

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
29 October 2009 (29.10.2009)

(10) International Publication Number  
**WO 2009/131939 A2**

(51) International Patent Classification:  
*A23D 7/00* (2006.01)      *A61K 9/107* (2006.01)  
*A23L 1/29* (2006.01)

(21) International Application Number:  
PCT/US2009/041114

(22) International Filing Date:  
20 April 2009 (20.04.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
61/046,747      21 April 2008 (21.04.2008)      US  
61/075,708      25 June 2008 (25.06.2008)      US  
61/111,593      5 November 2008 (05.11.2008)      US  
12/426,034      17 April 2009 (17.04.2009)      US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report (Rule 48.2(g))



**WO 2009/131939 A2**

(54) Title: LIPID-CONTAINING COMPOSITIONS AND METHODS OF USE THEREOF

(57) Abstract: Lipid compositions comprising nuts, seeds, oils, legumes, fruits, grains, and dairy useful in specified amounts as dietary supplements and diet plans designed around and including the aforementioned for the prophylaxis and treatment of numerous diseases are disclosed. The compositions include omega-6 and omega-3 fatty acids where the ratio of the omega-6 to the omega-3 fatty acids and their amounts are controlled based on one or more factors including age of the subject, sex of the subject, diet of the subject, the body weight of the subject, medical conditions of the subject, and climate of the subject's living area.

**LIPID-CONTAINING COMPOSITIONS AND METHODS OF USE THEREOF****CROSS-REFERENCE TO RELATED APPLICATION**

[0001] This application claims priority to U.S. Patent Application Ser. No. 61/046,747 filed on April 21, 2008, U.S. Patent Application Ser. No. 61/075,708 filed on June 25, 2008, and U.S. Patent Application Ser. No. 61/111,593 filed on November 5, 2008, all of which are incorporated by reference herein in its entirety for all purposes.

**BACKGROUND**

[0002] Fatty acids play important physiological functions. They are the building blocks of phospholipids and glycolipids, crucial components of cell membranes. Fatty acids are the best biological fuel molecules, capable of yielding more than twice as much energy per gram as produced by carbohydrate or protein. Fatty acids directly affect the functions of many proteins through covalent modifications of such proteins. Fatty acids also affect membrane fluidity and associated cellular processes. Fatty acids' derivatives are also important hormones and biological messengers, e.g., prostaglandins, thromboxanes, leukotrienes, lipoxins, and resolvins. These hormones and messengers affect a broad range of physiological functions such as vasal dilation, platelets aggregation, pain modulation, inflammation, and cell growth.

[0003] The human and animal bodies synthesize many kinds of fatty acids of various length of the carbon chain, with various numbers and locations of double bonds. The addition of double bonds into a fatty acid chain converts it into an unsaturated fatty acid, which play significant roles in physiological functions. One way of tracking the location of the double bond in an unsaturated fatty acid molecule is by its distance from the distal carbon, i.e., the omega-carbon. For example, the 18-carbon oleic acid, which has a double bond at the 9<sup>th</sup> carbon from the omega position, is called omega-9 fatty acid. Table 1 below describes various unsaturated fatty acid groups named according to their double bond locations relative to the omega position:

**Table 1. General Descriptions of Relevant Fatty Acids**

Name of Fatty Acid	General Formula	Starting Molecule for Biosynthesis
Omega-3	CH <sub>3</sub> -CH <sub>2</sub> -CH=CH-R-COOH	Alpha-Linolenic Acid
Omega-6	CH <sub>3</sub> -(CH <sub>2</sub> ) <sub>4</sub> -CH=CH-R-COOH	Linoleic Acid
Omega-7	CH <sub>3</sub> -(CH <sub>2</sub> ) <sub>5</sub> -CH=CH-R-COOH	Palmitoleic Acid
Omega-9	CH <sub>3</sub> -(CH <sub>2</sub> ) <sub>7</sub> -CH=CH-R-COOH	Oleic Acid

[0004] As shown in the table above, Linoleic acid (LA) and Alpha-linolenic Acid (ALA) are the precursors for all omega-6 and omega-3 fatty acids. It is well established that LA and ALA are “essential” fatty acids. They must be supplied in the diet because the human and other mammals cannot synthesize them from other sources. Dietary deficiency or excess of the two essential fatty acids may cause many illnesses. It is also well known that LA and ALA share the same metabolic pathways, and that the excess of one can increase the need for, or create a deficiency of, the other. The latest science also shows evidence that non-essential fatty acids can interfere with the activity and metabolism of essential fatty acids, and that the quantity of dietary fat can also influence the metabolism of fatty acids. ALA is known to be preferentially metabolized by the human body depending on the amount of the other fatty acids present in the diet.

[0005] Evidence also shows that antioxidants, phytochemicals, and vitamins and minerals also play a role in metabolism of essential fatty acids. Furthermore, human studies have identified that males and females appear to differ in their ability to metabolize essential fatty acids. It has been suggested that sex hormones play a role in these differences. Molecules of polyunsaturated fatty acids have a zigzag-like structure. Because they are flexible and do not pack tightly, they stay fluid even at cold temperatures and collectively lend flexibility to tissues. Hence, in colder climates the human body benefits from greater amounts of polyunsaturated fatty acids.

[0006] Numerous studies provide evidence for the prophylaxis and treatment of medical conditions using supplementation with omega-3 fatty acids and recommendations to reduce omega-6 consumption. The symptoms treated with such lipid profiles included menopause, cardiovascular diseases, mental disorders, neural disorders, musculoskeletal disorders, endocrine disorders, cancer, digestive system

disorders, symptoms of aging, viral infections, bacterial infections, obesity, overweight, renal diseases, pulmonary disorders, ophthalmologic disorders, dermatological disorders, sleep disorders, dental diseases, and the diseases of the immune system including autoimmunity. For example, U.S. Patent No. 5,780,451 taught lipid formulations for patients with ulcerative colitis, which include omega-3, omega-6, and omega-9 fatty acids. The omega-3 content in these lipid formulations was several-fold higher than that of omega-6. Similarly, a recently published U.S. patent application, US2008/0039525, disclosed lipid compositions used for diabetic patients, which contained omega-3, omega-6, and omega-9 fatty acids, with the specific ratio of omega-6 to omega-3 being between 0.25:1 to 3:1.

[0007] The traditional emphasis on increasing omega-3 and reducing omega-6 consumption often does not result in satisfactory relieves because of the uncertainties introduced by dietary and demographic factors. Accordingly, improved treatments, using improved lipid compositions, for medical conditions are still needed. In fact, on January 26, 2009, for the first time the American Heart Association issued an advisory to correct the perception that omega-6 are unhealthy (<http://americanheart.mediaroom.com/index.php?s=43&item=650>). The current methodologies are confusing for the consumer, hence lead to over consumption or under consumption of critical nutrients with major health consequences.

#### BRIEF SUMMARY

[0008] The present disclosure relates to compositions and methods for prophylaxis and/or treatment of medical conditions linked with an imbalance in one or more lipids within context of other factors. More particularly, the present disclosure relates to the use of compositions and methods that use more advantageous sources of omega-6 fatty acids, in the presence of nutritionally adequate omega-3 fatty acids. The disclosure also relates to methods and compositions that deliver omega-6 and omega-3 fatty acids along with other nutrients that optimize the daily delivery and bioavailability of omega-6 and omega-3 for prophylaxis and/or treatment of medical conditions linked with an imbalance in one or more lipids. This disclosure also relates to methods of steady delivery of the bioactive substances, daily, weekly, monthly or longer duration wide and sudden fluctuations of which may be harmful. Furthermore, this disclosure also relates to methods of daily

delivery of essential fatty acids within the optimal range with respect to the recommendations.

[0009] One general embodiment of the present disclosure is a lipid-containing composition comprising optimal amounts of fatty acids and phytochemicals for a mammalian subject based on one or more factors selected from the group including the subject's age, sex, diet, bodyweight, medical conditions, and the climate of the subject's living area. Such composition is administered to a subject through a steady delivery process, as explained later, according to one embodiment of the disclosure. According to another embodiment of the disclosure, the fatty acid components of the composition's lipid contents are achieved at least in part by using one or more of the following concentrated lipid sources: oils, butters, nuts, and seeds.

[0010] Another embodiment of the disclosure is a lipid-containing composition comprising polyunsaturated, monounsaturated, and saturated fatty acids, wherein the ratios and amounts of said three fatty acid types are controlled based on one or more of the following factors for a mammalian subject: age, sex, climate, body weight, diet, and medical conditions.

[0011] Another aspect of the present disclosure is a specific lipid composition suitable for administration to a mammalian subject. One embodiment of such composition comprises three or more of the following substances (or the oil thereof) in certain defined concentrations: peanuts, almonds, olives, soybeans, cashews, flaxseeds, pistachios, pumpkin seeds, sunflower seeds, sesame seeds, walnuts, anhydrous butter, and, coconut meat. Another example of such composition comprises a safflower oil, sunflower oil, peanut oil, almond oil, and anhydrous butter oil.

[0012] Another aspect of the present disclosure is directed at methods of prophylaxis or treatment of a medical condition for a mammalian subject, said method comprising administering a therapeutically effective amount of balanced lipid formula to said subject.

[0013] Yet another aspect of the present disclosure is directed at methods of creating lipid and other nutrients-balanced diet by combining special formulated lipid composition with lipid-free or low-lipid food.

## DETAILED DESCRIPTION

- [0014] As used herein, “prophylaxis” refers to the preservation of health, a preventive treatment, or a treatment meant to reduce the risk of a medical condition.
- [0015] As used herein, the term “treatment” in the context of a medical condition refers to the management of the condition and may or may not involve the complete amelioration of the condition.
- [0016] As used herein, “medical condition” is a disease, disorder, syndrome, and the like; or a symptom thereof.
- [0017] As used herein a “lipid imbalance” refers to a suboptimal/undesirable lipid profile in blood or other tissue of a mammal, or a deficiency or excess of one or more lipids as compared with a medical norm or as indicated by the manifestation of a disorder. It is understood that the body’s defense mechanisms (such as storage of essential fatty acids among others) can help compensate for a deficiency or excess of a particular fatty acid to a limited extent.
- [0018] As used herein a “therapeutically effective amount” is an amount of a composition that results in the prophylaxis and/or treatment of a medical condition or symptom of a medical condition. In some embodiments, the adverse level of a biomarker or the severity of a symptom of the medical condition is abated at least 10% or more, at least 25% or more, at least 50% or more, at least 75% or more, or 100% ameliorated.
- [0019] As used herein the phrase “adequate amount of omega-3” refers to a minimum of dietary reference intake (DRI) levels of omega-3 per day from foods, supplements, and/or the lipid compositions.
- [0020] A “therapeutic effect,” as that term is used herein, encompasses a therapeutic benefit and/or a prophylactic benefit. By therapeutic benefit is meant eradication or amelioration of the underlying disorder being treated. Also, a therapeutic benefit may be achieved with the eradication or amelioration of one or more of the physiological symptoms associated with the underlying disorder such that an improvement may be observed in the patient, notwithstanding that the patient may still be afflicted with the underlying disorder. For prophylactic benefit, the compositions may be administered to a patient at risk of developing a particular disease, or to a patient reporting one or more of the physiological symptoms of a disease, even though a diagnosis of this disease may not have been made. A prophylactic effect includes delaying or eliminating the appearance of a disease or

condition, delaying or eliminating the onset of symptoms of a disease or condition, slowing, halting, or reversing the progression of a disease or condition, or any combination thereof.

### **Lipid Formulations**

[0021] In one aspect, the present disclosure incorporates relatively high ratio of omega-6 to omega-3 fatty acid, while maintaining optimal daily delivery of both omega-6 and omega-3. One reason for maintaining the high ratio is because of the incorporation of nuts and nut oils as integral components of a formulation, which nuts and nut oils have high antioxidants and phytochemical content and other properties that render excessive omega-3 unnecessary.

[0022] Certain embodiments of the present disclosure provide for compositions comprising supplementation with one or more of the following: vitamin A, B9 (folic acid), C, D, E; carotenoids, like beta-carotene, lycopene, lutein, zeaxanthin; monophenols; polyphenols or flavonoids, including flavonols such as quercetin, kaempferol, and resveratrol; flavanones; flavones; flavan-3-ols such as catechins; anthocyanins and anthocyanidins; isoflavones or phytoestrogens including phytosterols such as campesterol, sitosterol, and stigmasterol; phenolic acids such as gallic acid, ellagic acid, and curcumin; hydroxycinnamic acids such as coumarins; organosulfides; saponins; melatonin; antioxidants and phytochemicals in general; and trace elements such as Cu, Zn, Mn, Fe, Se and Mg. In certain embodiments, each of these supplements/nutrients may reduce the requirement/tolerance for omega-3 fatty acids and allow for a higher omega-6 to omega-3 ratio than in the absence of said supplement(s)/nutrient(s). In certain embodiments, each of these nutrients is optimized through natural sources such as oils, butters, nuts, seeds, herbs, sweeteners, and other foods.

[0023] Nuts and seeds are plant embryos containing plant stem cells. They are made to survive the harshest of the climactic conditions until factors are suitable for germination. As such, gram per gram, they are one of the richest sources of natural nutrients. Almonds are one of the most nutritionally dense nuts, providing an array of powerful nutrients: flavonoids, vitamin E, manganese, magnesium, copper, vitamin B2 and phosphorus, to name a few. The flavonoids found in nuts, particularly almond skins, together with the vitamin E found in their meat double the antioxidants that either delivers separately.

[0024] Walnuts, pecans and chestnuts have the highest antioxidant content of the tree nuts, with walnuts delivering more than 20 mmol antioxidants per 3 ounces, including at least 16 antioxidant phenols, vitamin E, and ellagic and gallic acid. Walnuts are also exceptionally high in their content of the omega-6 fatty acid linoleic acid and the omega-3 fatty acid alpha-linolenic acid.

[0025] Peanuts also contribute significantly to dietary intake of antioxidants, rivaling the antioxidant content of blackberries and strawberries, and are far richer in antioxidants than apples, carrots or beets. Peanuts are a good source of vitamin E (gamma- and alpha- tocopherol), niacin, folate, proteins, and manganese. Peanuts also contain high concentrations of phytochemicals polyphenols, including resveratrol.

[0026] Sesame seeds are a very good source of manganese, copper, calcium, magnesium, iron, phosphorus, vitamin B1, zinc and dietary fiber. In addition to these important nutrients, sesame seeds contain sesamin and sesamolin, phytosterols. Sesame seeds have the highest total phytosterol content (400-413 mg per 100 grams) of all nuts and seeds; pistachios and sunflower seeds are the second richest (270-289 mg/100 g), closely followed by pumpkin seeds (265 mg/100 g).

[0027] A quarter cup of sunflower seeds may provide 31.9% of the daily value for magnesium. Sunflower seeds are also a good source of selenium. Cashews, flaxseeds, pumpkin seeds, and sesame seeds are a good source of magnesium. Almonds, cashews, sunflower seeds, pumpkin seeds, walnuts, and sesame seeds are a good source of copper. Almonds, flaxseeds, peanuts, sunflower seeds, pumpkin seeds, and walnuts are a good source of manganese. Just one-quarter cup of almonds may supply 45.0% of the daily value for manganese, and 20.0% of the daily value for copper.

[0028] In one aspect, the disclosure provides compositions that include seeds, nuts, and/or oils. In another aspect the compositions include legumes, dairy, cocoa, lentils, and/or grains. In one embodiment the composition can include one or more edible oils, culinary nuts and/or seeds in their whole form or their oils such as, but not limited to acai oil, amaranth oil, apple seed oil, apricot kernel oil, argan oil, artichoke oil, avocado oil, babassu oil, ben oil, blackcurrant seed oil, borage seed oil, borneo tallow nut oil, bottle gourd oil, buffalo gourd oil, butter oil (anhydrous), canola oil (rapeseed), cape chestnut oil, carob pod oil, cocklebur oil, cocoa butter oil, cohune oil, coriander seed oil, corn oil, cottonseed oil, dika oil,

evening primrose oil, false flax oil (*camelina sativa*), fish oil (cod liver), fish oil (herring), fish oil (menhaden), fish oil (salmon), fish oil (sardine), grapeseed oil, household lard, kapok seed oil, *lallemantia* oil, marula oil, meadowfoam seed oil, mustard oil, nutmeg butter, okra seed oil, palm oil, papaya seed oil, pequi oil, perilla oil, prune kernel oil, quinoa oil, ramtil oil, rice bran oil, royle oil, sacha inchi oil, safflower oil, sheanut oil, soybean lecithin oil, tea oil, thistle oil, tomato seed oil, ucuhuba butter oil, wheat germ oil, acorns, almonds, beech nuts, brazilnuts, breadnuts, candlenuts, chestnuts, chilacayote nuts, chilean hazel nuts, coconuts, cashews, colocynth nuts, filberts, hazelnut, hickory, kola nut, macadamia, mamoncillo, mongongo, obongo nut, olives, peanuts, pecans, pili nuts, pine nuts, pistachios, soya nuts, poppy seeds, pumpkin seeds, hemp seeds, flax seeds, sesame seeds, sunflower seeds, walnuts, and watermelon seeds.

