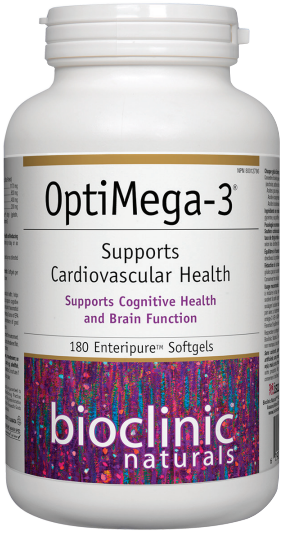

Code: 9351 **NPN:** 80012786
Size: 180 Enteripure® Softgels
Actual Size: 26.7 mm x 9.4 mm

OptiMega-3®

Supports Cardiovascular Health
Supports Cognitive Health and Brain Function

- Optimal 2:1 ratio EPA to DHA in a highly bioavailable softgel
- Pharmaceutical-grade omega-3 fish oil blend, USP verified for quality and consistency
- Free of lipid peroxides and environmental pollutants, including heavy metals, pesticides, dioxins, PCBs, and other harmful compounds
- Harvested through sustainable fishing practices
- Sourced from wild anchovies, sardines, and/or mackerel, one of the best natural sources of EPA and DHA

PRODUCT SUMMARY

Omega-3 fatty acids from fish oil improve a number of cardiovascular risk factors, including lowering atherosclerotic burden, reducing triglyceride levels and blood pressure, and improving platelet and vascular function. Not only do these fatty acids modulate risk factors, but controlled clinical trials have shown them to be effective in preventing cardiovascular and coronary events, particularly in persons at high risk.

EPA and DHA also support cognitive function through multiple mechanisms, as they are indispensable to neuronal membranes, with lower levels found to be not only a marker for neurological disease, but also a risk factor for cognitive impairment. EPA and DHA are essential to the resolution of inflammatory processes, providing the substrates for anti-inflammatory prostaglandins, resolvins and protectins.

Benefits have also been shown for improving overall health, including a wide variety of cardiovascular, inflammatory, and autoimmune conditions, ranging from cardiac arrhythmias, eczema, and inflammatory bowel disease, to pregnancy and breastfeeding support, rheumatoid arthritis, and neurodegenerative disease. Improvements in cognitive function have been established among youth and adolescents with ADHD, with improved mood and slower cognitive decline among the elderly. Meta-analyses of randomized trials found supplementation improved lipids and HbA1c as well as reduced proteinuria among diabetics, and enhanced insulin sensitivity among individuals with at least one symptom of a metabolic disorder.

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Serving Size: 1–5 Enteripure Softgels
Servings per Container: 36–180

Each Enteripure Softgel Contains:

Fish Oil Concentrate (Molecularly Distilled, Ultra Purified) (Anchovy, Sardine and/or Mackerel)	1170 mg
Omega-3 Fatty Acids	630 mg
Eicosapentaenoic Acid (EPA)	400 mg
Docosahexaenoic Acid (DHA)	200 mg

Non-medicinal Ingredients: Enteripure softgel (gelatin, glycerin, purified water, pectin), natural vitamin E.

Recommended Adult Dose: For Cardiovascular Support, Cognitive Health and Reducing Serum Triglycerides: 1 softgel 2–4 times per day or as directed by a health care practitioner. **For Mood Balance:** 1 softgel 3–4 times per day or as directed by a health care practitioner. **For Reducing Pain of Rheumatoid Arthritis:** 5 softgels per day or as directed by a health care practitioner. Keep out of reach of children.

Contraindications: Individuals with an allergy to fish or seafood should use caution, though fish oil is rarely allergenic. Both benefit and risk have been documented for those at risk of or being treated for cardiac arrhythmias, with close supervision indicated. Pregnant and nursing women are often advised to consume a minimum of 300 mg DHA per day, and although DHA is recognized as essential to neurological development, no dosage recommendations have been made for children or infants.

Drug Interactions: The antihypertensive effect of fish oil may potentially reduce the need or dosage for blood pressure medications, and patients should be closely monitored. Because fish oil has an antithrombotic effect, caution has traditionally been advised for those on anticlotting, antiplatelet or anticoagulant medications, or those at high risk of bleeding. However, a multinational, randomized, and controlled trial found that fish oil did not increase perioperative bleeding, and it reduced the number of transfusions needed, and appeared to be associated with a lower risk of bleeding when given pre- and postoperatively. At doses greater than 3 g per day, hyperglycemia has been observed in diabetics and those with hypertriglyceridemia, and close monitoring of patients on antidiabetic medication is recommended. Benefit has been shown when fish oil is taken with statins, SSRIs, anticonvulsant, and cytotoxic medications.

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Acute Musculoskeletal Protocol: Reducing Pain

Introduction

Acute pain (present for less than 3 months) can be medically managed through appropriate assessment, patient monitoring, and various integrative modalities, as outlined below.

