Khalesi S¹, Irwin C², Schubert M². Flaxseed consumption may reduce blood pressure: a systematic review and meta-analysis of controlled trials. *J Nutr*. 2015 Apr;145(4):758-65. doi: 10.3945/jn.114.205302. Epub 2015 Mar 4
- ¹⁰⁵ "CLA Research." The Healthy Edge Your Body Needs. 2008. Tonalin. 6 Nov. 2008 <<http://www.tonalin.com/content/view/23/38/1/0/lang,english/>>.
- ¹⁰⁶ Bhattacharya A, Banu J, Rahman M, Causey J, Fernandes G. Biological effects of conjugated linoleic acids in health and disease. *J Nutr Biochem*. 2006 Dec;17(12):789-810. Epub 2006 May 2. Review.
- ¹⁰⁷ Koba K¹, Yanagita T Health benefits of conjugated linoleic acid (CLA). *Obes Res Clin Pract*. 2014 Nov-Dec;8(6):e525-32. doi: 10.1016/j.orcp.2013.10.001. Epub 2013 Nov 5.
- ¹⁰⁸ Heymsfield SB, van Mierlo CA, van der Knaap HC, Heo M, Frier HI. Weight management using a meal replacement strategy: meta and pooling analysis from six studies. *Int J Obes Relat Metab Disord*. 2003 May;27(5):537-49.
- ¹⁰⁹ Smith TJ, Sigrist LD, Bathalon GP, McGraw S, Karl JP, Young AJ. Efficacy of a meal-replacement program for promoting blood lipid changes and weight and body fat loss in US Army soldiers. *J Am Diet Assoc*. 2010 Feb;110(2):268-73.

Practitioner Dietary Supplement Reference Guide – 3rd Edition

- ¹¹⁰ Flechtner-Mors M, Boehm BO, Wittmann R, Thoma U, Ditschuneit HH. Enhanced weight loss with protein-enriched meal replacements in subjects with the metabolic syndrome. *Diabetes Metab Res Rev.* 2010 Jul;26(5):393-405.
- ¹¹¹ Hamdy O, Zwiefelhofer D. Weight management using a meal replacement strategy in type 2 diabetes. *Curr Diab Rep.* 2010 Apr;10(2):159-64. Review.
- ¹¹² Ashley JM, St Jeor ST, Perumean-Chaney S, Schrage J, Bovee V. Meal replacements in weight intervention. *Obes Res.* 2001 Nov;9 Suppl 4:312S-320S.
- ¹¹³ Ditschuneit HH. Do meal replacement drinks have a role in diabetes management? Nestle Nutr Workshop Ser Clin Perform Programme. 2006;11:171-9; discussion 179-81. Review.
- ¹¹⁴ Li Z, Hong K, Saltsman P, DeShields S, Bellman M, Thames G, Liu Y, Wang HJ, Elashoff R, Heber D. Long-term efficacy of soy based meal replacements vs an individualized diet plan in obese type II DM patients: relative effects on weight loss, metabolic parameters, and C-reactive protein. *Eur J Clin Nutr.* 2005 Mar;59(3):411-8.
- ¹¹⁵ Poston WS, Haddock CK, Pinkston MM, Pace P, Karakoc ND, Reeves RS, Foreyt JP. Weight loss with meal replacement and meal replacement plus snacks: a randomized trial. *Int J Obes (Lond).* 2005 Sep;29(9):1107-14.
- ¹¹⁶ Douketis JD, Macie C, Thabane L, Williamson DF. Systematic review of long-term weight loss studies in obese adults: clinical significance and applicability to clinical practice. *Int J Obes (Lond).* 2005 Oct;29(10):1153-67. Review.
- ¹¹⁷ Ditschuneit HH, Flechtner-Mors M. Value of structured meals for weight management: risk factors and long-term weight maintenance. *Obes Res.* 2001 Nov;9 Suppl 4:284S-289S.
- ¹¹⁸ Rothacker DQ. Five-year self-management of weight using meal replacements: comparison with matched controls in rural Wisconsin. *Nutrition* 2000;16:344–8.