[0029] In some embodiments, the compositions of the present disclosure include the following optimally balanced fatty acids and combinations thereof. Saturated fatty acids: butyric (C4:0), lauric (C12:0), myristic (C14:0), palmitic (C16:0), stearic (C18:0), and arachidic (20:0); monounsaturated fatty acids: myristoleic (C14:1), palmitoleic (C16:1), and omega-9 oleic (C18:1), gadoleic (C20:1), erucic (C22:1), and nervonic (C24:1); and polyunsaturated fatty acids: omega-6 linoleic (C18:2), conjugated-linoleic (C18:2), gamma-linolenic (C18:3), eicosadienoic (C20:2), di-hommo-gamma-linolenic (C20:3), and arachidonic (C20:4); and omega-3 alpha-linolenic (C18:3), stearidonic (C18:4), eicosapentaenoic (C20:5), docosapentaenoic (C22:5), and docosahexaenoic (C22:6) fatty acids.

[0030] In some embodiments, synergy among complementing nutrients from different sources may be incorporated. Furthermore, using different sources avoids concentrated delivery of specific phytochemicals that may be harmful in excess, since nuts and seeds are known to have strong positive and negative outcomes. In one embodiment, Ayurvedic principles (ancient Indian medicine proven empirically over centuries) around the use of oils, nuts, and seeds may be integrated with western molecular science to design various lipid-containing compositions.

[0031] Given below in Table 2 are some examples of components of oils. USDA website (<http://www.nal.usda.gov/fnic/foodcomp/search/>) can be consulted for detailed components of various oils, nuts and seeds.

**Table 2. Relevant Components of Dietary Oils**

		Peanut Oil	Corn Oil	Sunflower Oil (high linoleic)	Fish Oil (herring)	Butter Oil (Anhydrous)	Coconut Oil
Nutrient	Units	1 tbsp	1 tbsp	1 tbsp	1 tbsp	1 tbsp	1 tbsp
Total lipid (fat)	g	13.5	13.6	13.6	13.6	12.73	13.6
Total Saturated Fatty Acids	g	2.281	1.761	1.401	2.895	7.926	11.764
Total Monounsaturated Fatty Acids	g	6.237	3.75	2.652	7.693	3.678	0.789
Total Polyunsaturated Fatty Acids	g	4.32	7.436	8.935	2.122	0.473	0.245
Butyric Acid (C4:0)	g					0.413	
Caproic Acid (C6:0)	g					0.244	0.082
Caprylic Acid (C8:0)	g					0.142	1.02
Capric Acid (C10:0)	g					0.319	0.816
Lauric Acid (C12:0)	g				0.021	0.358	6.066
Myristic Acid(C14:0)	g	0.014	0.003		0.977	1.281	2.285
Palmitic Acid (C16:0)	g	1.282	1.439	0.802	1.592	3.349	1.115
Margaric Acid (C17:0)	g		0.009				
Stearic Acid (C18:0)	g	0.297	0.251	0.612	0.111	1.543	0.381
Arachidic Acid (C20:0)	g	0.189	0.059				
Behenic Acid (C22:0)	g	0.378					
Lignoceric Acid (C24:0)	g	0.121					
Palmitoleic Acid (C16:1)	g	0.014	0.016		1.626	0.285	
Oleic Acid (C18:1, n-9)	g	6.048	3.717	2.652		3.203	0.789
Gadoleic Acid (C20:1, n-9)	g	0.176	0.018		1.853		
Erucic Acid (C22:1, n-9)	g				2.803		
Linoleic Acid (C18:2, n-6)	g	4.32	7.278	8.935	0.156	0.288	0.245
Alpha-linolenic Acid (C18:3, n-3)	g		0.158		0.104	0.185	
Arachidonic Acid (C20:4, n-6)	g				0.039		
Eicosapentaenoic Acid (C20:5 n-3)	g				0.853		
Docosapentaenoic Acid (C22:5 n-3)	g				0.084		
Docosahexaenoic Acid (C22:6 n-3)	g				0.572		
Vitamin A, RAE	mcg					108	
Retinol	mcg					105	
Carotene, beta	mcg					25	
Vitamin A, IU	IU					393	

Vitamin E (alpha-tocopherol)	mg	2.12	1.94	5.59		0.36	0.01
Tocopherol, beta	mg	0.06					
Tocopherol, gamma	mg	2.15					0.03
Tocopherol, delta	mg	0.18					
Vitamin K (phylloquinone)	mcg	0.1	0.3	0.7		1.1	0.1
Phytosterols	mg	28	132	14			12

**[0032]** In a related aspect, the disclosure provides compositions that include polyunsaturated fatty acids, monounsaturated fatty acids, saturated fatty acids, including omega-3, omega-6, and omega-9 fatty acids. In some embodiments the composition is a liquid formulation. In other embodiments the composition is a solid formulation. In yet other embodiments the composition is a semi-solid formulation. In certain embodiments, the composition can substitute the unbalanced fats (cooking oils, fats, and the like) that are typically added to various food preparations and/or supplement fats contained in an individual's diet from other sources. In certain embodiments, lipid-free or low-lipid diet plans are developed to complement the composition. In certain embodiments, the entire diet is a composition, balanced with respect to fatty acids, antioxidants, phytochemicals, vitamins, and minerals. In certain embodiments, in addition to normal lipid-containing ingredients, the disclosure may further comprise herbs, spices, sweeteners, and additives.

**[0033]** In some embodiments, the disclosure includes compositions wherein the ratios of omega-3, omega-6 and omega-9 are in an amount sufficient to prevent the onset or progression of, protect from the severity of or decrease a medical condition or disorder, or a symptom thereof. In particular embodiments, the compositions described herein are formulated with respect to one or more of an individual's factors including but not limited to diet, gender, age, size, weight, medical conditions, family medical history, climate and other demographic factors. The compositions may be delivered by any acceptable delivery method; in certain embodiments vitamins and minerals may be added to the compositions, and in certain embodiments, an additional vitamin and mineral supplement may be administered.

**[0034]** In one embodiment, an individual with a herbivorous diet, an ovo-lacto vegetarian diet, a vegan diet, or a high-antioxidant high-phytochemical omnivorous diet may be administered related compositions. In another aspect, an individual with a low-

antioxidant low-phytochemical herbivorous diet, a low-antioxidant low-phytochemical ovo-lacto vegetarian diet, a low-antioxidant low-phytochemical vegan diet, or a low-antioxidant low-phytochemical omnivorous diet may be administered related compositions. In another aspect, an individual may be administered with compositions that are formulated with respect to whether his or her diet comprises a low or high intake of seafood. This pertains to concentrated lipid compositions.

**[0035]** One method of measuring antioxidant and phytochemical consumption is to measure the number of fruits, vegetables, whole grains, and legumes servings per day, where two or more per day may provide high-antioxidant, high-phytochemical content. However, two or more servings of foods such as white rice or potatoes may contain very little phytochemicals. Yet certain other foods, particularly herbs such as turmeric, may contain potent phytochemicals (even in small quantities, e.g., a quarter-teaspoon). The website [www.phytochemicals.info](http://www.phytochemicals.info) may be consulted for addition information. Therefore, the disclosure provides a number of different compositions, including one with varying levels of omega-3 to suit a consumer's diet and/or tolerance level. As used herein, "tolerance" and the like means the ability of a consumer to withstand the composition without any discomfort. In some embodiments, the compositions designed for consumers with high seafood diet (two or more servings per week), include low amount of nuts and seeds. In some instances, no nuts or seeds. Other phytochemicals may also be minimized or eliminated as part of a composition to avoid unfavorable interactions.

#### **Administration**

**[0036]** In some embodiments, the compositions comprising the lipid formulation disclosed herein may be administered to an individual in any orally accepted form. The lipid formulations may be packaged in one, two, three, four or more mutually complementing daily dosages. In some embodiments, they may be contained in any one or more of, but not limited to, a single dosage or sustained and controlled release capsule, soft-gel capsule, hard capsule, tablet, powder, lozenge, or pill prepared in some instances with carriers such as starches, sugars, diluents, granulating agents, lubricants, binders, disintegrating agents, and the like; a powder or a granule; a nutritional bar; a bakery food product such as a bread, a dessert, a pastry, a truffle, a pudding or cake; a sealed single dosage packet or

resealable packaging containing a liquid, an oil blend, a gel, a sauce, a dressing, a spread, a butter, drops, a semi-solid; liquid, or the like; or a cooking oil such as a frying oil, a pan-frying oil, a parting oil or the like. In some embodiments, they may be unsealed and taken orally, or added as part of a cooking ingredient to previously cooked or uncooked food preparation with or without added fat. For example, they can be made into special cooking oil, butter, dressing, etc. and be added into foods while such foods are being prepared. The components of the compositions may be delivered in one-part or multiple parts as various components of a meal or to complement a meal, for example. In some embodiments, the lipid-containing compositions may be delivered using a gelatinous case, a vial, a pouch or a foil for containing such compositions. In some embodiments, they may be part of an enteral or parenteral formula, or a combination thereof. In some embodiments a one-day, one-week, two-week, bi-weekly, bi-monthly, or monthly diet plan may be formulated comprising various lipid formulations described herein, with varying compositions administered each day.

[0037] The balanced lipid composition disclosed herein may be used to create a completely balanced diet plan, by adding the composition, which contains balanced components of lipids, phytochemicals, antioxidants, vitamins, to name a few, into foods as a dietary component. In one embodiment, a dietary component can be a cooking ingredient added to prepared or unprepared food or beverage. In some embodiments, it can also be a finished food product such as a dessert or side dish, which are served together with other components of a meal. Special foods containing no lipid or low lipids (for example small amounts of lipids contained in meats, poultry, seafood, milk, fruits, vegetables, legumes and grains) may be created to be used together with balanced lipid formulation to ensure the complete balance of the lipid intake. Again, the administration of the balanced composite nutrients may be achieved through one course in a meal or multiple courses in a meal (e.g., salad, main course, and dessert).

[0038] Each individual may be given instructions on use of the product, and risk and cautionary measures, as is usual with any pharmaceutical, nutraceutical, or any product intended for ingestion. Oils, nuts, seeds, and herbs are potent; therefore, instructions may include recommended dosage, frequency, and suggestions for optimization.

[0039] The delivery of the desired lipid composition may be achieved through a one-part or multi-part delivery system. For example, the desired formulation may be achieved through adding various components to various parts of a meal, including bread, salad, main course, and/or dessert.

[0040] One aspect of the disclosure is to deliver fatty acids in such a way that the total daily delivery of omega-6 and omega-3 from the lipid composition and the rest of the diet are optimal with respect to daily recommendations.

[0041] Yet another aspect of the present disclosure is the concept of steady delivery of fatty acids, with respect to phytochemicals, based on the observation that each time there is a change in dietary lipid delivery/consumption, it upsets the body physiology, sometimes with adverse effects such as headaches, muscle and joint pains, digestive and bowel upset, mental confusion, and anxiety; and at other times it may cause short-lived euphoria and general sense of wellness. Though the body adapts to the change in 2-3 weeks or longer, long-term effects of the change outside the optimal range may be harmful. Furthermore, sudden large fluctuations in fatty acids ingestion can also have acute adverse effects. This steady delivery requires a steady dosage within the optimal range lasting approximately 2 to 3 weeks at a minimum.

## EXAMPLES

### Example 1. Formulas with Various Lipid Ratios

[0042] In specific embodiments of the disclosure the formulations described herein have high antioxidant and phytochemical content and properties that render extra omega-3 unnecessary. In specific embodiments sterols, sweeteners (such as honey), and herbs/spices (such as curcumin) included in the compositions can render extra omega-3 unnecessary. The formulations may provide a balanced fatty acid composition of approximately 10-100 grams of total daily fat. The formulations may include specific ratios of various lipid components as shown below in Table 3. The ratios may be weight by weight, weight by volume, or volume by volume (w/w, w/v, or v/v).

**Table 3. Lipid Ratios**

Lipid Component Ratio	Approximate Ratio Range
Omega-6 to Omega-3 Fatty Acids	1:1 - 50:1

Omega-9 to Omega-6 Fatty Acids	0.5:1 - 6:1
Total Fatty Acids to Monounsaturated Fatty Acids	1:1 - 15:1
Monounsaturated to Polyunsaturated Fatty Acids	0.25:1 - 6:1
Monounsaturated to Saturated Fatty Acids	0.25:1 - 7:1
Total Fatty Acids to Polyunsaturated Fatty Acids	1:1 - 15:1
Total Fatty Acids to Saturated Fatty Acids	1:1 - 15:1

[0043] In some embodiments, the lipid formulation calls for specific percentages of omega-9, omega-6, and omega-3 fatty acids, as shown in Table 4 below.

**Table 4. Contents of Various Unsaturated Fatty Acids**

Lipid Name	Content (w/w, w/v, or v/v of total lipids)
Omega-9	10-90%
Omega-6	4-75%
Omega-3	0.1-30%
Vitamin E-alpha/gamma	0.001-0.5%

**Example 2. Lipid Compositions According to Climate**

[0044] In one embodiment, compositions of the disclosure are formulated as per climatic condition and ambient temperature range. Table 5 provides % by weight ranges for a lipid formulation that includes oils, nuts and seeds as disclosed by embodiments of the present disclosure, by climatic condition and temperature range.

**Table 5. Lipid Formulation According to Climate**

% by Weight Ranges by Temperature (in °F)	HOT 90°- 135°		WARM 70°- 99°		COOL 50°- 75°		COLD 33°- 55°		BELOW FREEZING 0°- 37°		ARCTIC -50°- 5°		POLAR -100°- -45°	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
<b>Oils</b>														
Anhydrous Butter Oil	2	36	2	30	1	29	2	28	2	30	2	30	2	30
Avocado Oil	0	15	0	15										
Coconut Oil	0	25												
Corn Oil			0	15	0	15	0	15	2	30	2	30	2	30
Cotton seed oil	0	15	0	15	0	15	0	15	0	15	0	15	0	15
Fish Oil			0	15	0	15	0	15	0	20	0	20	0	20
Grapeseed oil	0	15	0	15	0	15	0	15	0	15	0	15	0	15

Hemp oil	0	15	0	15	0	15	0	15	0	15	0	15	0	15
Mustard Oil					0	15	0	15	0	20	0	20	0	20
Olive Oil			1	30	1	29	2	30	2	30	4	60	4	60
Palm Oil			0	5	0	5	0	5	0	5	0	5	0	1
Peanut Oil	2	68	2	53	0	35								
Perrilla oil	0	15	0	15	0	15	0	15	0	15	0	15	0	15
Rapeseed Oil	0	15	0	15	0	15	0	30	2	30	0	30	0	30
Rice Bran Oil	0	15	0	15	0	15	0	15	0	15	0	15	0	15
Safflower Oil	2	68	2	53	1	29	2	30	2	30	2	30	2	30
Soybean Lecithin	0	2	0	2	0	2	0	2	0	2	0	2	0	1
Sunflower Oil	4	72	2	53	1	37	2	30	2	30	2	30	2	30
Wheatgerm oil					0	10	0	10	0	10	0	10	0	10
<b>Nuts and Seeds</b>														
Almonds	3	48	3	49	2	47	3	46	3	48	3	48	3	48
Brazilnut					0	10	0	15	0	15	0	15	0	15
Cashews	2	37	2	31	1	20	1	18						
Chestnut							0	15	0	15	0	15	0	15
Coconut	0	25	0	10	0	10	0	5	0	5	0	5	0	4
Flaxseed					0	20	0	15	1	10	0	17	0	17
Hazelnut					0	10	0	15	0	15	0	15	0	15
Macadamia Nuts					0	10	0	15	0	15	0	15	0	15
Olives	2	33	2	28	1	28	2	27	2	28	2	28	2	28
Peanuts					1	33	2	38	3	47	3	47	3	47
Pine nuts							0	15	0	15	0	15	0	15
Pistachios			1	20	1	17	1	15	1	14	0	14	0	14
Pumpkin seeds	3	54	3	46	2	45	3	43						
Sesame					0	10	0	15	0	15	0	15	0	15
Soybeans			2	34	1	34	2	33	2	34	2	34	2	34
Sunflower Seeds	1	15	1	15	0	10	1	10						
Walnuts	2	33	2	28	1	27	2	26	2	27	2	27	2	27

**[0045]** Table 6 provides % by weight ranges (% of weight of the entire composition) for omega-9, omega-6, and omega-3 fatty acids as disclosed by embodiments of the present disclosure, by climatic condition and temperature range.