Assessment

For musculoskeletal pain history and physical exam, including:

1. Pain history: elements include the site, onset, distribution, quality, duration, temporal factors, intensity, aggravating and relieving factors, impact on daily living, associated symptoms, previous similar symptoms, and current and previous treatments.[1]
2. Physical functioning and quality of life.
3. Emotional functioning:
   a. Pain is now widely recognized to be a multi-factorial experience and should be understood as part of a biopsychosocial perspective. (See Distress and Risk Assessment Method [DRAM] intake below.)
4. Patient ratings of improvement or worsening of the pain.[2]
5. Define the involved structure using the following algorithm:[3]
   a. Watch for referred pain patterns from deep spinal structures.
   b. Use all necessary clinical skills and imaging.
   c. Specify location of pain.
   d. Define clinical process triggering the pain.
   e. Name the problem: inflammation, degeneration, strain, sprain, etc.
   f. Look for red flag clues for serious illness and yellow flag clues for psychosocial issues.
   g. Develop a working diagnosis and management plan in conjunction with the patient.

General Recommendations

1. Monitor progress of patients using:
   a. McGill Pain Inventory: **https://bit.ly/39BFsYh**
   b. Oswestry Low Back Pain Disability Questionnaire: **https://bit.ly/3eWKm2Z**
   c. PSQI: Pittsburgh Sleep Quality Index: **https://bit.ly/3hrICQO**
      Sleep has been shown to influence both acute and chronic pain perception.[4]
   d. Hamilton Depression Scale: **https://bit.ly/39oBTEB**
      Depression has been shown to influence the transition from acute to chronic pain.[5]
   e. Distress and Risk Assessment Method (DRAM): **https://bit.ly/2ZWXxgb**

Specific Treatment Plan

Acute Pain	Mild	Moderate	Severe
Sprain/strain	• RICE • **Dolor Ease™:** 1 capsule BID *OR* **Theracurmin® 2X:** 1 capsule QD • **Synerase®:** 2 capsules TID in between meals[6]	• RICE • Exercise-based rehabilitation and early mobilization associated with improved outcomes[7] • **Dolor Ease:** 2 capsules BID *OR* **Theracurmin 2X:** 1–2 capsules QD • **Synerase:** 3 capsules TID in between meals[6] • **PEA:** 1 capsule TID[8]	May require the use of prescription medications as part of the integrated protocol
Contusion	• RICE • **Dolor Ease:** 1 capsule BID *OR* **Theracurmin 2X:** 1 capsule QD • **Synerase:** 2 capsules TID in between meals[9]	• RICE • **Dolor Ease:** 2 capsules BID *OR* **Theracurmin 2X:** 1–2 capsules QD • **Synerase:** 3 capsules TID in between meals[9]	May require the use of prescription medications as part of the integrated protocol

Myalgia	• RICE • **Dolor Ease:** 1 capsule BID *OR* **Theracurmin 2X:** 1 capsule QD[10] • **Magnesium Bisglycinate:** 200 mg BID with food[11,12] • **Synerase:** 2 capsules TID in between meals[13]	• RICE • **Dolor Ease:** 2 capsules BID *OR* **Theracurmin 2X:** 1–2 capsules QD • **Ubiquinol CoQ10 200 mg:** 1 softgel QD[14,15] • **Mito AMP®:** 2 capsules BID[16,17] • **Magnesium Bisglycinate:** 200 mg BID with food[11,12] • **Synerase:** 3 capsules TID in between meals[13] • **OptiMega-3®:** 1 softgel BID with meals[18,19]	May require the use of prescription medications as part of the integrated protocol
Arthralgia	• RICE • **Dolor Ease:** 1 capsule BID *OR* **Theracurmin 2X:** 1 capsule QD • **Synerase:** 2 capsules TID in between meals[20,21] • **PEA:** 1 capsule TID[8]	• RICE • **Dolor Ease:** 2 capsules BID *OR* **Theracurmin 2X:** 1–2 capsules QD • **Synerase:** 3 capsules TID in between meals[20,21] • **OptiMega-3:** 1 softgel BID with meals[22] • **PEA:** 1 capsule TID[8]	May require the use of prescription medications as part of the integrated protocol

QD: daily; BID: two times per day; TID: three times per day; RICE: Rest, Ice, Compression, Elevation; PEA: Palmitoylethanolamide

Re-Assessment

Repeat clinical and laboratory measurements as indicated. Confirm progress with treatment or re-assess barriers to improvement, including possible red/yellow flags that did not present earlier.