- ¹¹⁹ Flechtner-Mors M, Ditschuneit HH, Johnson TD, Suchard MA, Adler G. Metabolic and weight loss effects of long-term dietary intervention in obese patients: four-year results. *Obes Res.* 2000 Aug;8(5):399-402.
- ¹²⁰ Adult weight management evidence-based nutrition practice guideline. American Dietetic Association Evidence Analysis Library Web site. http://www.adaevidencelibrary.com/topic.cfm?cat_2798. Accessed January 2, 2008
- ¹²¹ Position of the American Dietetic Association: Weight Management. February 2009 Volume 109 Number 2, Journal of the AMERICAN DIETETIC ASSOCIATION
- ¹²² A. R. Leeds. Formula food-reducing diets: A new evidence-based addition to the weight management tool box. 2014 The Author. *Nutrition Bulletin*, 39, 238–246. DOI: 10.1111/nbu.12098
- ¹²³ Renate Kruschitz · Sandra Johanna Wallner-Liebmann · Harald Lothaller, et al, Evaluation of a meal replacement-based weight management program in primary care settings according to the actual European Clinical Practice Guidelines for the Management of Obesity in Adults. *Wien Klin Wochenschr* (2014) 126:598–603 DOI 10.1007/s00508-014-0585-6
- ¹²⁴ Basciani S, Costantini D, Contini S, Persichetti A, Watanabe M, Mariani S, Lubrano C, Spera G, Lenzi A, Gnassi L. Safety and efficacy of a multiphase dietetic protocol with meal replacements including a step with very low-calorie diet. *Endocrine.* 2015 Apr;48(3):863-70. doi: 10.1007/s12020-014-0355-2. Epub 2014 Jul 26
- ¹²⁵ Joy L. Frestedt, Lindsay R. Young and Margie Bell. Meal Replacement Beverage Twice a Day in Overweight and Obese Adults (MDRC2012-001). *Current Nutrition & Food Science*, 2012, 8, 320-329
- ¹²⁶ Whitham C, Mellor DD, Goodwin S, Reid M, Atkin SL. Weight maintenance over 12 months after weight loss resulting from participation in a 12-week randomised controlled trial comparing all meal provision to self-directed diet in overweight adults. *Hum Nutr Diet.* 2014 Aug;27(4):384-90. doi: 10.1111/jhn.12178. Epub 2013 Nov 18.
- ¹²⁷ Ames GE, Patel RH, McMullen JS, Thomas CS, Crook JE, Lynch SA Lutes LD. Improving maintenance of lost weight following a commercial liquid meal replacement program: a preliminary study. *Eat Behav.* 2014 Jan;15(1):95-8. doi: 10.1016/j.eatbeh.2013.10.022. Epub 2013 Nov 1.
- ¹²⁸ Theim KR, Brown JD, Juarascio AS, Malcolm RR, O'Neil PM. Relations of hedonic hunger and behavioral change to weight loss among adults in a behavioral weight loss program utilizing meal-replacement products. *Behav Modif.* 2013 Nov;37(6):790-805. doi: 10.1177/0145445513501319. Epub 2013 Sep 6
- ¹²⁹ Khoo J, Ling PS, Chen RY, Ng KK, Tay TL, Tan E, Cho LW, Cheong M. Comparing the effects of meal replacements with an isocaloric reduced-fat diet on nutrient intake and lower urinary tract symptoms in obese men. *J Hum Nutr Diet.* 2014 Jun;27(3):219-26. doi: 10.1111/jhn.12151. Epub 2013 Sep 20
- ¹³⁰ Raynor HA, Anderson AM, Miller GD, Reeves R, Delahanty LM, Vitolins MZ, Harper P, Mobley C, Konersman K, Mayer-Davis E. Partial Meal Replacement Plan and Quality of the Diet at 1 Year: Action for Health in Diabetes (Look AHEAD) Trial. *J Acad Nutr Diet.* 2015 May;115(5):731-42. doi: 10.1016/j.jand.2014.11.003. Epub 2015 Jan 6.