**Table 6. Unsaturated Fatty Acid Contents According to Climate**

% by Weight Ranges by Temperature (in °F)	HOT 90°- 135°		WARM 70°- 99°		COOL 50°- 75°		COLD 33°- 55°		BELOW FREEZING 0°- 37°		ARCTIC -50°- 5°		POLAR -100°- -45°	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
	Omega-9 Fats	20	90	20	90	20	90	10	80	10	80	10	80	10
Omega-6 Fats	4	60	4	60	6	60	10	60	12	70	13	70	15	73
Omega-3 Fats	0.3	5	0.5	6	0.8	7	1	8	1.5	9	1.8	12	2	13

**[0046]** In the following example, specific lipid compositions were prepared for healthy individuals living in a variety of climates, with a high antioxidant/phytochemical

diet and/or a vegetarian diet, for maintenance of general health and well-being. The compositions were made up of a variety of oils, nuts and seeds, as described below. The compositions as presented in Table 7 were formulated by three different methods: lipid liquid formulation only, a solid or semi-solid nut and seed formulation only, or a combination formulation containing oils, nuts and seeds. The compositions were formulated to be administered in a once a day format (combined formulation), or a twice a day format where one administration was of the liquid lipid formulation and the other administration was of the solid nut and seed composition.

[0047] Table 7 provides the omega-6 to omega-3 ratio contained in the lipid compositions of this example for a range of climates. The ratios are presented, for any one of the liquid only, solid only, or combination formulations.

**Table 7. Ratio of Omega-6 (O6) to Omega-3 (O3) by Climate**

O6:O3 Ratio by Climate (°F)	
<b>Hot: 90°- 135°</b>	20:1
<b>Warm: 70°- 99°</b>	18:1
<b>Cool: 50°-75°</b>	15:1
<b>Cold: 33°- 55°</b>	13:1
<b>Below Freezing: 0°- 37°</b>	10:1
<b>Arctic: -50°- 5°</b>	8:1
<b>Polar: -100°- -45°</b>	7:1

[0048] Table 8 provides the ratio of total lipids to each of monounsaturated, polyunsaturated, and saturated fatty acids in the lipid compositions of this example, for a range of climates. The ratios are presented, for any one of the liquid only, solid only, or combination formulations.

**Table 8. Ratio of Total Lipids to Specific Lipid Components By Climate**

Ratios by Climate (°F)	HOT	WARM	COOL	COLD	BELOW FREEZING	ARCTIC	POLAR
	90°- 135°	70°- 99°	50°- 75°	33°- 55°	0°- 37°	-50°-5°	-100°- -45°
<b>Total Lipids: Monounsaturated Fats</b>	3.7	2.2	2.2	2.1	2.2	2.1	2.1
<b>Total Lipids: Polyunsaturated Fats</b>	5.9	3.2	3.2	3.3	3.1	3.3	3.2
<b>Total Lipids:</b>	9.2	5.4	5.5	5.7	5.9	6.1	6

Saturated Fats							
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### Example 3. Lipid Compositions Based on Age, Sex and Diet

[0049] One aspect of the disclosure is to supply lipid formulation tailored to different human subjects based on their age and sex, and diet. Table 9 below provides dose ranges for total fat content in grams, the ratio range of monounsaturated fat to polyunsaturated fat, and the ratio range of monounsaturated fat to saturated fat, range of omega-6 content in grams, ratio range of omega-9 to omega-6, range of omega-3 content in grams, and the ratio range of omega-6 to omega-3 for vegetarian or high antioxidant and/or high phytochemical consuming non-vegetarian subjects as disclosed by embodiments of the present disclosure, by gender and age group.

**Table 9. Lipid Dosages Based on Age and Sex for Vegetarians and High Anti-Oxidant/Phytochemical Consuming Omnivores**

	Range Total Fat - g	Range Mono:Poly	Range Mono:Sat	Range O6 - g	Range O9:O6	Range O3 - g	Range O6:O3
Infants							
7-12 mo	10-50	1:1-3:1	1:1-5:1	1-10	1:1-3:1	0.1-3	4:1-45:1
Children							
1-3 y	10-60	1:1-3:1	1:1-5:1	2-15	1:1-3:1	0.1-3	4:1-45:1
Males							
4-8 y	10-75	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.1-4	4:1-45:1
9-13 y	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.1-4	4:1-45:1
14-18 y	20-100	1:1-3:1	1:1-5:1	2-35	1:1-3:1	0.2-5	4:1-45:1
19-30 y	20-100	1:1-3:1	1:1-5:1	2-40	1:1-3:1	0.2-5	4:1-45:1
31-50 y	20-80	1:1-3:1	1:1-5:1	2-40	1:1-3:1	0.2-5	4:1-45:1
51-70 y	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-5	4:1-45:1
>70 y	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-5	4:1-45:1
Females							
4-8 y	12-70	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.1-3	4:1-45:1
9-13 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.1-3	4:1-45:1
14-18 y	20-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-4	4:1-45:1
19-30 y	20-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-4	4:1-45:1
31-50 y	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-4	4:1-45:1
Pregnancy	24-100	1:1-3:1	1:1-5:1	2-35	1:1-3:1	0.2-5	4:1-45:1
Lactation	24-100	1:1-3:1	1:1-5:1	2-35	1:1-3:1	0.2-5	4:1-45:1
Menopause	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-4	4:1-45:1

**[0050]** Table 10 provides dose ranges for total fat content in grams, the ratio range of monounsaturated fat to polyunsaturated fat, and the ratio range of monounsaturated fat to saturated fat, range of omega-6 content in grams, ratio range of omega-9 to omega-6, range of omega-3 content in grams, and the ratio range of omega-6 to omega-3 for non-vegetarian (i.e., omnivorous) or low-antioxidant and/or low phytochemicals consuming vegetarian subjects as disclosed by the present disclosure by gender and age group.

**Table 10. Lipid Dosages Based on Age and Sex for Omnivores and Low Anti-Oxidant/Phytochemical Consuming Vegetarians**

	Range Total Fat - g	Range Mono:Poly	Range Mono:Sat	Range O6 - g	Range O9:O6	Range O3 - g	Range O6:O3
<b>Infants</b>							
7-12 mo	10-50	1:1-3:1	1:1-5:1	1-10	1:1-3:1	0.1-3	1:1-10:1
<b>Children</b>							
1-3 y	10-60	1:1-3:1	1:1-5:1	2-15	1:1-3:1	0.1-3	1:1-10:1
<b>Males</b>							
4-8 y	10-75	1:1-3:1	1:1-5:1	2-20	1:1-3:1	0.2-5	1:1-10:1
9-13 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.2-5	1:1-10:1
14-18 y	20-100	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.3-6	1:1-10:1
19-30 y	20-100	1:1-3:1	1:1-5:1	2-35	1:1-3:1	0.3-6	1:1-10:1
31-50 y	20-80	1:1-3:1	1:1-5:1	2-35	1:1-3:1	0.3-6	1:1-10:1
51-70 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.3-6	1:1-10:1
>70 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.3-6	1:1-10:1
<b>Females</b>							
4-8 y	12-70	1:1-3:1	1:1-5:1	2-20	1:1-3:1	0.2-4	1:1-10:1
9-13 y	15-80	1:1-3:1	1:1-5:1	2-20	1:1-3:1	0.2-4	1:1-10:1
14-18 y	20-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.3-5	1:1-10:1
19-30 y	20-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.3-5	1:1-10:1
31-50 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.3-5	1:1-10:1
Pregnancy	24-100	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.3-5	1:1-10:1
Lactation	24-100	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.3-5	1:1-10:1
Menopause	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.3-5	1:1-10:1

**[0051]** Table 11 provides dose ranges for total fat content in grams, the ratio range of mono-unsaturated fat to polyunsaturated fat, and the ratio range of monounsaturated fat to saturated fat, range of omega-6 content in grams, ratio range of omega-9 to omega-6, range of omega-3 content in grams and the ratio range of omega-6 to omega-3 for high-seafood consumers as disclosed by the present disclosure by gender and age group.

**Table. 11. Lipid Dosages Based on Age and Sex for High-Seafood Consumers**

	Range Total Fat - g	Range Mono : Poly	Range Mono : Sat	Range O 6 - g	Range O9 : O6	Range O3 - g	Range O6 : O3
<b>Infants</b>							
7-12 mo	10-50	1:1-3:1	1:1-5:1	1-10	1:1-3:1	0.1-3	2:1-30:1

Children							
1-3 y	10-60	1:1-3:1	1:1-5:1	2-15	1:1-3:1	0.1-3	2:1-30:1
Males							
4-8 y	10-75	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.1-4	2:1-30:1
9-13 y	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.1-4	2:1-30:1
14-18 y	20-100	1:1-3:1	1:1-5:1	2-35	1:1-3:1	0.2-5	2:1-30:1
19-30 y	20-100	1:1-3:1	1:1-5:1	2-40	1:1-3:1	0.2-5	2:1-30:1
31-50 y	20-80	1:1-3:1	1:1-5:1	2-40	1:1-3:1	0.2-5	2:1-30:1
51-70 y	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-5	2:1-30:1
>70 y	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-5	2:1-30:1
Females							
4-8 y	12-70	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.1-3	2:1-30:1
9-13 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	0.1-3	2:1-30:1
14-18 y	20-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-4	2:1-30:1
19-30 y	20-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-4	2:1-30:1
31-50 y	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-4	2:1-30:1
Pregnancy	24-100	1:1-3:1	1:1-5:1	2-35	1:1-3:1	0.2-5	2:1-30:1
Lactation	24-100	1:1-3:1	1:1-5:1	2-35	1:1-3:1	0.2-5	2:1-30:1
Menopause	15-80	1:1-3:1	1:1-5:1	2-30	1:1-3:1	0.2-4	2:1-30:1

#### Example 4. Diet Formulations

- [0052] In one embodiment, the total daily lipids from all foods are within the ratios described herein and the compositions described herein are administered to an individual that falls within the age and calorie intake range as recommended.
- [0053] In another embodiment, the lipid ratios and compositions described herein are administered to an individual whose total diet comprises 20%-45% of calories from fat (including from the lipid compositions), 45%-65% calories from carbohydrates, and 10%-25% calories from proteins. In one particular aspect, the total calories consumed by the individual falls within the ranges as daily recommended average, as per gender, age, and activity level, to name a few.
- [0054] In particular embodiments a meal plan may be established for the subject to be followed in conjunction with the administration of the composition.
- [0055] In some embodiments, the lipid ratios and compositions described herein are administered to an individual whose diet comprises 20%-45% of calories from fat. In one aspect 60-90% of calories from fat are supplied by the lipid compositions described herein. In a further aspect the calories from fats are supplied by one or more of fish oils, dairy products (butter, butter oil, milk, milk cream, and/or cheese), fruit oils, vegetable oils, nuts, seeds, nut oils, and seed oils.
- [0056] In some embodiments, the lipid ratios and compositions described herein are administered to an individual whose diet comprises 45%-65% of total calories

from carbohydrates. In another aspect the diet comprises 45%-65% of total calories from carbohydrates, which carbohydrates are from a 50%-70% intake of grains in calories, 15%-30% intake of vegetables in calories, and 10%-30% intake of fruits in calories. In a related aspect the calories from carbohydrates are additionally from one or more of spices, sweeteners, and beverages. In a further aspect the 50%-70% of carbohydrates from grains are supplied by one or more of wheat, rice, corn, barley, spelt, oats, rye, buckwheat, millet, quinoa, and other grains.

[0057] In some embodiments, the lipid ratios and compositions described herein are administered to an individual whose diet comprises 10%-25% of calories from proteins. In another aspect the diet comprises 10%-25% of calories from proteins, which proteins are from one or more of but not limited to legumes, eggs, cheese, milk, yogurt, poultry, seafood, and meat.

[0058] In one embodiment, a diet plan is provided which includes the 20%-45% of calories from fat, which are supplied by the lipid compositions described herein. In a related embodiment, a 1-day, a 1-week, a 2-week, or a 1-month diet plan is provided which includes the 20%-45% of calories from fat, of which 60-90% of fat calories are supplied by the lipid compositions described herein. In one diet plan, the remaining 45-65% of calories from carbohydrates and 10-25% of calories from proteins are supplied by a diet including the following components, ranges specified in calories.

**a. Calories from Carbohydrates 45-65%**

i. Grains 50-70%

1. Wheat <50%
2. Rice <50%
3. Corn <20%
4. Barley <20%
5. Spelt <20%
6. Oats <20%
7. Rye <20%
8. Buckwheat <15%
9. Millet <15%
10. Quinoa <15%
11. Other Grains <10%

ii. Vegetables 15-30%

1. Asparagus, Bell Peppers, Cucumber, Eggplant, Green beans, Green peas, Kale, Romaine, Spinach, Squash

- summer and winter, Tomato, Carrots, Romaine Lettuce, Radish, Bitter Gourd, Okra, Fenugreek Leaves <50%
- 2. Broccoli, Brussels Sprout, Cabbage, Chard, Cauliflower, Mustard Greens, Collard Greens, Turnip Greens <40%
- 3. Turnip, Beets, Potatoes, Yams, Sweet Potatoes <50%
- 4. Fungi <25%
- 5. Other Vegetables <15%

iii. Fruits 10-30%

- 1. Apple, Apricot, Orange, Pear, Plum, Banana, Cantaloupe, Grapes <75%
- 2. Grapefruit, Papaya, Mango, Pineapple <50%
- 3. Blueberries, Cranberries, Figs, Kiwi, Prune, Raspberries, Pomegranate, Strawberries, Watermelon <30%
- 4. Other fruits <15%

iv. Spices <7%

- 1. Basil, Black pepper, Cayenne pepper, Chili Pepper, Cinnamon, Cloves, Coriander seeds and leaves, Cumin, Dill, Ginger, Mustard Seeds, Oregano, Peppermint leaves, Rosemary, Sage, Thyme, Turmeric, Fennel, Garlic, Onion, Leeks, Parsley, Celery, Cardamom, Saffron, Lime, Lemon, Tamarind, Table salt, Mint, Vinegar, other

v. Sweeteners <7%

- 1. Molasses, Cane Juice, Honey, Maple Syrup, Dates, Raisins, Dried Berries, Figs, Sugar, other

vi. Beverages <5%

- 1. Green tea, Black tea, cocoa, coffee, alcohol, other <5%

**b. Calories from proteins 10-25%**

- i. Legumes: Black beans, Dried Peas, Mung beans, Garbanzo, Kidney beans, Lentils, Lima beans, Navy beans, Pinto beans, Soybeans <75%
- ii. Eggs <25%
- iii. Cheese <25%
- iv. Milk <25%
- v. Yogurt <25%
- vi. Poultry <30%
- vii. Seafood <30%
- viii. Meat <30%
- ix. Other <15%

**Example 5. Formulation with Varied Omega-3 Fatty Acid Content**

[0059] Table 12 provides dose ranges for total fat content in grams, the ratio range of monounsaturated fat to polyunsaturated fat, and the ratio range of monounsaturated fat to saturated fat, range of omega-6 content in grams, ratio range of omega-9 to omega-6, ratio range of omega-6 to omega-3, range of omega-3 content in grams designed by age and gender with increasing strength of omega-3, low, medium, and high, such that the human subject may choose the composition most agreeable to his/her diet, where the selection may be based upon the level of antioxidants and phytochemicals in the diet and/or medical predisposition.

**Table 12. Lipid Dosages Based on Age and Sex for Various Levels of Omega-3 Fatty Acids**

	Range Total Fat - g	Range Mono:Poly	Range Mono:Sat	Range O6 - g	Range O9:O6	Range O6:O3	Range O3 - g	Range O3 - g	Low Strength	Med. Strength	High Strength Range O3 - g
Infants											
7-12 mo	10-50	1:1-3:1	1:1-5:1	1-10	1:1-3:1	1:1-45:1	0.1-1.0	1.0-2.0	2.0-3.0		
Children											
1-3 y	10-60	1:1-3:1	1:1-5:1	2-15	1:1-3:1	1:1-45:1	0.1-1.0	1.0-2.0	2.0-3.0		
Males											
4-8 y	10-75	1:1-3:1	1:1-5:1	2-20	1:1-3:1	1:1-45:1	0.1-1.0	1.0-2.0	2.0-5.0		
9-13 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	1:1-45:1	0.1-1.0	1.0-2.0	2.0-5.0		
14-18 y	20-100	1:1-3:1	1:1-5:1	2-30	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-6.0		
19-30 y	20-100	1:1-3:1	1:1-5:1	2-35	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-6.0		
31-50 y	20-80	1:1-3:1	1:1-5:1	2-35	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-6.0		
51-70 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-6.0		
≥70 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-6.0		
Females											
4-8 y	12-70	1:1-3:1	1:1-5:1	2-20	1:1-3:1	1:1-45:1	0.1-1.0	1.0-2.0	2.0-4.0		
9-13 y	15-80	1:1-3:1	1:1-5:1	2-20	1:1-3:1	1:1-45:1	0.1-1.0	1.0-2.0	2.0-4.0		
14-18 y	20-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-5.0		
19-30 y	20-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-5.0		
31-50 y	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-5.0		
Pregnancy	24-100	1:1-3:1	1:1-5:1	2-30	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-5.0		
Lactation	24-100	1:1-3:1	1:1-5:1	2-30	1:1-3:1	1:1-45:1	0.2-1.0	1.0-2.0	2.0-5.0		
Menopause	15-80	1:1-3:1	1:1-5:1	2-25	1:1-3:1	1:1-45:1	0.1-1.0	1.0-2.0	2.0-4.0		

**Example 6. Formulation Based on Medical Conditions**

[0060] In various embodiments, lipid compositions described herein are administered to an individual for the prophylaxis and/or treatment of diseases, disorders or conditions. For example, the lipid formulation is used to alleviate symptoms of

menopause, the process of the cessation of menstruation. It is also used to alleviate the symptoms of endocrine disorders.