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Rheumatoid Arthritis Protocol: Restoring Joint Function

Introduction

It is estimated that 300,000 Canadians have rheumatoid arthritis (RA).[1]

Assessment

1. Thorough physical exam focusing on:
   a. Mild-to-moderate joint swelling.
   b. Crepitus on movement.
   c. Pain with movement of joint and in particular at the end of its range of motion.
   d. Joint tenderness.
   e. Mild inflammation and warmth over the joint.
   f. See American College of Rheumatology Guidelines for RA diagnosis.[2]
   g. Patients may also present with fatigue, weight loss, and anemia on initial presentation. Additionally, many non-joint signs/symptoms may be overlooked, including accelerated atherosclerosis (leading cause of death among individuals with RA), episcleritis, neuropathy, vasculitis with severe RA, etc. (See Wasserman 2018 for a complete list of extra-articular manifestations).
2. Laboratory – the target population for testing are patients with at least one joint with definite clinical synovitis, not better explained by another disease:
   a. High-sensitivity CRP (hs-CRP) and ESR.
   b. Rheumatoid factor and anti-citrullinated protein antibody.
      - Upon initial diagnosis, CRP is elevated in 39%, rheumatoid factor (IgM) in 44%, and anti-citrullinated protein antibody in 39%.[3]
   c. Vitamin D: 1,25-$(OH)_2$ Vitamin D levels have been shown to be inversely associated with disease activity.[4] Meta-analysis of 25 (OH) vitamin D levels has also been shown to be inversely related to disease activity.[5] Polymorphisms within the vitamin D receptor (VDR) gene also appear to influence risk, even in the presence of normal vitamin D serum levels.[6]
   d. Radiological assessment: X-ray, MRI. Note that radiography may be helpful if the typical erosions are present, but rheumatoid nodules and radiographic erosive changes are no longer criteria for diagnosis, as they are less likely to be present in early disease.
   e. Joint aspiration of synovial fluid.

General Recommendations

1. Monitor progress of patients using:
   a. RA activity score using DAS 28 at **http://www.das-score.nl/das28/en/contact.html** or **http://www.4s-dawn.com/DAS28/**
   b. Clinical Disease Activity Index for RA at **https://bit.ly/2X5gXNV**

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Specific Treatment Plan*

	Mild	Moderate	Severe
Rheumatoid Arthritis	• Tai chi[7,8] • Yoga[9,10] • Mediterranean[11,12] and/or vegetarian/vegan diet[13,14] • **Theracurmin® 2X:** 1 capsule QD[15,16] • **BioFoundation-G®:** 1 tablet TID[17]	• Tai chi[7,8] • Yoga[9,10] • Mediterranean[11,12] and/or vegetarian/vegan diet[13,14] • **OptiMega-3®:** 5 softgels per day[18,19] • **Theracurmin 2X:** 1 capsule QD[15,16] • **BioFoundation-G:** 1 tablet TID[17] • **Ubiquinol:** 100 mg QD[20,21] • **Vitamin D3:** 1000 IU QD (up to 5000 IU QD in those with low serum levels) OR Calcitriol 500 IU per day[22] • **PEA:** 1 capsule TID[23]	• May require the use of prescription medications as part of the integrated protocol • Tai chi[7,8] • Yoga[9,10] • Mediterranean[11,12] and/or vegetarian/vegan diet[13,14] • **OptiMega-3:** 130 mg/kg QD (6-8 softgels per day, based off weight)[24] • **Theracurmin 2X:** 1 capsule BID[15,16] • **BioFoundation-G:** 1 tablet TID[17] • **Ubiquinol:** 100 mg QD[20,21] • Vitamin D3 plus calcium, especially for patients using corticosteroid therapy[25] • **PEA:** 1 capsule TID[23]

QD: daily; BID: two times per day; TID: three times per day; QID: four times per day; PEA: Palmitoylethanolamide
*Caution: Contraindications exist for patients taking warfarin.

Re-Assessment

Repeat clinical and laboratory measurements as indicated.

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Neurological Protocol: Restoring Neurological Function

Introduction

Chronic degenerative neurological concerns are being reported more frequently in everyday clinical practice, including Parkinson's disease, multiple sclerosis, and dementia.

Assessment

For neurological damage or degenerative risk:

1. Thorough clinical neurological workup, potentially including CT scan, electromyography, MRI, and PET when diagnosis is uncertain.[1]
2. Potential laboratory considerations:
   a. Insulin resistance assessment, such as an oral glucose tolerance test
   b. Hemoglobin A1c
   c. Fasting glucose
   d. Hs-CRP
   e. Homocysteine
   f. Methylmalonic acid (B12)
   g. 25-OH vitamin D levels
   h. Anti-myelin antibodies
   i. AST (aspartate aminotransferase)
   j. Markers for oxidative damage and genetic risk, such as urinary levels of 8-hydroxy-deoxyguanosine and APOE gene testing, respectively