- ¹³¹ Levitsky DA, Youn T. The more food young adults are served, the more they overeat. *J Nutr.* 2004 Oct;134(10):2546-9.

Practitioner Dietary Supplement Reference Guide – 3rd Edition

- ¹³² Wansink B, Painter JE, North J. Bottomless bowls: why visual cues of portion size may influence intake. *Obes Res.* 2005 Jan;13(1):93-100.
- ¹³³ Wansink B, Johnson KA. The clean plate club: about 92% of self-served food is eaten. *Int J Obes (Lond).* 2015 Feb;39(2):371-4. doi: 10.1038/ijo.2014.104. Epub 2014 Jun 20.
- ¹³⁴ Rolls BJ, Roe LS, Meengs JS. Reductions in portion size and energy density of foods are additive and lead to sustained decreases in energy intake. *Am J Clin Nutr.* 2006 Jan;83(1):11-7.
- ¹³⁵ Austel A, Ranke C, Wagner N, Gorge J, Ellrott T. Weight loss with a modified Mediterranean-type diet using fat modification: a randomized controlled trial. *Eur J Clin Nutr.* 2015 Feb 18. doi: 10.1038/ejcn.2015.11. [Epub ahead of print]
- ¹³⁶ Jeffery RW, Wing RR, Thorson C, Burton LR, Raether C, Harvey J, Mullen M. Strengthening behavioral interventions for weight loss: a randomized trial of food provision and monetary incentives. *J Consult Clin Psychol.* 1993 Dec;61(6):1038-45
- ¹³⁷ McCarron DA, Oparil S, Chait A, Haynes RB, Kris-Etherton P, Stern JS, Resnick LM, Clark S, Morris CD, Hatton DC, Metz JA, McMahon M, Holcomb S, Snyder GW, Pi-Sunyer FX. Nutritional management of cardiovascular risk factors. A randomized clinical trial. *Arch Intern Med.* 1997 Jan 27;157(2):169-77.
- ¹³⁸ Wing RR, Jeffery RW. Food provision as a strategy to promote weight loss. *Obes Res.* 2001 Nov;9 Suppl 4:271S-275S. Review.
- ¹³⁹ Wing RR, Jeffery RW, Burton LR, Thorson C, Nissinoff KS, Baxter JE. Food provision vs structured meal plans in the behavioral treatment of obesity. *Int J Obes Relat Metab Disord.* 1996 Jan;20(1):56-62.
- ¹⁴⁰ Abbot JM, Thomson CA, Ranger-Moore J, Teixeira PJ, Lohman TG, Taren DL, Cussler E, Going SB, Houtkooper LB. Psychosocial and behavioral profile and predictors of self-reported energy underreporting in obese middle-aged women. *J Am Diet Assoc.* 2008 Jan;108(1):114-9.
- ¹⁴¹ Fast LC, Harman JJ, Maertens JA, Burnette JL, Dreith F. Creating a measure of portion control self-efficacy. *Eat Behav.* 2015 Jan;16:23-30. doi: 10.1016/j.eatbeh.2014.10.009. Epub 2014 Nov 1.
- ¹⁴² Metzgar CJ¹, Preston AG, Miller DL, Nickols-Richardson SM. Facilitators and barriers to weight loss and weight loss maintenance: a qualitative exploration. *J Hum Nutr Diet.* 2014 Sep 18. doi: 10.1111/jhn.12273. [Epub ahead of print]
- ¹⁴³ Aljuraiban GS, Chan Q, Oude Griep LM, Brown IJ, Daviglius ML, Stamler J, et al, The Impact of Eating Frequency and Time of Intake on Nutrient Quality and Body Mass Index: The INTERMAP Study, a Population-Based Study. *J Acad Nutr Diet.* 2015 Apr;115(4):528-536.e1. doi: 10.1016/j.jand.2014.11.017. Epub 2015 Jan 22