[0061] Table 13 provides dose ranges for total fat content in grams, the ratio range of monounsaturated fat to polyunsaturated fat, and the ratio range of monounsaturated fat to saturated fat, range of omega-6 content in grams, ratio range of omega-9 to omega-6, range of omega-3 content in grams, and the ratio range of omega-6 to omega-3 for subjects with medical indications as disclosed by the present disclosure.

**Table 13. Lipid Formulation Based on Medical Conditions**

	Range Total Fat - g	Range Mono:Poly	Range Mono:Sa- t	Range O6 - g	Range O9:O6	Range O3 - g	Range O6:O3
Menopause	15-100	1:1-3:1	1:1-5:1	2-30	5:1 1:1-	0.2-4	1:1-45:1
Cardiovascular Disease	15-100	1:1-3:1	1:1-5:1	2-35	5:1 1:1-	0.1-6	1:1-45:1
Mental Disorders	15-100	1:1-3:1	1:1-5:1	2-30	5:1 1:1-	0.1-6	1:1-45:1
Musculoskeletal Disorders	15-100	1:1-3:1	1:1-5:1	2-30	5:1 1:1-	0.1-6	1:1-45:1
Symptoms of Aging	15-100	1:1-3:1	1:1-5:1	2-30	5:1 1:1-	0.1-6	1:1-45:1
Endocrine Disorders	15-100	1:1-3:1	1:1-5:1	2-35	5:1 1:1-	0.1-5	1:1-45:1
Viral Infections	15-100	1:1-3:1	1:1-5:1	1-30	5:1 1:1-	0.1-4	1:1-45:1
Bacterial Infections	15-100	1:1-3:1	1:1-5:1	1-30	5:1 1:1-	0.1-4	1:1-45:1
Obesity	15-100	1:1-3:1	1:1-5:1	1-40	5:1 1:1-	0.1-6	1:1-45:1
Renal Diseases	15-100	1:1-3:1	1:1-5:1	1-30	5:1 1:1-	0.1-6	1:1-45:1
Pulmonary Disorders	15-100	1:1-3:1	1:1-5:1	1-25	5:1 1:1-	0.1-6	1:1-45:1
Ophthalmologic Disorders	15-100	1:1-3:1	1:1-5:1	1-25	5:1 1:1-	0.1-6	1:1-45:1
Dental Disorders	15-100	1:1-3:1	1:1-5:1	2-30	5:1 1:1-	0.1-6	1:1-45:1
Cancer	15-100	1:1-3:1	1:1-5:1	1-35	5:1	0.1-6	1:1-45:1

#### **Example 7. Lipid Composition According to Diet and Medical Condition**

[0062] In one example lipid composition parameters were established per diet or medical condition, intended for daily administration (one or more components). As per Table 14 and Table 15 the parameters of the compositions were established for an individual whose diet is high in antioxidants/phytochemicals and/or is a

vegetarian; an individual whose diet is low in antioxidants/ phytochemicals and/or is a non-vegetarian, or an individual presenting with a medical condition or disorder. The compositions are made up of a variety of nut oils, seed oils, vegetable oils, fruit oils, and other oils, nuts, and seeds. Table 14 presents the ratio ranges of polyunsaturated, monounsaturated, saturated, omega-3, omega-6, and omega-9 fats. Table 15 presents some compositions with the specified ratios of polyunsaturated, monounsaturated, saturated, omega-3, omega-6, and omega-9 fats.

**Table 14. Lipid Composition in Ratio Ranges, by Diet Type or Medical Condition**

Ratio Ranges by Diet	High Antioxidant/ Phytochemical Diet and/or Vegetarian		Low Antioxidant/ Phytochemical Diet and/ or Non- Vegetarian		Individual with Medical Issues	
	Low	High	Low	High	Low	High
Total Lipids: Monounsaturated Fats	1.50	4.00	1.50	4.00	1.50	4.00
Monounsaturated: Polyunsaturated Fats	1.00	3.00	1.00	3.00	1.00	3.00
Polyunsaturated: Saturated Fats	1.00	3.00	1.00	3.00	1.00	3.00
Monounsaturated: Saturated Fats	1.00	4.00	1.00	4.00	1.00	4.00
O9:O6	1.00	3.00	1.00	3.00	1.00	5.00
O6:O3	4.00	20.00	1.00	8.00	1.00	20.00
O9:O3	5.00	30.00	4.00	10.00	4.00	10.00
O9 % of Total Lipids	22.86	91.43	21.62	86.49	22.86	91.43
O6 % of Total Lipids	12.86	51.43	10.81	43.24	5.71	22.86
O3 % of Total Lipids	0.86	3.43	4.05	16.22	5.71	22.86

**Table 15. Lipid Composition Ratios, by Diet Type or Medical Condition**

Ratios	High Antioxidant/ Phytochemical Diet and/or Vegetarian	Low Antioxidant/ Phytochemical Diet and/ or Non- Vegetarian	Individual with Medical Issues
Total Lipids: Monounsaturated Fats	2.19	2.31	2.19
Monounsaturated: Polyunsaturated Fats	1.45	1.23	1.45
Polyunsaturated: Saturated Fats	1.38	1.63	1.38
Monounsaturated: Saturated Fats	2.00	2.00	2.00
O9:O6	1.78	2.00	4.00
O6:O3	15.00	2.67	1.00
O9:O3	26.67	5.33	4.00
O9 % of Total Lipids	45.71	43.24	45.71
O6 % of Total Lipids	25.71	21.62	11.43

Ratios	High Antioxidant/ Phytochemical Diet and/or Vegetarian	Low Antioxidant/ Phytochemical Diet and/ or Non- Vegetarian	Individual with Medical Issues
O3 % of Total Lipids	1.71	8.11	11.43

**Example 8. Two-Component Lipid Formulation According to Diet and Medical Condition**

[0063] In one example liquid lipid and solid lipid composition parameters were established per diet or medical condition, intended for twice-a-day administration (i.e. 2 component daily formulation). As per Table 16 to Table 19, the parameters of the compositions were established for an individual whose diet is high in antioxidants/phytochemicals and/or is a vegetarian; an individual whose diet is low in antioxidants/phytochemicals and /or is a non-vegetarian, or an individual presenting with a medical condition or disorder. The compositions are made up of a variety of nut oils, seed oils, vegetable oils, fruit oils, and other oils, nuts, and seeds. Table 16 presents the ratios of polyunsaturated, monounsaturated, saturated, omega-3, omega-6, and omega-9 fats for the bar (solid) formulation. Table 17 presents the ratios of polyunsaturated, monounsaturated, saturated, omega-3, omega-6, and omega-9 fats for the liquid formulation. Table 18 presents examples of bar formulation (solid) and Table 19 presents one liquid composition with the specified ratio ranges of polyunsaturated, monounsaturated, saturated, omega-3, omega-6, and omega-9 fats.

[0064] **Table 16. Solid Lipid Composition in Ratios, by Diet Type or Medical Condition**

2-Component Formulation, Ratios	In Bar Formulation		
Ratios	High Antioxidant/ Phytochemical Diet and/or Vegetarian	Low Antioxidant/ Phytochemical Diet and/ or Non- Vegetarian	Individual with Medical Issues
Total Lipids: Monounsaturated Fats	2.33	2.56	2.40
Monounsaturated: Polyunsaturated Fats	1.50	1.13	1.25
Polyunsaturated: Saturated Fats	1.00	1.33	1.33
Monounsaturated: Saturated Fats	1.50	1.50	1.67
O9:O6	1.33	1.33	1.60
O6:O3	10.00	3.00	2.50
O9:O3	13.33	4.00	4.00
Omega-9 % of Total Lipids	38.10	34.78	33.33
Omega-6 % of Total Lipids	28.57	26.09	20.83
Omega-3 % of Total Lipids	2.86	8.70	8.33

**Table 17. Liquid Lipid Composition in Ratios, by Diet Type or Medical Condition**

2-Component Formulation, Ratios	In Liquid Formulation		
Ratios	High Antioxidant/ Phytochemical Diet and/or Vegetarian	Low Antioxidant/ Phytochemical Diet and/or Non- Vegetarian	Individual with Medical Issues
Total Lipids: Monounsaturated Fats	1.87	2.00	2.25
Monounsaturated: Polyunsaturated Fats	1.67	1.36	1.00
Polyunsaturated: Saturated Fats	2.25	2.75	4.00
Monounsaturated: Saturated Fats	3.75	3.75	4.00
O9:O6	1.72	1.75	2.00
O6:O3	41.60	4.00	2.00
O9:O3	71.50	7.00	4.00
Omega-9 % of Total Lipids	51.07	46.67	44.44
Omega-6 % of Total Lipids	29.71	26.67	22.22
Omega-3 % of Total Lipids	0.71	6.67	11.11

**Table 18. Solid Lipid Composition in Ratio Ranges, by Diet Type or Medical Condition**

2-Component Formulation, Ratio Ranges	Bar Formulation					
	High Antioxidant/ Phytochemical Diet and/or Vegetarian		Low Antioxidant/ Phytochemical Diet and/or Non- Vegetarian		Individual with Medical Issues	
	Low	High	Low	High	Low	High
Total Lipids: Monounsaturated Fats	1.50	4.00	1.50	4.00	1.50	4.00
Monounsaturated: Polyunsaturated Fats	1.00	3.00	1.00	3.00	1.00	3.00
Polyunsaturated: Saturated Fats	1.00	3.00	1.00	3.00	1.00	3.00
Monounsaturated: Saturated Fats	1.00	4.00	1.00	4.00	1.00	4.00
O9:O6	1.00	3.00	1.00	3.00	1.00	5.00
O6:O3	4.00	16.00	1.00	8.00	1.00	16.00
O9:O3	5.00	20.00	4.00	10.00	4.00	10.00
Omega-9 % of Total Lipids	19.05	76.19	17.39	69.57	16.67	66.67
Omega-6 % of Total Lipids	14.29	57.14	13.04	52.17	10.42	41.67
Omega-3 % of Total Lipids	1.43	5.71	4.35	17.39	4.17	16.67

**Table 19. Liquid Lipid Composition in Ratio Ranges, by Diet Type or Medical Condition**

2-Component Formulation, Ratio Ranges	Liquid Formulation		
	High Antioxidant/ Phytochemical Diet and/or Vegetarian	Low Antioxidant/ Phytochemical Diet	Individual with Medical Issues

			and/ or Non-Vegetarian			
	Low	High	Low	High	Low	High
Total Lipids: Monounsaturated Fats	1.50	4.00	1.50	4.00	1.50	4.00
Monounsaturated: Polyunsaturated Fats	1.00	3.00	1.00	3.00	1.00	3.00
Polyunsaturated: Saturated Fats	1.00	3.00	1.00	3.00	1.00	4.00
Monounsaturated: Saturated Fats	1.00	4.00	1.00	4.00	1.00	4.00
O9:O6	1.00	3.00	1.00	3.00	1.00	5.00
O6:O3	8.00	45.00	1.00	8.00	1.00	45.00
O9:O3	10.00	75.00	4.00	10.00	4.00	10.00
Omega-9 % of Total Lipids	25.54	90	23.33	93.33	22.22	88.89
Omega-6 % of Total Lipids	14.86	59.43	13.33	53.33	11.11	44.44
Omega-3 % of Total Lipids	0.36	1.43	3.33	13.33	5.56	22.22

#### Example 9. Special Formulations Based on Diet

[0065] In this example one liquid lipid composition parameters was established and one formulation was prepared, intended for once, twice, or thrice or more a day administration to an individual whose diet is high in antioxidants/phytochemicals and/or is a vegetarian and to an individual who does not favor, or cannot tolerate nuts and seeds. The compositions include a variety of nut oils, seed oils, vegetable oils, fruit oils, and other oils. Some ranges for a formulation are provided by % by weight (w/w) for each component (representing the % weight for that individual component on a daily basis). The compositions can be administered once or more daily. Some compositions may include two or more of: almond oil (4%-23%), anhydrous butter oil (5%-29%), avocado oil (1%-6%), cashew oil (2%-15%), coconut oil (0%-2%), corn oil (3%-19%), fish oil (0%-5%), flaxseed oil (0%-5%), mustard oil (0%-5%), olive oil (3%-17%), palm oil (0%-5%), peanut oil (5%-30%), pistachio oil (1%-7%), pumpkin seeds (1%-8%), safflower oil (high oleic) (1% - 5%), sesame oil(0% - 50%), soybean lecithin (0%-5%). soybean oil(1%-7%), sunflower oil (high oleic)(2% -14%), sunflower oil (regular)(0%-5%), and/or walnut oil (3%-15%).

[0066] Another set of parameters for one liquid lipid composition was established, intended for once, twice, or thrice a day administration to an individual who does not favor, or can not tolerate nuts and seeds. The compositions included a variety of nut oils, seed oils, vegetable oils, fruit oils, and other oils. Some ranges for a formulation are provided by % by weight (w/w) for each component (representing the % weight for that individual component on a daily basis). The ranges can

accommodate vegetarian/high-antioxidant/high-phytochemical user and omnivore/low-antioxidant/low-phytochemical user or a seafood user, in different combinations. The compositions can be administered once or more daily. Some compositions may include two or more of: almond oil (2%-36%), anhydrous butter oil (2%-36%), coconut oil (0%-8%), corn oil (1%-24%), flaxseed oil (0%-8%), mustard oil (0%-8%), olive oil (2%-36), palm oil (0%-2%), peanut oil (4%-72%), pumpkin seeds oil (1%-24%), safflower oil (high oleic) (2% - 60%), soybean lecithin (0%-4%), sunflower oil (high oleic) (4% -72%), and/or walnut oil (2%-36%).

#### **Example 10. Daily Formulations**

[0067] Liquid lipid and solid lipid composition parameters were established for a twice-daily administration (i.e. 2-component daily formulations). The compositions were made up of a variety of nut oils, seed oils, vegetable oils, fruit oils, and other oils. The ranges for each component of the liquid and solid formulations are presented for each of the solid and liquid formulations. The solid formulation includes two or more of by % weight of total composition: almonds (10% - 25%), cashews (7% -15%) coconut shredded (1% -4%), flaxseed (0% -1%), olives (15% -25%), peanuts (4% -15%), pistachios (2% -9%), pumpkin seeds (2% -12%), sesame (0% -0%), soybeans (8% -20%), sunflower seeds (1% -4%), and/or walnuts (5% -15%). The liquid formulation includes two or more of by % weight of total composition: avocado oil (3% -14%), corn oil (15% -30%), mustard oil (0% -2%), olive oil (10% -22%), palm oil (0% -2%), peanut oil (15% -35%), safflower oil (high oleic)(5% -15%), soybean lecithin (0% -2%), sunflower oil (high oleic)(10% -25%), and/or anhydrous butter oil (5% -15%).

[0068] Some parameters were also established for one or more daily administration (e.g., 1, 2 or 3 component daily formulation). The compositions were made up of a variety of nuts, seeds, nut oils, seed oils, vegetable oils, fruit oils, and other oils. The ranges for each component of the formulations are presented for each of the solid and liquid components. The formulation can include two or more of by % weight of total composition: peanuts or peanut oil (4-35), almonds or almond oil (2%-25%), olives or olive oil(3%-45%), legumes or grains (15%-45%), cashews or cashew oil (10%-40%), pistachios or pistachio oil (5%-25%), pumpkin seeds or pumpkin seed oil (4%-25%), sunflower seeds or sunflower seed oil (2%-30%), sesame seeds or sesame seed oil (0%-20%), walnuts or walnut oil (5%-25%),

flaxseed or flaxseed oil (0%-10%), anhydrous butter oil or milk product including cheese (5%-45%), coconut meat or coconut oil (2%-8%), corn oil (3%-20%), avocado oil (3%-8%), safflower oil (2%-20%), mustard oil (0%-8%), palm oil (0%-8%), and/or soybean lecithin (0%-2%).

**Example 11. A Case Study on Menopause, Aging, and Musculoskeletal Disorders**

**[0069]** A 47-year old female presented with menopause-related hot flushes. The subject's diet was supplemented with a combination of vegetable oils, seed oils, nuts and seeds for a period of 6 weeks. The subject was provided with the twice-daily administration formulation in Example 10. By optimizing omega-6 and omega-3 fatty acids and ratios thereof, it was observed that there was an adaptation period over which the intensity of hot flushes gradually diminished. Other symptoms reduced were: night sweats, loss of libido, vaginal dryness, fatigue, hair loss, sensitivity to hot and cold, sleep disorders, difficulty concentrating, memory lapses, weight gain, bloating, mood swings, depression, anxiety, irritability, breast tenderness, migraines, aching joints, burning tongue, the feeling of electric shocks, digestive problems, gum problems, muscle tensions, itchy skin, and tingling in the extremities, as reported by the subject. During the 6-week course of treatment, the subject did improve her posture, which is indicative of greater muscle mass, joint and/or tendon strength and flexibility, and bone density. The effect on osteoporosis can be tested by continuing the treatment with the supplement of oils, nuts, and seeds over a longer period of time and measuring bone density, using standard methods, before, during, and after treatment.