General Recommendations

1. Monitor progress of patients using:
   a. Standardized Mini-Mental State Examination at https://bit.ly/2BLAFGU
   b. Unified Parkinson's Disease Rating Scale at https://bit.ly/2VXwleB
   c. Standardized neurological exam and EDSS for multiple sclerosis at https://bit.ly/3ffj0pS

Specific Treatment Plan

	Mild	Moderate	Severe
Week 1: Initiation Phase	• Mediterranean-style diet[2,3] • Aerobic and resistance exercise training[4,5] • Calligraphy therapy[6,7] • **BioFoundation-G®:** 2 tablets TID with meals[8,9]	• Mediterranean-style diet[2,3] • Goal of 10,000 steps per day as assessed by pedometer, with individualized targets[10] • Age-appropriate yoga: Three 55-minutes sessions per week[11,12] • **BioFoundation-G:** 2 tablets TID with meals[8,9]	• Mediterranean-style diet[2,3] • Tai Chi: 60 minutes twice weekly[13,14] • **BioFoundation-G**: 2 tablets TID with meals[8,9]
Week 2–7: Intensive Therapy Phase	• **BioFoundation-G:** 2 tablets TID with meals[8,9] • **Mito AMP®:** 1 softgel per day[15–17] • **PQQ-10®:** 1 softgel per day[18,19] • **OptiMega-3®:** 1 softgel BID with meals[20–22] • **Vitamin D3:** 1000 IU QD[23,24]	• **BioFoundation-G:** 2 tablets TID with meals[8,9] • **Mito AMP:** 2 softgels per day[15–17] • **PQQ-10:** 2 softgels per day[18,19] • **OptiMega-3:** 1 softgel BID with meals[20–22] • **Theracurmin® 2X:** 1 capsule BID[25] • **Vitamin D3:** 2000 IU QD[23,24]	• **BioFoundation-G:** 2 tablets TID with meals[8,9] • **Mito AMP:** 3 softgels per day[15–17] • **PQQ-10:** 3 softgels per day[18,19] • **OptiMega-3:** 1 softgel BID with meals[20–22] • **Theracurmin 2X:** 1 capsule BID[25] • **Vitamin D3:** 2000 IU QD[23,24] • **N-Acetyl-L-Cysteine:** 1 capsule TID[26] • **Melatonin:** 3–5 mg at night[27]

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Week 8: Maintenance Phase	• Mediterranean-style diet[2,3] • Aerobic and resistance exercise training[4,5] • **BioFoundation-G:** 2 tablets TID with meals[8,9]	• Mediterranean-style diet[2,3] • Aerobic and resistance exercise training[4,5] • **BioFoundation-G:** 2 tablets TID with meals[8,9] • **Mito AMP:** 1 softgel per day[15–17] • **PQQ-10:** 2 softgels per day[18,19] • **OptiMega-3:** 1 softgel BID with meals[20–22] • **Theracurmin 2X:** 1 capsule QD[25] • **Vitamin D3:** 1000 IU QD[23,24]	• Mediterranean-style diet[2,3] • Aerobic and resistance exercise training[4,5] • **BioFoundation-G:** 2 tablets TID with meals[8,9] • **Mito AMP:** 2 softgels per day[15–17] • **PQQ-10:** 2 softgels per day[18,19] • **OptiMega-3:** 1 softgel BID with meals[20–22] • **Theracurmin 2X:** 1 capsule BID[25] • **Vitamin D3:** 1000 IU QD[23,24] • **N-Acetyl-L-Cysteine:** 1 capsule BID[26]

QD: daily; BID: two times per day; TID: three times per day.

Re-assessment

Repeat clinical and laboratory measurements.

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Osteoarthritis Protocol: Restoring Joint Function

Introduction

Osteoarthritis (OA) is the most common type of arthritis, affecting nearly five million Canadians[1] and over 32 million US adults[2].

Assessment

1. Physical exam and imaging:
   a. Clinical diagnosis in those over age 45 with activity-related joint pain and no morning stiffness or no stiffness that lasts more than 30 minutes, after excluding atypical features, including history of trauma, hot swollen joint, gout, etc.[3]
   b. Plain X-rays can help confirm the diagnosis but are insensitive early in the disease, though they may be useful for ruling out other etiologies. Findings include narrowed joint spaces and/or osteophytes. MRI is useful for more complicated diagnoses.[4]
   c. See American College of Rheumatology Guidelines for Osteoarthritis of the Hip, Knee, and Hand.[5]
2. Laboratory:
   a. Laboratory evaluation is not typically indicated, though CRP and/or ESR can be used to rule out other inflammatory conditions.

