

# I-CARE<sup>SM</sup>

## INSULIN RESISTANCE TREATMENT

### A Guide to Managing Insulin Resistance, Metabolic Syndrome, and Type II Diabetes

Insulin resistance has emerged in the last 50 years as the world's most common disorder and the single largest cause of loss of life. Also known as 'metabolic syndrome, it leads to conditions like high blood pressure, high blood sugar, excess body fat around the waist, and abnormal triglyceride and cholesterol levels. As this document makes clear, insulin resistance and type II diabetes are largely reversible through adopting healthy lifestyles.

### TREATMENTS

**Intermittent fasting/time-restricted eating:** This is the most efficient and effective way to lower insulin levels and restore insulin sensitivity. In addition, fasting has a profound benefit on the immune system, partly by stimulating the clearing of damaged cells (autophagy), damaged mitochondria (mitophagy), and misfolded and foreign proteins. Fasting also improves mitochondrial health and increases stem cell production, and is the most effective method to achieve sustained weight loss.

#### Cautions and contraindications

Avoid fasting if:

- You are malnourished or underweight
- You have anorexia nervosa/bulimia
- You have type I diabetes (true insulin deficiency)
- You are under 18 years of age
- You are pregnant or breastfeeding

Use caution and seek the advice of a healthcare provider if:

- You have type II diabetes (as you will likely have to adjust your diabetic medications)
- You have chronic diseases and take multiple medications
- You have gout



**Low-carbohydrate (ketogenic) diet:** Aim for a diet high in saturated fat, mono-unsaturated fat, and Omega-3 fatty acids. The carbohydrate content of a meal should not exceed 25 grams.

#### *Healthy foods include:*

All vegetables (especially avocado, cruciferous, and leafy vegetables); Nuts (almonds, brazil nuts, cashews, and pistachios); Peanut butter (but avoid the white bread and grape jelly!) and chia seeds; Fish (especially Alaskan salmon and sardines); Chicken breast (free range, no hormones, no antibiotics); Eggs (they've been given a bad rap!); Meat (grass-fed, no hormones, avoid processed meats); Blueberries (limit volume if highly insulin resistant); Grapefruit (limit volume if highly insulin resistant); Coffee (with heavy cream or coconut oil; choose Stevia over sugar or artificial sweeteners).

### About this protocol

The treatment of metabolic syndrome and type II diabetes should always be done under the supervision of a qualified healthcare provider.

As all the interventions suggested in this guidance will lower blood glucose levels, patients who take diabetic medications need to have their medications adjusted (titrated) to avoid life-threatening hypoglycemia.

Blood glucose monitoring is critical, especially during the induction phase, and a continuous glucose monitor is recommended.

This guideline should not be used in patients with type I diabetes, who have an absolute insulin deficiency.

### Disclaimer

This guide is meant solely for educational purposes. Never disregard professional medical advice because of something you read on our website and releases. This is not intended to be a substitute for professional medical advice, diagnosis, or treatment.

Treatment for an individual patient is determined by many factors and thus should rely on the judgement of your qualified healthcare provider. Always seek their advice regarding your medical condition or health.

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### Berberine

- **Dose:** total daily dose of 1000-1500 mg (take 500 mg two or three times daily or 600 mg twice daily). Once metabolic stability is achieved, it may be possible to reduce the dose of berberine to 500 mg once or twice daily.
- **Cautions and contraindications**
  - Berberine is remarkably safe; the only adverse events include transient gastrointestinal symptoms (diarrhea, flatulence).
  - As berberine lowers blood glucose and lowers blood pressure, these parameters should be monitored.
  - Berberine should not be taken in patients taking cyclosporine as this combination will increase cyclosporine levels (absolute contraindication).
  - Berberine may alter the metabolism of the following drugs, which should be used with caution (monitor effects): anticoagulants, dextromethorphan, tacrolimus (Prograf), phenobarbitone and sedative drugs (see <https://www.webmd.com/vitamins/ai/ingredientmono-1126/berberine>).
  - Berberine is contraindicated during pregnancy, breastfeeding, and in neonates and children.
  - If you are scheduled for surgery, please notify your anesthesia team if you are taking Berberine. You may need to stop taking Berberine one week prior to surgery.

### Metformin

- **Dose:** 500-1000 mg twice daily. The dose of metformin will likely need to be reduced in type II diabetics as insulin resistance improves during the induction phase.

### Magnesium

- **Dose:** A starting dose of 100 to 200 mg daily is suggested, increasing the dose as tolerated up to 300 mg (females) to 400 mg daily.

### Melatonin

- **Dose:** 2-10 mg slow release/extended release at night (dose as tolerated).

### Resveratrol

- **Dose:** 400-500 mg daily. Resveratrol may potentiate the effect of time-restricted feeding (intermittent fasting) in activating autophagy. Resveratrol should therefore be taken during fasting and not with a meal.

### Cinnamon

- **Dose:** 1-2 g daily.

### Omega-3 fatty acids

- **Dose:** We suggest a combination of EPA/DHA with an initial dose of 1 g/day (combined EPA and DHA) and increasing up to 4 g/day of the active Omega-3 fatty acids.

### Probiotics with Bifidobacterium

- Look for brands without added sugar and choose products with more than one strain of lactobacillus and bifidobacteria.

### Avoid excessive stress

- Stress increases cortisol and catecholamines which increase blood sugar levels.

### Exercise

- Aim for at least 30 minutes a day of moderate activity (like brisk walking), 5 or more days a week.

### A quick guide to intermittent fasting

There are a number of intermittent fasting plans that can be adapted and modified to best suit any lifestyle.

The 2016 book by Dr. Jason Fung, *The Complete Guide to Fasting*, provides excellent guidance on approaches to intermittent fasting.

Start with a 12-hour eating window 5 days a week and reduce week-by-week to an 8-hour eating window 7 days a week. This eating window can be shortened to 4 hours or less over time. The ideal is a 1-2 hour eating window restricted to one meal a day. Timed fasting can be interspersed with 36-to 48-hour fasts.

Some things to bear in mind:

- Premenopausal women appear less tolerant to time-restricted eating and should therefore restrict the time-based eating window slowly.
- Don't eat (or snack) within 3-4 hours of going to bed.
- Time-restricted eating is best coupled with a low-carbohydrate diet.
- Eat real rather than processed foods.
- Keep your meals diverse and include lots of green and cruciferous vegetables.
- Avoid fruit juices.
- To prevent large excursions of blood sugar, avoid high glycemic index foods.
- No snacking.
- Don't calorie count or obsess about eating and food choices.
- No artificial sweeteners and no sodas.