**[0070]** It is likely that beneficial effects of treatment on the menopause-related symptoms was due to achieving steady sex-hormone-like benefit from omega-6 and omega-3 fatty acid supplementation and optimization. The amount of dietary fat, its composition, and the period during which the nutrient is fed to animals is known to affect the secretion and metabolism of androgens and endogenous steroids, and the presentation of sex hormone receptor on the cell surface. Estrogens and polyunsaturated fatty acids are also believed to have similar actions. Das UN. Estrogen, statins, and polyunsaturated fatty acids: similarities in their actions and benefits-is there a common link? Nutrition. 2002 Feb;18(2):178-88. McVey MJ, Cooke GM, Curran IH, Chan HM, Kubow S, Lok E, Mehta R. Epub 2007 Sep 11. Effects of dietary fats and proteins on rat testicular steroidogenic enzymes and

serum testosterone levels. *Food Chem Toxicol.* 2008 Jan;46(1):259-69.

Gromadzka-Ostrowska J. Effects of dietary fat on androgen secretion and metabolism. *Reprod Biol.* 2006;6 Suppl 2:13-20. In addition to amount and composition, relatively steady dosages may also be important to reduce hormone fluctuations.

[0071] Nutrients from the total diet (natural sources) including the lipid composition administered were as follows in Table 20.

**Table 20. The Subject's Daily Nutrients**

Nutrient	Weight	Nutrient	Weight
Protein g	60-100	Cystine g	1-2.5
Carbohydrate g	225-325	Glutamic acid g	12-14
Total Lipids g	50-65	Glycine	2-4
Calories	1700-1900	Histidine g	1-3
Cholesterol mg	150-300	Isoleucine g	2-4.5
Fiber g	30-45	Leucine g	4.5-7.5
Alpha Carotene mcg	3000-4000	Lysine g	4-5.5
Beta Carotene mcg	10000-14000	Methionine g	1-2.5
Beta Cryptoxanthin mcg	600-850	Phenylalanine g	2.5-4.5
Betaine mg	20-50	Proline g	4-6
Choline mg	150-250	Serine g	2.5-5.5
Folate mcg	500-800	Threonine g	2-4
Lycopene mcg	1600-1900	Tryptophan g	0.5-2
Lutein Zeaxanthin mcg	10000-14000	Tyrosine g	2-4
Niacin mg	15-20	Valine g	3-5
Pantothenic Acid mg	8-14	Total Fat g	50-65
Retinol mcg	300-400	Monounsaturated g	18-26
Riboflavin mg	2-3	Polyunsaturated g	12-18
Thiamin mg	1.5-2.5	Saturated g	12-17
Vitamin E Tocopherol Beta mg	0.1-0.5	Butyric acid 4:0 g	0.2-.75
Vitamin E Tocopherol Delta mg	0.1-0.5	Caproic acid 6:0 g	0.1-0.5
Vitamin E Tocopherol Gamma mg	2.0-4.0	Caprylic acid 8:0 g	0.1-0.5
Vitamin E Tocopherol Alpha mg	10-15	Caprice acid 10:0 g	0.2-0.6
Vitamin A IU	20000-30000	Lauric acid 12:0 g	0.4-0.75
Vitamin A RAE	1500-1900	Myristic 14:0 g	1-3.0
Vitamin B6 mg	1.5-2.5	Palmitic 16:0 g	3.0-7.0
Vitamin B12 mcg	2-5	Palmitoleic 16:1 g	0.25-1.5
Vitamin C mg	250-400	Stearic 18:0 g	1.5-3.0
Vitamin D IU	200-400	Oleic 18:1 g	16-22
Vitamin K mcg	300-550	Linoleic 18:2 g	11-14
Calcium mg	1200-1500	Alpha-linolenic 18:3 g	0.8-1.5
Copper mg	2-3	Arachidic 20:0 g	0.1-1.0
Iron mg	14-18	Gadoleic (Eicosenoic) 20:1 g	0.1-4
Magnesium mg	400-700	Arachidonic 20:4 g	0.01-0.5
Manganese mg	6-8	Eicosapentaenoic 20:5 g	0-0.5
Phosphorous mg	1600-1900	Erucic 22:1 g	0-0.3
Potassium mg	3800-5500	Docosapentaenoic 22:5 g	0-0.5
Selenium mcg	65-80	Docosahexaenoic 22:6 g	0.01-0.2

Nutrient	Weight	Nutrient	Weight
Sodium mg	2000-2500	Phytosterols mg	90-150
Zinc mg	10-14	Campesterol mg	0.8-1.5
Alanine g	2.5-4.5	Sitosterol mg	15-30
Arginine g	3-4.5	Stigmasterol mg	0.3-1.5
Aspartic acid g	6-8		

**Example 12. A Case Study on Hypercholesterolemia, Cardiovascular Disease**

[0072] The host subject experienced hypercholesterolemia on a vegetarian diet low in fat, mostly olive oil (75% monounsaturated fat), a daily fish oil supplement of 1 gram, and a daily total essential fatty acids (EFA) supplement of 1 gram. As part of the treatment, the fish oil and EFA supplements were discontinued. The subject was then administered a daily lipid composition supplement containing 11 grams of omega-6 and 1.2 grams of omega-3, made up primarily from a combination of vegetable oils, and nuts and seeds. Administration of the lipid composition resulted in a reduction of LDL from 160mg to 120mg. Very low levels of blood pressure were observed, 90/55 mmHg, when omega-3 was increased to 1.8 grams; blood pressure levels normalized at 105/70 mmHg at 11 grams of omega-6 and 1.2 grams of omega-3. When omega-3 was reduced from 1.8 grams to 1.2 grams per day, the subject experienced an irregular heartbeat, which subsided over a period of 2-3 weeks. However, when omega-3 was further reduced to 0.5 grams per day, it resulted in an ongoing arrhythmia.

[0073] This case study demonstrated that supplementation with vegetable oils, nuts, and seeds, wherein the omega-6 to omega-3 ratio was about 9:1 results in a significant decrease in LDL cholesterol blood levels (dyslipidemia which is associated with atherosclerosis). This case study also demonstrated that the lipid compositions and ratios described herein may be useful in moderating blood pressure and arrhythmia.

[0074] In another human subject, intense muscle spasms arising from the left thoracic cavity/wall were observed subsequent to a meal high in omega-6, whereas the subject's typical diet included primarily monounsaturated fatty acids and very small amounts of saturated fatty acids. It is hypothesized, that sudden increase in omega-6, when the body is chronically deficient may be harmful.

[0075] Polyunsaturated fats (omega-6, particularly gamma-linolenic acid) have often been recommended to reduce coronary heart disease along with recommendations to reduce saturated fatty acids. But all saturated fats do not have the same effect

on cholesterol synthesis in the liver. Saturated fats of chain-length 12, 14 and 16 (lauric acid, myristic acid and palmitic acid) have been shown to elevate blood cholesterol. Stearic acid (18-carbon, saturated) has been shown to lower cholesterol by 21%--even more than oleic acid (18-carbon, monounsaturated), which lowers LDL by 15%. Polyunsaturated fats increase cell membrane fluidity and therefore tissue flexibility, including that of the arteries. It has been suggested that reduced activity of Delta6 and Delta5 desaturases, enzymes that metabolize essential fatty acids may be a factor in the initiation and progression of atherosclerosis. Das UN. A defect in the activity of Delta6 and Delta5 desaturases may be a factor in the initiation and progression of atherosclerosis. Prostaglandins Leukot Essent Fatty Acids. 2007 May;76(5):251-68. Epub 2007 Apr 26. Certain phytochemicals have been shown to inhibit the enzymatic activity. Fujiyama-Fujiwara Y, Umeda R, Igarashi O. Effects of sesamin and curcumin on delta 5-desaturation and chain elongation of polyunsaturated fatty acid metabolism in primary cultured rat hepatocytes. J Nutr Sci Vitaminol (Tokyo). 1992 Aug;38(4):353-63.

#### **Example 13. A Case Study on Mood Swing, Mental Function**

[0076] The subject host was placed on a trial of varying ratios of omega-6 and omega-3 using various oils and nut combinations. Each time omega-3 was reduced or omega-6 was increased the subject became depressed and was given to crying at the slightest provocation. When omega-3 was increased, it elevated the subject's mood, immediately noticeable. However, within certain ranges of omega-6 and omega-3, the effect was self-adjusting, e.g., over a period of 3-6 weeks the moods normalized. It was also observed that within that range of omega-6 and omega-3, over a period of 3-6 weeks the subject in fact was more grounded at higher levels of omega-6; and was euphoric at higher levels of omega-3. Omega-3 increase enhanced cognitive function, which was immediately noticeable. Omega-3 reduction caused confusion, dyslexia, and a decline in cognitive function but these symptoms subsided with time, again within certain omega-6 and omega-3 ranges. The subject also displayed greater attention span and concentration after omega-6 and omega-3 were optimized over a period of 3-6 weeks, with greater reading speeds and comprehension. Thus, the subject performed better at a lower level of omega-3, which suggests that an adaptation mechanism was activated to compensate for the required level of omega-6 metabolites. There may be a similar

adaptation mechanism for required level of omega-3. The cumulative effects of such adaptations could pose a threat to the individual.

[0077] Manipulation of dietary fats can alter the fatty acid composition of brain-cell membranes, with effects on thought processing and behavior. Polyunsaturated fatty acids could be associated at different levels in brain functions through their role in the membrane fluidity which influences diverse steps of neurotransmission and through their function as precursors of pro-inflammatory cytokines and eicosanoids disturbing neurotransmission.

#### **Example 14. Case Studies on Neural Disorders**

##### 1. Progressive Supra-nuclear Palsy

[0078] The subject host was a 50-year old woman whose symptoms included dental sensitivity, deteriorating muscle mass, occasional breathing difficulty, easy bruising, mild arrhythmia, and difficult bowel movement. A dentist, as a solution to her sensitive teeth, had extracted and replaced her teeth with dentures at 50. Each of her other symptoms was treated as a stand-alone symptom and treated with non-lipid medications. At 60 she developed loss of balance, diplopia (double vision), and slurry speech. Eventually when she started having bone-shattering falls, she was diagnosed with Progressive Supra-nuclear Palsy (PSP), a neurological disease mainly characterized by loss of neural tissue in the brainstem. The subject then lost ambulation and speech, and developed dysphagia. She passed away at 67 from pneumonia.

[0079] The woman had had four healthy deliveries, a healthy life until 50, and had no incidence of neural disease in her family. Closer examination of changes in her life around 50 revealed that around that time the fats in her diet had been significantly cut back because of the prevalent doctrine in the 1980s that fats cause heart-disease, and that all fats are deleterious. Both of the woman's parents in their early 70s, and a brother at 48, had died of heart attacks. Hence, the fat reduction was a precautionary measure to avoid cardiac disease, which was then believed to have a strong genetic component. However, it is hypothesized in the present disclosure that the fats were cut to a point where she became severely deficient in both omega-6, and omega-3 fatty acids. The woman was a postmenopausal vegetarian with high antioxidant and phytochemicals intake, and the little fat that was in her diet was either saturated fat (less than 20% of total fat) or monounsaturated fat (70-90% of total fat), mostly olive oil following the then

doctrine that held olive oil above all others. Olive oil is 75% monounsaturated oil and rich in polyphenols. Since all fatty acids compete for the same enzymes in the metabolic pathway and antioxidants and phytochemicals increase the requirement for omega-6, in her case the deficiency of omega-6 acid appears to be the culprit. The deficiency of omega-6 is also evident from her early symptoms: muscle mass requires a balance of omega-6 and omega-3, lack of omega-6-derivative leukotrienes would lead to asthma-like breathing issues (conversely excessive leukotrienes can also lead to asthma like symptoms), deficiency of omega-3 has been linked with arrhythmia, and deficiency of omega-6 derived thromboxanes would lead to easy bruising, and lack of omega-6 derived prostaglandins will impede smooth muscle activity and therefore the bowel movement. The fact that she was post-menopausal made the requirement of omega-6 and omega-3 more critical, since estrogen and androgens, as hypothesized in the present disclosure, have similar actions and benefits as polyunsaturated fats. When the reproductive hormones decline, the body increasingly depends on omega-6 and omega-3 for the physiological functions.

[0080] It is an embodiment of the present disclosure, that deficiency of linoleic acid (LA) metabolite Arachidonic acid (AA) and alpha-linolenic acid (ALA) metabolite docosahexaenoic acid (DHA), that are so abundantly present in neural tissue, particularly the membranes of neural synapses, may have caused the neurodegeneration. Neuroinflammation is a host defense mechanism associated with neutralization of an insult and restoration of normal structure and function of brain, and is characteristic of all major neural diseases. The dietary deficiency of LA and ALA, and the resulting unfavorable tissue ratio of AA to DHA might have affected the neurodegeneration associated with acute neural trauma and neurodegenerative disease.

[0081] It is important to note that not all omega-6 or omega-3 deficiencies or imbalance lead to PSP. It simply creates a distress in the body; the disease developed depends on rest of the body chemistry. In the Western world omega-3 has received much attention because of the populace's consumption was highly skewed towards omega-6 and that with inadequate antioxidant and phytochemical intake. Requirement of omega-3 is very small, and increases only with the increase in omega-6. Disclosed herein are methods and compositions to balance

omega-3 and omega-6, in light of demographic factors, and for their steady delivery.

## 2. Amyotrophic Lateral Sclerosis

[0082] The subject was a vegetarian woman in her mid-30s, on a low-fat diet using primarily olive oil and nuts. She had developed Amyotrophic Lateral Sclerosis (ALS)-like symptoms: muscle weakness in hands, arms, legs, and the muscles of speech, twitching and cramping of muscles, shortness of breath, and difficulty in swallowing. The left side of her body was affected more than the right side. Upon administration of a lipid composition and changes in diet that increased omega-6 to about 12 grams, her symptoms disappeared and the muscle tone improved, better than before the onset of symptoms. It is hypothesized that in this instance, the amount of omega-3 relative to omega-6 in the tissue had exceeded the ratio tolerated by the body. Since the vegetarian diet and nuts contributed plenty of antioxidants and phytochemicals, the subject became deficient in omega-6, despite moderate levels of omega-3.

[0083] The initial symptoms of ALS can be quite varied in different people. One person may experience tripping over carpet edges, another person may have trouble lifting and a third person's early symptom may be slurred speech. In a small number of people, ALS is known to remit or halt its progression, though there is no scientific understanding as to how and why this happens. The inventor hypothesizes that it has to do with inadvertent change in omega-6 and omega-3 fatty acids. Most of us fall into certain food patterns based on likes and dislikes, habits inherited from family, accessibility of certain foods, cooking habits, and the foods that happen to be in vogue. But, there is always that change in life, a dinner party at a friend's, food gift from a well-wisher, or a vacation to a remote locale, or a new oil that one takes a liking to, which brings about change in diet. All it takes is a handful of nuts, or a spoonful of high-omega-6 and/or omega-3 oil to tip the balance, even if temporarily. However little, it does register in the body.

[0084] Subsequent to the experimental adjustment of omega-6 and omega-3 levels in other host subjects the inventor observed, improvement in motor coordination, handwriting, balance, and body's ability to follow a rhythm, in dance steps, for example.

**Example 15. Case Studies on Musculoskeletal Disorders****1. Muscular Performance**

[0085] In a subject host, the inventor observed many musculoskeletal issues appear and disappear in the course of omega-6 and omega-3 therapy by administration of lipid compositions. Increases in omega-3 beyond 0.5g, in a vegetarian host with omega-6 at 10-11 grams, yielded better muscular performance, lesser joint pain, lesser joint crackling sounds, and better spatial task performance. But a point of diminishing marginal returns was reached at about 1.2 grams of omega-3. Increases of omega-3 beyond 1.2 grams resulted in weaker muscle tone, posture, and exercise endurance. When the omega-3 was gradually brought back to 1.2 grams, the subject experienced leg cramps, lower back pain, burning sensation in the scalp, buckling of knee joints, and joint pains in knees and shoulders. Over a period of 3-6 weeks these symptoms subsided.

**2. Gout**

[0086] In another subject host, the inventor observed the development of Gout, a joint disorder, on a low-fat diet, primarily olive oil, and nuts. The symptoms disappeared upon increase of omega-6 in the diet.

**3. Myofascial Pains and Thoracic Outlet Syndrome**

[0087] In a 35-year old vegetarian female, on a low-fat diet using olive oil as the main fat in the diet, the development of episodes of acute myofascial pains was observed. The subject experienced severe muscle tightness in several areas of the body, neck, shoulders, para-spinal muscles, thighs, hands, and arms.