General Recommendations

1. Monitor progress of patients using:
   a. KOOS Knee Scale and HOOS Scale for osteoarthritis of the hip at **http://www.koos.nu/** or WOMAC Scale at **https://www.orthopaedicscore.com/**
   b. Oswestry Low Back Pain Disability Index at **https://bit.ly/3eWKm2Z**
   c. Michigan Hand Outcome Questionnaire at **https://bit.ly/2X0V7uW**

Specific Treatment Plan

	Mild	Moderate	Severe
Osteoarthritis	• Weight loss[6,7] • Acupuncture[8,9] • Exercise[10] • Massage[11,12] • **Theracurmin® 2X:** 1 capsule QD[13–16]	• Knee: manual therapy[17] • **Vitamin D3:** 1000–2000 IU QD; if low serum levels of 25 (OH) vitamin D, 5000 IU QD[18] • **Dolor Ease™:** 2 capsules BID *OR* **Theracurmin 2X:** 1 capsule BID[13–16] • **OptiMega-3®:** 1 capsule BID with meals[19] • **PEA:** 1 capsule TID[20]	• May require the use of prescription medications and/or joint replacement as part of the integrated protocol • **Vitamin D3:** 1000–2000 IU QD; if low serum levels of 25 (OH) vitamin D, 5000 IU QD[18] • **Dolor Ease:** 2 capsules BID *OR* **Theracurmin 2X:** 1 capsule BID[13–16] • **OptiMega-3:** 1 capsule BID with meals[19] • **SAMe:** 400 mg QID[21] • **PEA:** 1 capsule TID[20]

QD: daily; BID: two times per day; TID: three times per day; QID: four times per day; PEA: Palmitoylethanolamide

Re-Assessment

Repeat clinical and laboratory measurements as indicated.

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Weight Loss

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WHAT IS THE EXTENT OF THE PROBLEM?

As the prevalence of overweight and obesity continues to rise, the resultant complications and associated morbidities take an ever increasing toll on those affected, as well as on total healthcare costs. Analysis from the National Health and Nutrition Examination Survey (NHANES) 2003-2004 revealed that 17.1% of US children and adolescents were overweight, and 66.3% of adults were either overweight or obese.[1]

Furthermore, obesity has been found to be underdiagnosed in outpatient settings according to a recent analysis. Only 29% of visits by adult patients who were obese—according to their body mass index (BMI)—had a documented diagnosis of obesity,[2] while only 63% of adolescents have both their height and weight measured annually; very few receive diet or exercise counselling.[3]

Even more concerning are the predictions for future rates of overweight and obesity based on current trends. Using NHANES data, researchers from the Johns Hopkins Bloomberg School of Public Health predict that by 2030, 86.3% of all US adults will be overweight or obese, with more than half obese. They predict that by 2048 all adults will be overweight or obese if the trends in weight gain continue. Additionally, a doubling in total healthcare costs attributable to obesity/overweight every decade to $860.7-$956.9 billion US dollars is expected by 2030, accounting for 16-18% of total US healthcare costs.[4]

HOW ARE OBESITY AND OVERWEIGHT DEFINED?

In adults, overweight is defined as a BMI of 25.0 to 29.9 kg/m^2, and obesity is defined as a BMI $\geq$ 30 kg/m^2. The definition in children and adolescents (age 2-18) has not been as clearly defined, but in 2005 the Institute of Medicine defined obesity in this age group as a BMI of > 30 kg/m^2, or 95th percentile for age and gender (whichever is smaller). Prior to this definition, children in these categories of weight were termed overweight, but not obese; the definition change reflects a growing concern for the magnitude of the problem in children, as well as in adults.[5]

Although BMI is perhaps the easiest to assess and the most frequently used measure of weight, it is also the least useful anthropometric index. As discussed below, other markers such as waist circumference or the waist-to-hip ratio appear to be better predictors of risk.

WHAT ARE SOME OF THE CAUSES OF WEIGHT GAIN?

Food choices and inactivity

Certainly, a sedentary lifestyle combined with a nutrient-poor, but calorie-rich diet contributes greatly to the obesity epidemic in the US. For example, consumption of sugar-sweetened beverages (SSBs) have been linked to the obesity epidemic, and from 1977 to 2001, energy intake from soft drinks and fruit drinks increased by 135%. Analysis of NHANES data also shows that the number of individuals that consume SSBs daily has increased to 63%, combined with an increase in portion size. They also found SSB consumption to be highest in those groups most at risk for obesity and Type 2 diabetes.[6] This increase has affected children too—NHANES 1999-2004 data shows that children and adolescents now derive 10% to 15% of their total calories from sugar-sweetened beverages and 100% fruit juice, with increasing consumption in all age groups.[7]

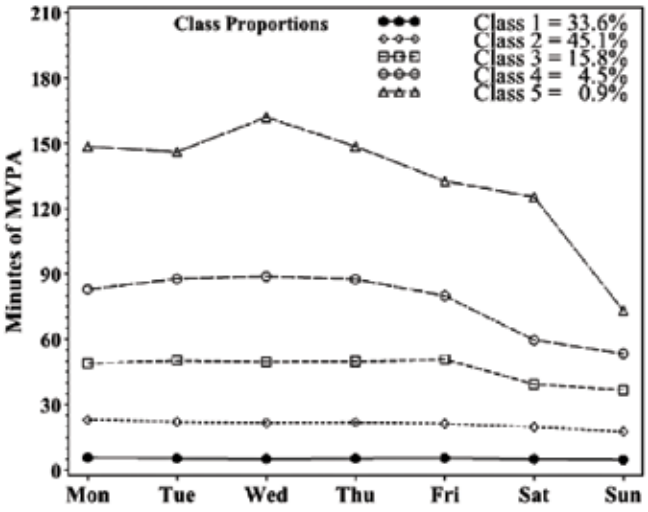

Figure 1* **Five latent classes: MVPA.** Class proportions have been weighted to account for the complex sample design.

Along with the increased consumption of empty calories has come a decrease in physical activity. Epidemiological data from the NHANES 2003-2004 study found that 34% of the entire US population averages 5.3 minutes of moderate to vigorous physical activity (MVPA) per day, while another 45% had a mean of 21 minutes per day. This means that 79% of the US population is falling short of minimum recommendations for physical activity *(See Figure 1)*.[8]

When an increase in calories is combined with a decrease in physical activity, the energy gap between calories consumed and calories burned widens. A recent study clearly demonstrated the relationship between physical activity, SSB intake, and not only anthropomorphic indices such as BMI, but also with that of insulin resistance (IR). In a study of nearly 7,000 ado-

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lescents, increased consumption of SSBs was independently associated with increased HOMA-IR (an index of insulin resistance), systolic blood pressure, waist circumference, and BMI percentile for age and sex, as well as decreased HDL cholesterol concentrations. Higher levels of physical activity were also independently associated with decreased HOMA-IR, LDL cholesterol concentrations, triglyceride concentrations, and increased HDL cholesterol concentrations. Furthermore, low SSB intake and high physical activity levels appear to modify each other's effects of decreasing HOMA-IR and triglyceride concentrations and increasing HDL cholesterol concentrations.[9]

INSULIN RESISTANCE AND INFLAMMATION

The majority of overweight and obese individuals have some degree of IR, and inflammation is now thought to be a corollary of obesity.[10, 11] Adipocytes have only recently been recognized as a functional endocrine organ, because they release a number of biologically-active signals, or adipokines, which influence insulin sensitivity and initiate the induction of inflammatory cytokines. Obesity leads to an increase in the number and size of adipocytes, which activates this network of inflammatory signaling pathways. While it is still unclear which precedes which, obesity and insulin resistance certainly fuel each other, making weight loss much more challenging once obesity is established.

Abnormal glucose homeostasis was also found to be predictive of the amount of weight regained after weight loss, as demonstrated recently in a prospective trial. Following an oral glucose tolerance test (OGTT), subjects who had the lowest glucose concentrations were found to have the greatest risk for weight gain over time. The authors speculate that insulin resistance is responsible for this effect, given its association with weight gain, weight regain after loss, and lower blood glucose concentrations during an OGTT. This effect is likely due to the fluctuations in blood glucose levels after a meal; with poor glucose homeostasis, glucose concentrations have more significant highs and lows. It is very likely that these lows in glucose levels stimulate hunger, leading to greater appetite and calorie intake, and ultimately to weight regain.[12]

WHAT ARE THE CONSEQUENCES OF EXCESS WEIGHT?

The metabolic diseases associated with overweight and obesity are many, including Type 2 diabetes, atherosclerosis, allergic disease (including food allergy), hypertension, sleep apnea, and urinary incontinence.[13, 14, 15, 16] While not all of the mechanisms are clearly understood, the underlying increase in systemic inflammation and insulin resistance are thought to mediate many of these consequences, which are often clustered together *(See Figure 2)*.

HOW IS BODY WEIGHT BEST ASSESSED?

Although BMI is the most commonly used assessment tool, other anthropometric indices appear to be better predictors of risk. This is in large part because the distribution of excess adiposity may be more important than total adiposity, a distinction which is not captured by BMI alone. Both waist circumference (WC) and waist-to-hip ratios (WHR) are better predictors of risk, because they assess abdominal/central adiposity, which is more closely associated with cardiovascular

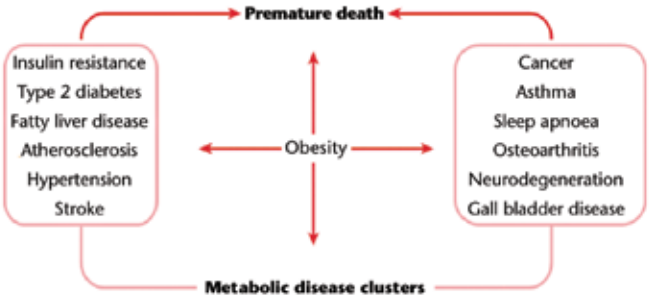

Figure 2 **Clustering of metabolic diseases.** Obesity is considered to be a central feature that increases the risk for a vast array of diseases, with significant morbidity and mortality. In general, the mechanistic basis of the link between obesity and the diseases listed on the right are poorly understood compared with that of those listed on the left.