[0088] The host was diagnosed with Myofascial Pain Syndrome (MFS) and Thoracic Outlet Syndrome (TOS). TOS consists of a group of distinct disorders that affect the nerves in the brachial plexus (nerves that pass into the arms from the neck) and the subclavian artery and vein blood vessels between the base of the neck and axilla (armpit). For the most part, these disorders are produced by compression of the components of the brachial plexus (the large cluster of nerves that pass from the neck to the arm), the subclavian artery, or the subclavian vein. Neurogenic form of TOS accounts for 95-98% of all cases of TOS, hence neural disease was suspected. The host subject went through numerous examinations including: MRIs of the entire CNS, X-rays, blood work, drug therapies, massage therapies, and chiropractic treatment. The symptoms would go away and then reappear a few months or a year later. After the inventor optimized the omega-6 and omega-

3 in the subject's diet by administration of lipid compositions the episodes of TOS and myofascial pains subsided. It is hypothesized herein that these episodes were the result of the body being severely deficient in omega-6 and omega-3. Each time there was an inadvertent increase in omega-6 and omega-3, which can occur by any incidental changes in diet, there was a sudden surge in prostaglandins, thromboxanes, and leukotrienes, resulting in severe muscular tightening. Other mechanisms related to the lipids may be involved that are not yet understood.

**[0089]** Fatty acids' relationship with musculoskeletal disorders is very intricate. There are many studies demonstrating that arachidonic acid and other polyunsaturated fatty acids modulate the function of voltage gated calcium, sodium, and potassium channels, primarily in neural and muscle cells impacting the excitability of the cells. Boland LM, Drzewiecki MM. Polyunsaturated Fatty Acid modulation of voltage-gated ion channels. *Cell Biochem Biophys.* 2008;52(2):59-84. Epub 2008 Oct 2. In some studies changes in muscle fiber type may be observed with changes in amount and type of fatty acids. de Wilde J, Mohren R, van den Berg S, Boekschoten M, Dijk KW, de Groot P, Müller M, Mariman E, Smit E. Short-term high fat-feeding results in morphological and metabolic adaptations in the skeletal muscle of C57BL/6J mice. *Physiol Genomics.* 2008 Feb 19;32(3):360-9. Epub 2007 Nov 27. On the skeletal side, bone mass is governed by balanced action of osteoblasts (bone forming cells) and osteoclast (bone resorbing cells). There is increasing evidence that various long-chain polyunsaturated fatty acids and their metabolites affect calcium balance, osteoblastogenesis, osteoclastogenesis, and osteoblast and osteoclast function. Poulsen RC, Moughan PJ, Kruger MC. Long-chain polyunsaturated fatty acids and the regulation of bone metabolism. *Exp Biol Med (Maywood).* 2007 Nov;232(10):1275-88. Rahman MM, Bhattacharya A, Fernandes G. Docosahexaenoic acid is more potent inhibitor of osteoclast differentiation in RAW 264.7 cells than eicosapentaenoic acid. *J Cell Physiol.* 2008 Jan;214(1):201-9.

#### **Example 16. A Case Study on Thyroid Disturbances**

**[0090]** In a host subject, symptoms of thyroid disturbance with a decrease in omega-3, fatigue and weakness, cold intolerance, hair loss, cold hands and feet, weight gain, insomnia, constipation, depression, poor memory, forgetfulness, and nervousness were observed.

**Example 17. A Case Study on Weight Gain, Obesity**

[0091] In a vegetarian host subject it was discovered that there was a band of optimal quantity and ratio of omega-6 and omega-3, beyond which the subject gained weight. At omega-6 of 11 grams and omega-3 of 2 grams, the subject was at 134 lbs. When the inventor gradually reduced omega-3 to 1.2 grams, the subject initially gained 6 lbs., and then after 6 weeks, lost 12 lbs. for an ending weight of 128 lbs. Obesity often has been linked to slow metabolism. In turn, metabolic rate has been linked to cell-membrane composition. Hulbert AJ. Membrane fatty acids as pacemakers of animal metabolism. *Lipids*. 2007 Sep;42(9):811-9. Epub 2007 Apr 27. High polyunsaturated membrane composition may be linked with fast membrane associated processes. Membrane composition influences all aspects of the energy balance equation: electrolyte gradient balance, neuropeptide regulation, gene regulation and glucose regulation.

**Example 18. A Case Study on Diabetes**

[0092] Varying quantities and ratios of omega-6 and omega-3 were administered on otherwise healthy subjects to see if very early symptoms of diabetes could be induced. High blood sugar, excessive urine production, excessive thirst and increased fluid intake, blurred vision, unexplained weight gain and lethargy were induced by certain ratios of omega-6 and omega-3 fatty acids. These simulated symptoms with very high levels of omega-3 may also be reversed by reducing the dosage. In one instance, insulin resistance may be associated with low levels of omega-6 fatty acids. Summers LK, Fielding BA, Bradshaw HA, Ilic V, Beysen C, Clark ML, Moore NR, Frayn KN. Substituting dietary saturated fat with polyunsaturated fat changes abdominal fat distribution and improves insulin sensitivity. *Diabetologia*. 2002 Mar;45(3):369-77.

**Example 19. A Case Study on Digestive System Disorders**

[0093] In the host subject, incidences of acid reflux disease, irritable bowels, indigestion, and dyspepsia were observed. Each time omega-6 was increased or omega-3 was decreased the following symptoms appeared: stomach pain, bloating, heartburn, nausea (upset stomach), and burping; but they all disappeared as the body adjusted to increased omega-6. Omega-6 was tested up to 11 grams. It is hypothesized that beyond that point in the particular host the symptoms would persist. Increasing omega-3 beyond 2 grams caused tight dark pellet-like stools. In the optimal omega-6 and omega-3 balance, bile production was optimal as determined by the

yellowish brown color of the stools. It was also observed that mucus production in the alimentary canal was optimal with the proper omega-6 and omega-3 quantities and ratio, using mucus production in the oral cavity as an indicator. Halitosis was also observed with 2 grams of omega-3, and got worse when omega-3 was reduced, and then normalized over a period of 3-6 weeks. Arachidonic acid plays a pivotal role in protection and integrity of the intestinal mucosa. Excessive omega-3 can displace arachidonic acid leading to gastro-intestinal mucosal damage.

**Example 20. A Case Study on Ovulation, Reproductive Disorders**

[0094] In a host subject, a 35-year old female, cessation of ovulation (as indicated by watery pale menstrual cycles), intense ovulation-related pains and anovulatory menstruation at extremely low omega-6 in diet were observed; olive oil being the main fat source. It is hypothesized herein that this was due to deficiency of omega-6 derived prostaglandins, which aid ovulation. The same phenomenon was observed when the subject was put on Advil, which blocks cyclooxygenase activity and therefore the prostaglandin synthesis.

[0095] Dietary fatty acids are intricately linked with reproduction from menstruation, to fertilization, to gestation-related complications such as diabetes, to development of the fetus, to pre-term delivery, to post-natal health of the mother and the child.

**Example 21. Case Studies on Aging, Tissue Repair**

[0096] In host subjects, symptoms of aging were modulated by balancing and optimizing omega-6 and omega-3 fatty acids including muscle mass restoration, stabilizing sleep, increasing mental sharpness, increasing energy and vigor, improved skin, reduction in hair loss, improving bowel function, improving libido and sexual function, and weight management. The management of frequent urination with the ideal balance of omega-6 and omega-3 was also observed. It is hypothesized that this is due to combined effect of management of omega-6 and omega-3 related eicosanoids and their effect on physiological functions, and due to the sex-hormone-like effect of these lipids, and due to their effect on the optimization of sex hormone production.

[0097] The present disclosure also provides compositions and methods for tissue repair and/or regeneration by induction and maintenance of endogenous stem cell proliferation and/or differentiation including by providing the environment for the stem cells to proliferation and/or differentiate. The fibroblast is a type of cell that

synthesizes the extra-cellular matrix and collagen, the structural framework for animal tissues. Proper fibroblast function is essential for optimal tissue repair and regeneration. Polyunsaturated fatty acids and sterols create a favorable fibroblast plasma membrane environment, and are believed to play a role in electrochemical gradient across the bilayer-lipid membrane. Schroeder F, Kier AB, Sweet WD. Role of polyunsaturated fatty acids and lipid peroxidation in LM fibroblast plasma membrane transbilayer structure. *Arch Biochem Biophys.* 1990 Jan;276(1):55-64. Haines TH. Do sterols reduce proton and sodium leaks through lipid bilayers? *Prog Lipid Res.* 2001 Jul;40(4):299-324. Intestinal cells and bone marrow cells offer examples of adult stem cells for their abundance and their role in the continuous, lifelong, physiological replenishment of circulating cells.

#### **Example 22. A Case Study on Pulmonary Disorders**

[0098] In a host subject, an increase of omega-6 or a decrease of omega-3 was associated with breathing difficulty, nasal congestion, ear ache, sneezing, and excess mucus. But within the optimal ranges of omega-6 and omega-3, it was self-adjusting over a period of time. A low-fat diet, primarily monounsaturated fats, a total essential fatty acid (EFA) supplement of 1 gram, and a fish oil supplement caused dyspnea in the host subject. The dyspnea disappeared when supplemented with 10-11 grams of omega-6. It is concluded that the EFA supplement was not adequately producing the required leukotrienes. Omega-6 and omega-3-derived leukotrienes are very important agents in lung function. They help bring the needed cells to the tissue, and they increase vascular permeability. In excess they can cause airflow obstruction, increased secretion and accumulation of mucus, bronchial constriction, and inflammation. The self-adjustment indicates that sudden and wide changes may upset the immune system. Further studies may find a link with susceptibility to common colds and influenza with sudden and wide changes in omega-6 and omega-3.

#### **Example 23. A Case Study on Ophthalmologic Disorders**

[0099] In a host subject, dry eye and pressure-like ache in the eye was observed upon reduction of omega-3 and an increase of omega-6. When levels of omega-6 and omega-3 were kept within suitable ranges by demographic type, the symptoms disappeared over time. It was also observed that drusen, excessive eye mucus that often gathers in the corners of the eyes, could be gotten rid of with proper omega-6 and omega-3 balance. However, when omega-6 or omega-3 were excessively

increased the dry eye syndrome persisted. Excessive omega-3 also resulted in very thin blood—thromboxanes action reduction—and therefore caused blood-shot eyes.

**[00100]** Docosahexaenoic acid (omega-3) is an important component of retinal photoreceptors and brain synaptic membranes, and arachidonic acid (omega-6) is an important component of vascular endothelial cells. Moreover, since omega-6 also has a role in vascular blood pressure, both omega-6 and omega-3 are critical to optic health. Although omega-3, and formulations of vitamins C, E, beta-carotene, and zinc have been shown to be preventative in progression of age-related macular degeneration (AMD); increased intakes of lutein/ zeaxanthin and omega-3 fatty acids are associated with progression of AMD, whereas lower intakes lutein/ zeaxanthin and omega-3 are associated with greater optic health; suggesting the role of phytochemicals, and the importance of dosage. Robman L, Vu H, Hodge A, Tikellis G, Dimitrov P, McCarty C, Guymer R. Dietary lutein, zeaxanthin, and fats and the progression of age-related macular degeneration. *Can J Ophthalmol.* 2007 Oct;42(5):720-6.

#### **Example 24. Case Studies on Dermatological Disorders**

**[00101]** Host subjects demonstrated large amounts of omega-3 in the diet increased the size of the skin pores, whereas large amounts of omega-6 in the diet made skin dry. Balancing the two gave the best results. Fine lines may be reduced using the correct balance. Omega-6 reduction, at times, may be associated with the appearance of a rash around the neck area. It is hypothesized that a sudden increase in cytokine activity from an increase in omega-6 produced the skin rash. Brittle nails and foot corns and calluses disappear with the proper balance of fatty acids. Sloughing of skin, as in dead cells coming to the surface after omega-3 reduction, was also observed.

**[00102]** Skin displays highly active metabolism of polyunsaturated fatty acids. Deficiency of dietary omega-6, linoleic acid results in scaly dermatoses and disruption of the skin barrier system. Linoleic acid intake combined with high intakes of vitamin C are associated with better skin-aging appearance. Dietary hempseed oil has been shown to cause significant changes in plasma fatty acid profiles and improved clinical symptoms of atopic dermatitis, which may be due to the abundant supply of both omega-6 and omega-3 fats in hempseed oil. Ziboh VA. Prostaglandins, leukotrienes, and hydroxy fatty acids in epidermis. *Semin*

Dermatol. 1992 Jun;11(2):114-20. Ziboh VA, Cho Y, Mani I, Xi S. Biological significance of essential fatty acids/ prostanoids/ lipoxygenase-derived monohydroxy fatty acids in the skin. Arch Pharm Res. 2002 Dec;25(6):747-58. Cosgrove MC, Franco OH, Granger SP, Murray PG, Mayes AE. Dietary nutrient intakes and skin-aging appearance among middle-aged American women. Am J Clin Nutr. 2008 Aug;88(2):480.

#### **Example 25. Case Studies on Sleep Disorders**

**[00103]** It was observed that use of optimized levels of omega-6 and omega-3 by demographic type, more restful sleep may be achieved, and normalization of sleep and wake hours in host subjects. In fact, a more restful sleep with a sleep time reduction to 7 hours from 8 in one host subject, over time was observed. Restless leg syndrome may also be relieved in host subjects. Each time omega-6 and omega-3 amounts were changed the host went through an adjustment period. Omega-3 was more sleep inducing and omega-6 was more awakening, to the point of causing temporary insomnia. It is hypothesized this is because of the effect of omega-6 and omega-3 fatty acids on thyroid function and the effect of thyroid function on sleep, among other mechanisms.

**[00104]** Omega-6 metabolite PGD2 is believed to be a strong sleep-inducing agent, with a strong rebound of wakefulness reaching insomnia. In other studies omega-3-deficient diet has been shown to lessen the pineal melatonin rhythm, weaken the endogenous functioning of the circadian clock, and to play a role in nocturnal sleep disturbances. Among other fatty acids, palmitoleic and oleic acid have been shown to be important for sleep disorders, perhaps due to their function as precursors of the sleep inducing oleamide.

#### **Example 26. A Case Study on Dental Diseases**

**[00105]** In a vegetarian host subject, less dental sensitivity, reversal of gum receding, brightening of tooth enamel, and lessening of dental spots and plaque were observed when omega-3 was reduced from 2 grams to 1.2 grams while holding omega-6 constant at 11 grams. Lipid compositions comprising nuts and oils were the source of omega-6 and omega-3 fatty acids. There was an adjustment period of 3-6 weeks, when the symptoms got worse in the host subjects before getting better. Longer-term intervention studies should be able to test a hypothesis by studying tooth loss during the intervention period. Bioactivity

of lipids may explain the linkage between periodontitis/tooth loss and coronary heart disease.

**Example 27. Case Studies on Immunity, Autoimmune and Infectious and Inflammatory Diseases**

[00106] In a vegetarian host subject, a 48-year old menopausal woman, on 11g of linoleic acid (LA) and 1.8g of alpha-linolenic acid (ALA), from oils and nuts, spinal burning sensation, heat in the body, skin and feet, and delayed wound healing were observed. The subject also developed vaginal yeast infection. Symptoms disappeared upon reducing to 1.2g after an initial adjustment period. It is hypothesized that omega-6 and omega-3 imbalance leads to inflammation, compromised immunity, and infection. It is further suspected that both omega-6 and omega-3 are anti-inflammatory in small doses and inflammatory in large doses; particularly in light of possible interactions with phytochemicals.

[00107] It is understood that the total percent by weight of any combination of components does not exceed 100%. It is also understood that if a component is present in a composition, then the component is present in a non-zero amount (for example, more than about 0.00000001) mg or percent by weight of total weight.

[00108] The amounts and ratios of various nuts, seeds, lipids, and oil, to name a few, of the present embodiments were discovered to be beneficial, including by links to benefits for various diseases and conditions, as set forth above, empirically by outcome focused experimentation. The above recited examples, case studies, links with particular medical conditions, and the like are not meant to limit the present disclosure, but merely to explain the disclosure by way of example.

[00109] While some embodiments of the present disclosure have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the disclosure. It should be understood that various alternatives to the embodiments of the disclosure described herein may be employed in practicing the disclosure. It is intended that the following claims define the scope of the disclosure and that methods and structures within the scope of these claims and their equivalents be covered thereby.