incident risk.[17] It has been suggested that WHR is a superior predictor of cardiovascular disease (CVD) risk because it includes a measurement of hip circumference, which is inversely associated with dysglycemia, dyslipidemia, diabetes, hypertension, CVD, and death. A recent study found that WHR is also a stronger predictor of subclinical atherosclerosis than either WC or BMI; the association with atherosclerotic burden was strongest for WHR, intermediate for waist circumference, and weakest for BMI, using carotid intimal medial thickness (IMT) as a marker *(See Figure 3)*.[18]

Given the close connection between insulin resistance and other metabolic abnormalities, the assessment of insulin resistance, glucose, systemic inflammation, and other lipid markers should be done as part of a comprehensive evaluation.

HOW IS WEIGHT LOSS ACHIEVED?

Considering the high recidivism rate for weight regain, there may be no single program that is effective for everyone. However, a combination of dietary changes, increasing physical activity, targeting insulin resistance and inflammation, and addressing personal motivation are all powerful tools for weight loss.

Diet & Exercise

Consistently, reduced calorie diets are associated with meaningful weight loss, often regardless of the type of macronutrients emphasized.[19] Calorie restricted diets also improve endothelial function in peripheral arteries within 12 weeks in overweight and obese adults.[20] However, it has recently been demonstrated that in response to a reduction in caloric intake, metabolic adaptations take place, which lower sedentary energy expenditure, and, in free-living adults, lead to a reduction in physical activity—two changes that may be responsible for the inability to lose weight the longer a calorie restricted diet is in place.[21] Certainly, calorie restriction alone is not enough to lose weight.

Although it is unclear what macronutrient composition is most associated with weight loss, a recent trial found that less favourable effects on flow-mediated vasodilatation and lipid risk factors were found with an Atkins diet compared to Ornish and South Beach diets. Specifically, saturated fat content was inversely correlated to brachial artery dilatation, and this effect

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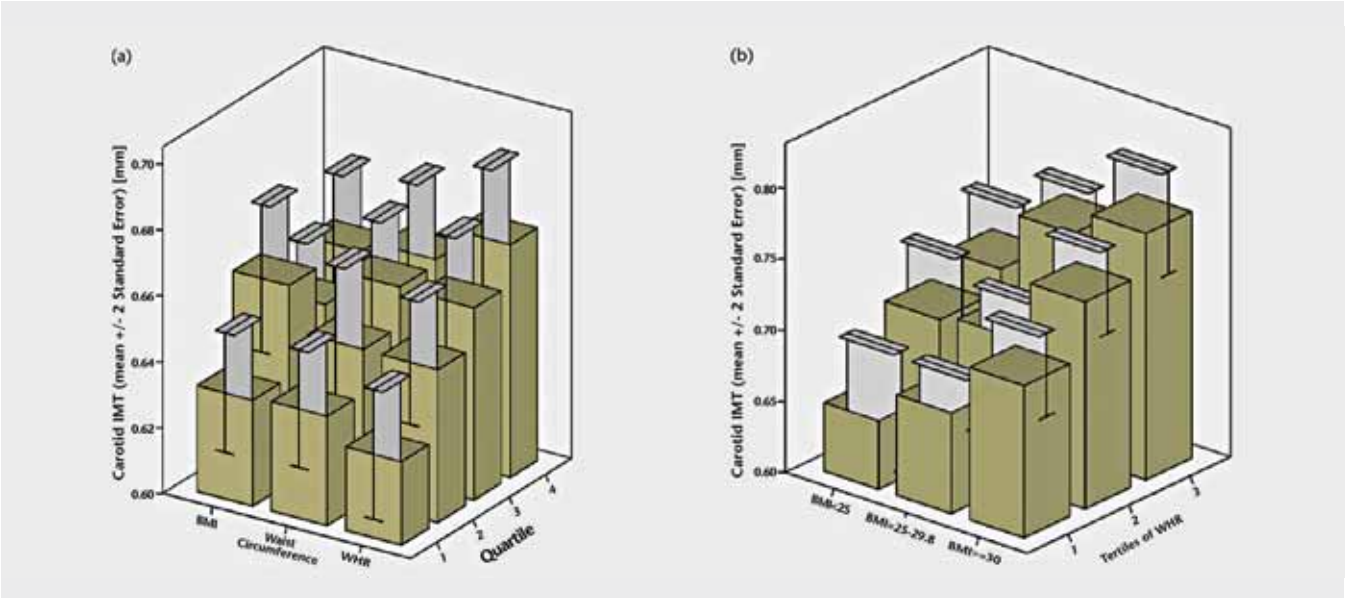

Figure 3 **Carotid intimal-medial thickness across tertiles of waist circumference by traditional body mass index categories. a]** For BMI < 25 kg/ m²: P = 0.049 for trend across waist circumference tertiles. For BMI = 25-29.9 kg/ m²: P-0.001 for trend across waist circumference tertiles. For BMI ≥ 30 kg/m²: P = 0.01 for trend across waist circumference tertiles. **b]** Carotid intimal-medial thickness across tertiles of waist-to-hip ratio by traditional body mass index categories. For BMI < 25 kg/m²: P = 0.002 for trend across WHR tertiles. For BMI – 25-29.9 kg/m²: P = 0.001 for trend across WHR tertiles. For BMI ≥ 30 kg/m²: P = 0.997 for trend across WHR tertiles.

was also seen when comparing a low-carbohydrate diet to a low-fat diet.[22, 23]

The Mediterranean diet has also been associated with better glycemic control in obese individuals, and, given its high compliance rate, may be more suited to addressing underlying insulin resistance.[24] Certainly, a low glycemic index diet rich in fruits, vegetables, and fibre that is low in saturated fat has been found to be effective not only for weight loss, but for controlling hunger. By reducing energy density with high fibre intake, satiety is reached before caloric intake is excessive.[25, 26, 27]

Appetite control is also improved by increasing physical activity, an effect that may be mediated by a number of gastrointestinal peptides.[28, 29] While the weight loss and improvements in glucose tolerance may not be different in groups that either restrict calories or increase their physical activity, there does seem to be a preservation of lean mass in those who combine moderate to vigourous exercise with caloric restriction.[30, 31]

While aerobic exercise is an important part of a weight loss program, resistance training appears to have unique benefits as well. Regular resistance training has been shown to improve insulin sensitivity and fasting glycemia, while reducing abdominal fat in a trial that enrolled older men with Type 2 diabetes.[32] And in a trial with overweight women, weight loss resulting from resistance training was found to maintain both strength and resting energy expenditure compared to women who lost weight with no exercise or with aerobic exercise.[33] Clearly, strength training plays an important role in preventing the drop in metabolism that is normally seen with longer term weight loss and calorie restriction. Lastly, one study suggests that the benefits to glucose homeostasis from resistance training may in part be determined by ethnicity, as African American men with Type 2 diabetes lost more weight and had greater improvements in insulin sensitivity with resistance training than did white men.[34]

One small study suggests that subclinical hypothyroidism may interfere with the benefits of exercise on metabolism and insulin sensitivity; this warrants thyroid function evaluation if weight loss is not occurring as expected with regular physical activity and dietary changes.[35]

Supplementation

In combination with diet and exercise changes, nutritional supplementation has been shown to improve appetite control and insulin sensitivity, to reduce inflammation, and to assist with overall weight loss.

PGX

Given the importance of dietary fibre in regulating glucose homeostasis, reducing energy density (which improves appetite control), and for minimizing glucose highs and lows that occur postprandially, the use of PolyGlycopleX (PGX) has considerable therapeutic potential for weight loss. PGX typically lowers after-meal blood glucose levels by approximately 35 to 70% and also lowers insulin secretion by approximately 40%, producing a whole body insulin sensitivity index improvement of nearly 60%. Because PGX minimizes glucose fluctuations that occur postprandially, this has the effect of reducing appetite. The glucose lows associated with poor glucose homeostasis are prevented, and hunger is reduced. In a recent trial comparing PGX, a highly-viscous fibre, to low and medium viscosity fibres,

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PGX was found to have the greatest reduction in caloric and gram intake, an effect likely to lead to significant weight loss.

Other supportive therapies include:

- ***PGX® Weight Loss Meal Replacement*** – contains a full spectrum of vitamins and minerals, 20 g of high quality undenatured whey protein and 5 g PGX—the dose found to control appetite and reduce cravings for several hours. It also contains medium chain triglycerides (MCTs) derived from coconuts, which have been shown to lead to greater total loss of trunk adiposity, and intraabdominal adipose tissue when compared to olive oil, likely through an increase in fat oxidation. (*Available in Double Chocolate, Very Strawberry and French Vanilla).*
- ***Calm-Pro™*** – contains Suntheanine L-Theanine, a natural amino acid found in green tea. Extensive research on L-Theanine shows that in higher doses (100-300 mg), it can reduce emotionally-driven food cravings and stabilize mood.[36]
- ***Omega-3 Fatty Acids*** – in addition to the reduction in inflammation and improvements in insulin sensitivity seen with n-3 fatty acids, they may also modulate satiety.

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FIGURES

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