## WHAT IS CLAIMED IS:

1. A lipid-containing composition comprising daily optimal amounts of fatty acids and phytochemicals for a mammalian subject based on one or more factors selected from the following group: age of the subject, sex of the subject, diet of the subject, the body weight of the subject, medical conditions of the subject, and climate of the subject's living area.
2. The composition of claim 1, wherein said composition is administered to the subject by steady delivery.
3. The composition of claim 1, wherein such composition further comprises omega-6 and omega-3 fatty acids and wherein the ratio of omega-6 to omega-3 fatty acids and their amounts are controlled based on one or more factors selected from said group.
4. The composition of claim 3, wherein said ratio of omega-6 to omega-3 fatty acid is in the range of 4:1 to 45:1.
5. The composition of claim 3, wherein said ratio of omega-6 to omega-3 fatty acid is in the range of 1:1 to 10:1 and said subject has a diet of low anti-oxidants and/or low phytochemicals.
6. The composition of claim 3, further comprising one or more omega-9 fatty acids wherein the ratio of omega-9 to omega-6 fatty acids is also determined based on one or more factors selected from said group.
7. The composition of claim 6, wherein
  - said ratio of omega-9 to omega-6 is in the range of 1:1 to 5:1;
  - said ratio of omega-6 to omega-3 is in the range of 1:1 to 45:1; and
  - said medical condition is associated with a form of lipid imbalance.
8. The composition of claim 6, wherein
  - said omega-9 fatty acid is in the range of 10% to 80% of total lipids in the composition;
  - said omega-6 fatty acid is in the range of 4% to 60% of total lipids in the composition; and

said omega-3 fatty acid is in the range of 0.3% to 20% of total lipids in the composition.

9. The composition of claim 1, wherein the fatty acid components of the composition is achieved at least in part by using one or more of the following concentrated lipid sources: oils, butters, nuts, and seeds.
10. The composition of claim 1, wherein said group further includes lipid tolerance of said subject.
11. The composition of claim 1, which is used as a dietary component.
12. The composition of claim 6, wherein said omega-9 is in the range of 15% to 80% of total lipids in the composition and wherein said omega-6 is in the range of 8% to 60% of total lipids in the composition and omega-3 in the range of 0.3% to 12% of total lipids in the composition.
13. The composition of claim 12, further comprising: a vitamin E wherein an amount of the vitamin E is in the range of 0.001% to 0.2% of total lipids in the composition.
14. The composition of claim 6, said subject being an omnivorous human, or a human with low antioxidant and/or low phytochemical diet,  
said omega-9 lipids being in the range of 15% to 80% of total lipids in the composition, wherein said omega-6 are in the range of 6% to 53% of total lipids in the composition and said omega-3 lipids are in the range of 1% to 18% of total lipids in the composition.
15. The composition of claim 14, further comprising: a vitamin E in the range of 0.005% to 0.2% of total lipids in the composition.
16. A lipid-containing composition comprising polyunsaturated, monounsaturated, and saturated fatty acids, wherein the ratios and amounts of said three fatty acid types are controlled based on one or more of the following factors for a mammalian subject: age, sex, climate, body weight, diet, and medical conditions.

17. The composition of claim 16, wherein additional nutrients are also controlled based on one or more of said factors and wherein said additional nutrients are one or more components selected from the following group: phytochemicals, antioxidants, vitamins, and minerals.
18. A method of creating a balanced diet plans, using the composition of claim 16.
19. The method of claim 17, wherein lipid-free or low-lipid foods are designed for use in combination with said lipid composition to achieve a balanced diet plan.
20. The composition of claim 16, wherein
  - the ratio of a total fatty acid content to monounsaturated content in the composition is in the range of 1.25:1 to 4:1;
  - wherein the ratio of monounsaturated to polyunsaturated fatty acids in the composition is in the range of 1:1 to 3:1; and
  - wherein the ratio of monounsaturated fatty acids to saturated fatty acids in the composition is in the range of 1:1 to 5:1.
21. The composition of claim 16, comprising one or more of the following components: peanut oil, vegetable oil, avocado oil, olive oil, sunflower oil, safflower oil.
22. The composition of claim 16, further comprising one or more of the following components: mustard oil, palm oil, and soybean lecithin.
23. The composition of claim 16, comprising three or more of the following components:
  - a peanut oil present at 8 to 56 percent by weight in said composition;
  - a vegetable oil present at 8 to 46 percent by weight in said composition;
  - an avocado oil present at 3 to 16 percent by weight in said composition;
  - an olive oil present at 5 to 32 percent by weight in said composition;
  - a sunflower oil present at 6 to 34 percent by weight in said composition; and
  - a safflower oil present at 2 to 30 percent by weight in said composition.
24. The composition of claim 16, wherein said controlled fatty acid components come from one or more of the following nuts and seeds: peanuts, almonds, olives,

soybeans, cashews, pistachios, pumpkin seeds, sunflower seeds, walnuts, coconut meat.

25. The composition of claim 16, wherein said controlled fatty acid components further come from anhydrous butter.
26. A lipid-containing composition suitable for administration to a mammalian subject, the lipid composition comprising three or more of the following components:

peanuts present at 2 to 11 percent by weight in said composition;  
almonds present at 5 to 32 percent by weight in said composition;  
olives present at 6 to 36 percent by weight in said composition;  
soybeans present at 4 to 25 percent by weight in said composition;  
cashews present at 4 to 21 percent by weight in said composition;  
pistachios present at 2 to 9 percent by weight in said composition;  
pumpkin seeds present at 2 to 15 percent by weight in said composition;  
sunflower seeds present at 1 to 4 percent by weight in said composition;  
walnuts present at 3 to 25 percent by weight in said composition;  
anhydrous butter present at 4 to 24 percent by weight in said composition; and  
coconut meat present at 1 to 6 percent by weight in said composition.
27. A lipid-containing composition suitable for administration to a mammalian subject, the lipid composition comprising three or more of the following components:

an almond oil present at 2 to 23 percent by weight in said composition;  
an avocado oil present at 1 to 7 percent by weight in said composition;  
a soybean oil present at 1 to 7 percent by weight in said composition;  
a cashew oil present at 2 to 15 percent by weight in said composition;  
a pistachio oil present at 1 to 7 percent by weight in said composition;  
a pumpkin seed oil present at 1 to 8 percent by weight in said composition;  
a walnut oil present at 3 to 25 percent by weight in said composition;  
a peanut oil present at 5 to 30 percent by weight in said composition;  
a corn oil present at 3 to 19 percent by weight in said composition;  
an olive oil present at 3 to 17 percent by weight in said composition;

a safflower oil present at 1 to 14 percent by weight in said composition; and

an anhydrous butter oil present at 5 to 29 percent by weight in said composition.

28. A method of prophylaxis or treatment of a medical condition for a mammalian subject, said method comprising administering a therapeutically effective amount of the composition of claim 16 to said subject, wherein said medical condition is linked with a lipid imbalance in said mammalian subject.
29. The method of claim 28, wherein said medical condition is selected from the group consisting of: a symptom of menopause, a cardiovascular disease, a mental disorder, a neural disorder, a musculoskeletal disorder, an endocrine disorder, a cancer, a digestive system disorder, a symptom of aging, a viral infection, a bacterial infection, obesity, overweight, a renal disease, a pulmonary disorder, an ophthalmologic disorder, a dermatological disorder, a sleep disorder, a dental disease, an immune system disease, and an autoimmunity.
30. A lipid composition suitable for administration to a mammalian subject, the lipid composition comprising three or more of the following components:
  - an almond oil present at 1 to 36 percent by weight in said composition;
  - a pumpkin seed oil present at 1 to 24 percent by weight in said composition;
  - an oil from walnuts present at 2 to 36 percent by weight in said composition;
  - a peanut oil present at 4 to 72 percent by weight in said composition;
  - a corn oil present at 1 to 24 percent by weight in said composition;
  - an olive oil present at 2 to 36 percent by weight in said composition;
  - a sunflower oil present at 4 to 72 percent by weight in said composition;
  - a safflower oil present at 2 to 60 percent by weight in said composition; and
  - an anhydrous butter oil present at 2 to 36 percent by weight in said composition.
31. The lipid composition of claim 30, further comprising one or more of the following: a mustard oil present at 8 percent or less by weight in said composition, a flaxseed oil present at 8 percent or less by weight in said composition, a palm oil present at 2 percent or less by weight in said composition, a coconut oil present at

8 percent or less by weight in said composition, and a soybean lecithin present at 4 percent or less by weight in said composition.

32. A lipid-containing composition suitable for administration to a mammalian subject wherein the lipid components are controlled based on the seasonal climate of the subject's living area.
33. The composition of claim 32, wherein said seasonal climate has a daytime high temperature range and said composition has corresponding lipid components selected from the groups A through G listed below, and wherein said temperature ranges are in degrees of Fahrenheit (°F) and said lipid components comprise three or more components selected from group entitled "Said Lipid Component Group" below which corresponds to said daytime high temperature range:

Group Reference No.	The Approximate Range of Said Daytime High Temperature (°F)	Said Lipid Component Group (Three or more components are selected from each group corresponding to said daytime high temperature)
A	90 to 135	<ul style="list-style-type: none"> <li>(1) a sunflower oil present at 4 to 72 percent by weight in said composition;</li> <li>(2) a peanut oil present at 2 to 68 percent by weight in said composition;</li> <li>(3) a safflower oil present at 2 to 68 percent by weight in said composition;</li> <li>(4) an anhydrous butter oil present at 2 to 36 percent by weight in said composition;</li> <li>(5) almonds or an almond oil present at 1 to 48 percent by weight in said composition;</li> <li>(6) olives or an olive oil present at 2 to 33 percent by weight in said composition;</li> <li>(7) cashews or a cashew oil present at 2 to 37 percent by weight in said composition;</li> <li>(8) pumpkin seeds or a pumpkin seed oil present at 3 to 54 percent by weight in said composition;</li> <li>(9) sunflower seeds present at 1 to 15 percent by weight in said composition; and</li> <li>(10) walnuts or a walnut oil present at 2 to 33 percent by weight in said composition.</li> </ul>

B	70 to 99	<ul style="list-style-type: none"> <li>(1) a sunflower oil present at 2 to 53 percent by weight in said composition;</li> <li>(2) a peanut oil present at 2 to 53 percent by weight in said composition;</li> <li>(3) an olive oil present at 2 to 30 percent by weight in said composition;</li> <li>(4) a safflower oil present at 2 to 53 percent by weight in said composition;</li> <li>(5) an anhydrous butter oil present at 2 to 30 percent by weight in said composition;</li> <li>(6) almonds or an almond oil present at 1 to 49 percent by weight in said composition;</li> <li>(7) olives present at 2 to 28 percent by weight in said composition;</li> <li>(8) soybeans or a soybean oil present at 2 to 34 percent by weight in said composition;</li> <li>(9) cashews or a cashew oil present at 2 to 31 percent by weight in said composition;</li> <li>(10) pistachios or a pistachio oil present at 1 to 20 percent by weight in said composition;</li> <li>(11) pumpkin seeds or a pumpkin seed oil present at 3 to 46 percent by weight in said composition;</li> <li>(12) sunflower seeds present at 1 to 15 percent by weight in said composition; and</li> <li>(13) walnuts or a walnut oil present at 2 to 28 percent by weight in said composition.</li> </ul>
C	50 to 75	<ul style="list-style-type: none"> <li>(1) a sunflower oil present at 1 to 37 percent by weight in said composition;</li> <li>(2) an olive oil present at 1 to 29 percent by weight in said composition;</li> <li>(3) a safflower oil present at 1 to 29 percent by weight in said composition;</li> <li>(4) an anhydrous butter oil present at 1 to 29 percent by weight in said composition;</li> <li>(5) almonds or an almond oil present at 1 to 49 percent by weight in said composition;</li> <li>(6) peanuts present at 1 to 33 percent by weight in said composition;</li> <li>(7) almonds present at 2 to 47 percent by weight in said composition;</li> </ul>

		<ul style="list-style-type: none"> <li>(8) olives present at 1 to 28 percent by weight in said composition;</li> <li>(9) soybeans or a soybean oil present at 1 to 34 percent by weight in said composition;</li> <li>(10) cashews or a cashew oil present at 1 to 20 percent by weight in said composition;</li> <li>(11) pistachios or a pistachio oil present at 1 to 17 percent by weight in said composition;</li> <li>(12) pumpkin seeds or a pumpkin seed oil present at 2 to 45 percent by weight in said composition; and</li> <li>(13) walnuts or a walnut oil present at 1 to 27 percent by weight in said composition.</li> </ul>
D	33 to 55	<ul style="list-style-type: none"> <li>(1) a sunflower oil present at 2 to 30 percent by weight in said composition;</li> <li>(2) an olive oil present at 2 to 30 percent by weight in said composition;</li> <li>(3) a safflower oil present at 2 to 30 percent by weight in said composition;</li> <li>(4) an anhydrous butter oil present at 2 to 28 percent by weight in said composition;</li> <li>(5) almonds or an almond oil present at 1 to 46 percent by weight in said composition;</li> <li>(6) peanuts present at 2 to 38 percent by weight in said composition;</li> <li>(7) olives present at 2 to 27 percent by weight in said composition;</li> <li>(8) soybeans or a soybean oil present at 2 to 33 percent by weight in said composition;</li> <li>(9) cashews or a cashew oil present at 1 to 18 percent by weight in said composition;</li> <li>(10) pistachios or a pistachio oil present at 1 to 15 percent by weight in said composition;</li> <li>(11) pumpkin seeds or a pumpkin seed oil present at 3 to 43 percent by weight in said composition;</li> <li>(12) sunflower seeds or a sunflower seed oil present at 1 to 10 percent by weight in said composition; and</li> <li>(13) walnuts or a walnut oil present at 2 to 26 percent by weight in said composition.</li> </ul>
E	0 to 37	<ul style="list-style-type: none"> <li>(1) a sunflower oil present at 2 to 30 percent by weight in said composition;</li> <li>(2) a corn oil present at 2 to 30 percent by weight in said</li> </ul>

		<p>composition;</p> <p>(3) an olive oil present at 2 to 30 percent by weight in said composition;</p> <p>(4) a safflower oil present at 2 to 30 percent by weight in said composition;</p> <p>(5) an anhydrous butter oil present at 2 to 30 percent by weight in said composition;</p> <p>(6) peanuts or peanut oil present at 3 to 47 percent by weight in said composition;</p> <p>(7) almonds or an almond oil present at 1 to 48 percent by weight in said composition;</p> <p>(8) olives present at 2 to 28 percent by weight in said composition;</p> <p>(9) soybeans or a soybean oil present at 2 to 34 percent by weight in said composition;</p> <p>(10) pistachios or a pistachio oil present at 1 to 14 percent by weight in said composition; and</p> <p>(11) walnuts or a walnut oil present at 2 to 27 percent by weight in said composition.</p>
F	-50 to 5	<p>(1) a sunflower oil present at 2 to 30 percent by weight in said composition;</p> <p>(2) a corn oil present at 2 to 30 percent by weight in said composition;</p> <p>(3) an olive oil present at 4 to 60 percent by weight in said composition;</p> <p>(4) a safflower oil present at 2 to 30 percent by weight in said composition;</p> <p>(5) an anhydrous butter oil present at 2 to 30 percent by weight in said composition;</p> <p>(6) peanuts or peanut oil present at 3 to 47 percent by weight in said composition;</p> <p>(7) almonds or an almond oil present at 1 to 48 percent by weight in said composition;</p> <p>(8) olives present at 2 to 28 percent by weight in said composition; and</p> <p>(9) walnuts or a walnut oil present at 2 to 27 percent by weight in said composition.</p>
G	-100 to -45	<p>(1) a sunflower oil present at 2 to 30 percent by weight in said composition;</p> <p>(2) a corn oil present at 2 to 30 percent by weight in said composition;</p>

		<ul style="list-style-type: none"> <li>(3) an olive oil present at 4 to 60 percent by weight in said composition;</li> <li>(4) a safflower oil present at 2 to 30 percent by weight in said composition;</li> <li>(5) an anhydrous butter oil present at 2 to 30 percent by weight in said composition;</li> <li>(6) peanuts or peanut oil present at 3 to 47 percent by weight in said composition;</li> <li>(7) almonds or an almond oil present at 1 to 48 percent by weight in said composition;</li> <li>(8) olives present at 2 to 28 percent by weight in said composition</li> <li>(9) soybeans or soybean oil present at 2 to 34 percent by weight in said composition; and</li> <li>(10) walnuts or a walnut oil present at 2 to 27 percent by weight in said composition.</li> </ul>
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34. The composition of claim 32, further comprising one or more additional components selected from one of the additional component groups listed below corresponding to said daytime high temperatures:

Group Reference No.	The Approximate Range of Said Daytime High Temperature (°F)	Said Additional Component Groups (One or more said additional components are selected from a group corresponding to said daytime high temperature)
A	90 to 135	<ul style="list-style-type: none"> <li>(1) an avocado oil present at 15 percent or less by weight in said composition;</li> <li>(2) a coconut oil present at 25 percent or less by weight in said composition;</li> <li>(3) a soybean lecithin present at 1 percent or less by weight in said composition;</li> <li>(4) a hemp oil present at 15 percent or less by weight in said composition;</li> <li>(5) a perrilla oil present at 15 percent or less by weight in said composition;</li> <li>(6) a rapeseed oil present at 15 percent or less by weight in said composition;</li> <li>(7) a cottonseed oil present at 15 percent or less by weight</li> </ul>

		<p>in said composition;</p> <p>(8) a rice bran oil present at 15 percent or less by weight in said composition; and</p> <p>(9) a grape seed oil present at 15 percent or less by weight in said composition.</p>
B	70 to 99	<p>(1) an avocado oil present at 15 percent or less by weight in said composition;</p> <p>(2) a corn oil present at 15 percent or less by weight in said composition;</p> <p>(3) a palm oil present at 5 percent or less by weight in said composition;</p> <p>(4) a soybean lecithin present at 2 percent or less by weight in said composition;</p> <p>(5) a fish oil present at 15 percent or less by weight in said composition;</p> <p>(6) a hemp oil present at 15 percent or less by weight in said composition;</p> <p>(7) a perrilla oil present at 15 percent or less by weight in said composition;</p> <p>(8) a rapeseed oil present at 15 percent or less by weight in said composition;</p> <p>(9) a cottonseed oil present at 15 percent or less by weight in said composition;</p> <p>(10) a rice bran oil present at 15 percent or less by weight in said composition;</p> <p>(11) a grape seed oil present at 15 percent or less by weight in said composition; and</p> <p>(12) a coconut meat or oil present at 10 percent or less by weight in said composition.</p>
C	50 to 75	<p>(1) a mustard oil present at 15 percent or less by weight in said composition;</p> <p>(2) a fish oil present at 15 percent or less by weight in said composition;</p> <p>(3) a peanut oil present at 35 percent or less by weight in said composition;</p> <p>(4) a corn oil present at 15 percent or less by weight in said composition;</p> <p>(5) a palm oil present at 5 percent or less by weight in said composition;</p> <p>(6) a soybean lecithin present at 2 percent or less by weight in said composition;</p>

		<ul style="list-style-type: none"> <li>(7) a hemp oil present at 15 percent or less by weight in said composition;</li> <li>(8) a perrilla oil present at 15 percent or less by weight in said composition;</li> <li>(9) a rapeseed oil present at 15 percent or less by weight in said composition;</li> <li>(10) a wheatgerm oil present at 10 percent or less by weight in said composition;</li> <li>(11) a cottonseed oil present at 15 percent or less by weight in said composition;</li> <li>(12) a rice bran oil present at 15 percent or less by weight in said composition;</li> <li>(13) a grape seed oil present at 15 percent or less by weight in said composition</li> <li>(14) sunflower seeds present at 10 percent or less by weight in said composition;</li> <li>(15) sesame seeds or sesame oil present at 10 percent or less by weight in said composition;</li> <li>(16) flaxseeds or flaxseed oil present at 20 percent or less by weight in said composition;</li> <li>(17) macadamia nuts or macadamia nut oil present at 10 percent or less by weight in said composition;</li> <li>(18) brazil nuts or brazil nut oil present at 10 percent or less by weight in said composition;</li> <li>(19) hazelnuts or hazelnut oil present at 10 percent or less by weight in said composition; and</li> <li>(20) coconut meat or coconut oil present at 10 percent or less by weight in said composition.</li> </ul>
D	33 to 55	<ul style="list-style-type: none"> <li>(1) a mustard oil present at 15 percent or less by weight in said composition;</li> <li>(2) a fish oil present at 15 percent or less by weight in said composition;</li> <li>(3) a corn oil present at 15 percent or less by weight in said composition;</li> <li>(4) a palm oil present at 5 percent or less by weight in said composition;</li> <li>(5) a soybean lecithin present at 2 percent or less by weight in said composition;</li> <li>(6) a hemp oil present at 15 percent or less by weight in said composition;</li> <li>(7) a perrilla oil present at 15 percent or less by weight in</li> </ul>

		<p>said composition;</p> <p>(8) a rapeseed oil present at 15 percent or less by weight in said composition;</p> <p>(9) a wheatgerm oil present at 10 percent or less by weight in said composition;</p> <p>(10) a cottonseed oil present at 15 percent or less by weight in said composition;</p> <p>(11) a rice bran oil present at 15 percent or less by weight in said composition;</p> <p>(12) a grape seed oil present at 15 percent or less by weight in said composition</p> <p>(13) sesame seeds or sesame seed oil present at 15 percent or less by weight in said composition;</p> <p>(14) flaxseeds or flaxseed oil present at 15 percent or less by weight in said composition;</p> <p>(15) macadamia nuts or macadamia nut oil present at 15 percent or less by weight in said composition;</p> <p>(16) brazil nuts or brazil nut oil present at 15 percent or less by weight in said composition;</p> <p>(17) hazelnuts or hazelnut oil present at 15 percent or less by weight in said composition;</p> <p>(18) pine nuts or a pine nut oil present at 15 percent or less by weight in said composition;</p> <p>(19) chestnuts or a chestnut oil present at 15 percent or less by weight in said composition; and</p> <p>(20) a coconut meat or coconut oil present at 5 percent or less by weight in said composition.</p>
E	0 to 37	<p>(1) a mustard oil present at 20 percent or less by weight in said composition;</p> <p>(2) a fish oil present at 20 percent or less by weight in said composition;</p> <p>(3) a palm oil present at 5 percent or less by weight in said composition;</p> <p>(4) a soybean lecithin present at 2 percent or less by weight in said composition;</p> <p>(5) a hemp oil present at 15 percent or less by weight in said composition;</p> <p>(6) a perrilla oil present at 15 percent or less by weight in said composition;</p> <p>(7) a wheatgerm oil present at 10 percent or less by weight in said composition;</p>

		<ul style="list-style-type: none"> <li>(8) a cottonseed oil present at 15 percent or less by weight in said composition;</li> <li>(9) a rice bran oil present at 15 percent or less by weight in said composition; and</li> <li>(10) a grape seed oil present at 15 percent or less by weight in said composition.</li> <li>(11) sesame seeds or sesame seed oil present at 15 percent or less by weight in said composition;</li> <li>(12) flaxseeds or flaxseed oil present at 15 percent or less by weight in said composition;</li> <li>(13) macadamias nuts or macadamia nut oil present at 15 percent or less by weight in said composition;</li> <li>(14) brazil nuts or brazil nut oil present at 15 percent or less by weight in said composition;</li> <li>(15) hazelnuts or hazelnut oil present at 15 percent or less by weight in said composition;</li> <li>(16) pine nuts or a pine nut oil present at 15 percent or less by weight in said composition;</li> <li>(17) chestnuts or a chestnut oil present at 15 percent or less by weight in said composition;</li> <li>(18) a coconut meat or coconut oil present at 5 percent or less by weight in said composition; and</li> <li>(19) a rapeseed oil present at 30 percent or less by weight in said composition.</li> </ul>
F	-50 to 5	<ul style="list-style-type: none"> <li>(1) a mustard oil present at 20 percent or less by weight in said composition;</li> <li>(2) a fish oil present at 20 percent or less by weight in said composition;</li> <li>(3) a palm oil present at 5 percent or less by weight in said composition;</li> <li>(4) a soybean lecithin present at 2 percent or less by weight in said composition;</li> <li>(5) a hemp oil present at 15 percent or less by weight in said composition;</li> <li>(6) a perrilla oil present at 15 percent or less by weight in said composition;</li> <li>(7) a rapeseed oil present at 30 percent or less by weight in said composition;</li> <li>(8) a wheatgerm oil present at 10 percent or less by weight in said composition;</li> <li>(9) a cottonseed oil present at 15 percent or less by weight</li> </ul>

		<p>in said composition;</p> <p>(10) a rice bran oil present at 15 percent or less by weight in said composition;</p> <p>(11) a grape seed oil present at 15 percent or less by weight in said composition;</p> <p>(12) pistachios or a pistachio oil present at 14 percent or less by weight in said composition;</p> <p>(13) sesames or sesame oil present at 15 percent or less by weight in said composition;</p> <p>(14) flaxseeds or a flaxseed oil present at 17 percent or less by weight in said composition;</p> <p>(15) macadamias or a macadamia oil present at 15 percent or less by weight in said composition;</p> <p>(16) brazil nuts or brazil nut oil present at 15 percent or less by weight in said composition;</p> <p>(17) hazelnuts or hazelnut oil present at 15 percent or less by weight in said composition;</p> <p>(18) pine nuts or a pine nut oil present at 15 percent or less by weight in said composition;</p> <p>(19) chestnuts or a chestnut oil present at 15 percent or less by weight in said composition; and</p> <p>(20) a coconut meat or a coconut oil present at 5 percent or less by weight in said composition.</p>
G	-100 to -45	<p>(1) a mustard oil present at 20 percent or less by weight in said composition;</p> <p>(2) a fish oil present at 20 percent or less by weight in said composition;</p> <p>(3) a palm oil present at 5 percent or less by weight in said composition;</p> <p>(4) a soybean lecithin present at 2 percent or less by weight in said composition;</p> <p>(5) a hemp oil present at 15 percent or less by weight in said composition;</p> <p>(6) a perrilla oil present at 15 percent or less by weight in said composition;</p> <p>(7) a rapeseed oil present at 30 percent or less by weight in said composition;</p> <p>(8) a wheatgerm oil present at 10 percent or less by weight in said composition;</p> <p>(9) a cottonseed oil present at 15 percent or less by weight in said composition;</p>

	<ul style="list-style-type: none"> <li>(10) a rice bran oil present at 15 percent or less by weight in said composition;</li> <li>(11) a grape seed oil present at 15 percent or less by weight in said composition;</li> <li>(12) pistachios or a pistachio oil present at 14 percent or less by weight in said composition;</li> <li>(13) sesames or sesame oil present at 15 percent or less by weight in said composition;</li> <li>(14) flaxseeds or a flaxseed oil present at 17 percent or less by weight in said composition;</li> <li>(15) macadamias or a macadamia oil present at 15 percent or less by weight in said composition;</li> <li>(16) brazil nuts or brazil nut oil present at 15 percent or less by weight in said composition;</li> <li>(17) hazelnuts or hazelnut oil present at 15 percent or less by weight in said composition;</li> <li>(18) pine nuts or a pine nut oil present at 15 percent or less by weight in said composition;</li> <li>(19) chestnuts or a chestnut oil present at 15 percent or less by weight in said composition; and</li> <li>(20) a coconut meat or a coconut oil present at 4 percent or less by weight in said composition.</li> </ul>
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35. A lipid-containing composition suitable for administration to a mammalian subject, wherein the subject is in an environment with a given or forecasted ambient daily high temperature, and wherein the lipid-containing composition and a temperature range of the given or forecasted ambient daily high temperature are selected from the group consisting of:

the lipid-containing composition includes one or more omega-9 lipid present in a range of 20 to 90 percent by weight of total lipid, the lipid-containing composition includes one or more omega-6 lipid present in a range of 4 to 60 percent by weight of total lipid, the lipid-containing composition includes one or more omega-3 lipid present in a range of 0.3 to 5 percent by weight of total lipid, and the temperature range is from about 90 to about 135 degrees Fahrenheit;

the lipid-containing composition includes one or more omega-9 lipid present in a range of 20 to 90 percent by weight of total lipid, the lipid-containing composition includes one or more omega-6 lipid present in a range of 4 to 60

percent by weight of total lipid, the lipid-containing composition includes one or more omega-3 lipid present in a range of 0.5 to 6.0 percent by weight of total lipid, and the temperature range is from about 70 to about 99 degrees Fahrenheit;

the lipid-containing composition includes one or more omega-9 lipid present in a range of 20 to 90 percent by weight of total lipid, the lipid-containing composition includes one or more omega-6 lipid present in a range of 6 to 60 percent by weight of total lipid, the lipid-containing composition includes one or more omega-3 lipid present in a range of 0.8 to 7.0 percent by weight of total lipid, and the temperature range is from about 50 to about 75 degrees Fahrenheit;

the lipid-containing composition includes one or more omega-9 lipid present in a range of 10 to 80 percent by weight of total lipid, the lipid-containing composition includes one or more omega-6 lipid present in a range of 10 to 60 percent by weight of total lipid, the lipid-containing composition includes one or more omega-3 lipid present in a range of 1 to 8.0 percent by weight of total lipid, and the temperature range is from about 33 to about 55 degrees Fahrenheit;

the lipid-containing composition includes one or more omega-9 lipid present in a range of 10 to 80 percent by weight of total lipid, the lipid-containing composition includes one or more omega-6 lipid present in a range of 12 to 70 percent by weight of total lipid, the lipid-containing composition includes one or more omega-3 lipid present in a range of 1.5 to 9.0 percent by weight of total lipid, and the temperature range is from about 0 to about 37 degrees Fahrenheit;

the lipid-containing composition includes one or more omega-9 lipid present in a range of 10 to 80 percent by weight of total lipid, the lipid-containing composition includes one or more omega-6 lipid present in a range of 13 to 70 percent by weight of total lipid, the lipid-containing composition includes one or more omega-3 lipid present in a range of 1.8 to 12.0 percent by weight of total lipid, and the temperature range is from about -50 to about 5 degrees Fahrenheit; and

the lipid-containing composition includes one or more omega-9 lipid present in a range of 10 to 80 percent by weight of total lipid, the lipid-containing

composition includes one or more omega-6 lipid present in a range of 15 to 73 percent by weight of total lipid, the lipid-containing composition includes one or more omega-3 lipid present in a range of 2.0 to 13.0 percent by weight of total lipid, and the temperature range is from about -100 to about -45 degrees Fahrenheit.

36. The composition of claim 35, further comprising one or both of the following components: a vitamin E alpha present in a range of 0.005 to 0.2 percent by weight of total lipid; and a vitamin E gamma present in a range of 0.001 to 0.04 percent by weight of total lipid..
37. A lipid-containing composition suitable for administration to a mammalian subject, comprising: total lipids which consist of one or more monounsaturated lipids, one or more polyunsaturated lipids, and one or more saturated lipids; wherein the subject is in an environment with a given or forecasted ambient daily high temperature; and wherein the lipid-containing composition and a temperature range of the given or forecasted ambient daily high temperature are selected from one of the following groups:
  - the ratio of the total lipids to the monounsaturated lipids is in a range of 1.0:1.0 to 4.5:1.0, the ratio of the total lipids to the polyunsaturated lipids is 1.7:1.0 to 15.0:1.0, and the ratio of the total lipids to the saturated lipids is 2.0:1.0 to 10.0:1.0, and the temperature range is from about 90 to about 135 degrees Fahrenheit;
  - the ratio of the total lipids to the monounsaturated lipids is in a range of 1.0:1.0 to 4.5:1.0, the ratio of the total lipids to the polyunsaturated lipids is in a range of 1.5:1.0 to 10.0:1.0, and the ratio of the total lipids to the saturated lipids is in a range of 2.0:1.0 to 10.0:1.0, and the temperature range is from about 70 to about 99 degrees Fahrenheit;
  - the ratio of the total lipids to the monounsaturated lipids is in a range of 1.0:1.0 to 4.5:1.0, the ratio of the total lipids to the polyunsaturated lipids is in a range of 1.5:1.0 to 8.0:1.0, and the ratio of the total lipids to the saturated lipids is in a range of 2.0:1.0 to 10.0:1.0, and the temperature range is from about 50 to about 75 degrees Fahrenheit;

the ratio of the total lipids to the monounsaturated lipids is in a range of 1.0:1.0 to 4.5:1.0, the ratio of the total lipids to the polyunsaturated lipids is in a range of 1.4:1.0 to 7.0:1.0, and the ratio of the total lipids to the saturated lipids is in a range of 2.0:1.0 to 11.0:1.0, and the temperature range is from about 33 to about 55 degrees Fahrenheit;

the ratio of the total lipids to the monounsaturated lipids is in a range of 1.0:1.0 to 5.0:1.0, the ratio of the total lipids to the polyunsaturated lipids is in a range of 1.3:1.0 to 6.5:1.0, and the ratio of the total lipids to the saturated lipids is in a range of 2.0:1.0 to 11.0:1.0, and the temperature range is from about 0 to about 37 degrees Fahrenheit;

the ratio of the total lipids to the monounsaturated lipids is in a range of 1.0:1.0 to 5.0:1.0, the ratio of the total lipids to the polyunsaturated lipids is in a range of 1.2:1.0 to 6.0:1.0, and the ratio of the total lipids to the saturated lipids is in a range of 2.0:1.0 to 11.0:1.0, and the temperature range is from about -50 to about 5 degrees Fahrenheit; and

the ratio of the total lipids to the monounsaturated lipids is in a range of 1.0:1.0 to 5.0:1.0, the ratio of the total lipids to the polyunsaturated lipids is in a range of 1.1:1.0 to 5.0:1.0, and the ratio of the total lipids to the saturated lipids is in a range of 2.0:1.0 to 11.0:1.0, and the temperature range is from about -100 to about -45 degrees Fahrenheit.

38. The lipid-containing composition of claim 37, further comprising one or both of the following components: a vitamin E alpha present in a range of 0.005 to 0.2 percent by weight of total lipid; and a vitamin E gamma present in a range of 0.001 to 0.04 percent by weight of total lipid.
39. A composition comprising safflower oil, sunflower oil, almond oil, and anhydrous butter oil.
40. A composition comprising olive oil and sunflower oil, wherein the amount of one or more omega-6 lipids in the composition is greater than 20% of total lipids in the composition.
41. A composition comprising anhydrous butter oil wherein the ratio of omega-6 lipids to omega-3 lipids in the composition is 8:1 to 12:1.