

Low-Carbohydrate / Ketogenic Diet

Prediabetes and insulin resistance develop when the body's tissues respond less effectively to insulin, leading to elevated blood glucose levels. Many inflammatory skin diseases such as psoriasis, atopic eczema, and hidradenitis suppurativa are often associated with insulin resistance, prediabetes, and diabetes. This means that problems with sugar metabolism in the body can contribute to inflammation and may worsen skin disease.

One of the most effective non-pharmacologic strategies to improve insulin sensitivity is reducing dietary carbohydrate intake. A low-carbohydrate or ketogenic diet lowers post-meal glucose spikes, reduces insulin secretion, and may support weight loss and metabolic improvement.

The goal of this dietary approach is to substantially reduce carbohydrates and replace them with healthy fats and adequate protein, allowing the body to rely more on fat metabolism rather than glucose as its primary fuel source.

This dietary approach is not a replacement for medical treatment, but it can be a helpful adjunct to standard therapy and may improve both general health and skin disease control.

1. Basic Principles of a Low-Carbohydrate Diet (also known as "Ketogenic Diet")

The main idea of a low-carbohydrate diet is to reduce foods that raise blood sugar and replace them with foods that provide steady energy.

In practice, this means:

Abandon sugary and starchy foods, such as bread, pasta, rice, potatoes, sweets, and sugary drinks. Eat moderate amounts of protein, such as fish, eggs, chicken, meat, tofu, or yogurt. Include healthy fats in your meals, such as olive oil, butter, tallow, avocado, nuts, seeds, and fatty fish.

When carbohydrate intake is reduced, blood sugar and insulin levels decrease. If carbohydrates are reduced further, the body begins to burn fat for energy and produces substances called ketones, which many organs can use as an alternative fuel.

Intermittent fasting can also be helpful for some people. This does not mean fasting all the time. Occasionally extending the time between meals—for example skipping breakfast or having dinner earlier so that there is a 12–24 hour break without food—may help the body reset insulin levels and improve metabolic balance. This can be done from time to time rather than every day, depending on individual tolerance.

2. Foods to Emphasize

Focus on whole, minimally processed foods that have minimal impact on blood glucose.

Protein Sources. Include moderate portions of high-quality protein:

- Fish and seafood
- Eggs
- Poultry
- Meat (beef, lamb, pork)
- Tofu or tempeh

- Greek yogurt (unsweetened)

Protein helps maintain muscle mass and contributes to satiety.

Healthy Fats: become an important energy source:

- Butter or ghee
- Tallow
- Olive oil
- Avocado and avocado oil
- Nuts (almonds, walnuts, macadamia)
- Seeds (chia, flax, pumpkin seeds)
- Fatty fish (salmon, sardines), cod liver oil

These fats help stabilize energy levels and reduce hunger.

Low-Carbohydrate Vegetables: should form a large portion of the diet:

- Leafy greens (spinach, kale, lettuce)
- Broccoli
- Cauliflower
- Zucchini
- Cabbage
- Mushrooms
- Peppers
- Asparagus

These foods provide fiber, vitamins, and micronutrients with minimal carbohydrate load.

3. Foods to Limit or Avoid

The most important change is reducing foods that rapidly raise blood glucose.

Refined Carbohydrates: Avoid!

- Bread, pasta, rice
- Breakfast cereals
- Pastries and baked goods
- Chips and crackers

Avoid Sugary Foods

- Sugar and sweets
- Soft drinks and fruit juices
- Sweetened coffee beverages
- Candy and desserts

Avoid Starchy and High-Carbohydrate Foods

- Potatoes
- Corn
- Rice
- Most packaged snack foods

- **Fruit: eat as a treat.** Fruit contains natural sugars. Small amounts of berries (e.g., blueberries, raspberries) are usually acceptable, but large servings of high-sugar fruits (bananas, grapes, mangoes) should be limited.

4. Practical Meal Examples

Breakfast

- * Eggs with avocado with optional bacon
- * Greek yogurt with nuts and chia seeds

Lunch

- * Salad with grilled chicken, olive oil, and vegetables
- * Tuna with avocado and leafy greens

Dinner

- * Salmon with roasted broccoli and olive oil
- * Chicken thighs with cauliflower and zucchini

Snacks (if needed)

- * Handful of nuts
- * Hard Swiss cheese
- * Hard-boiled eggs

Many patients find that hunger decreases significantly on this diet, allowing them to **reduce snacking and meal frequency.

5. Additional Lifestyle Measures

Diet works best when combined with other lifestyle changes:

Physical activity

- Aim for at least 150 minutes per week of moderate exercise
- Resistance training improves insulin sensitivity

Sleep

- Poor sleep worsens insulin resistance; aim for 7–8 hours per night

Stress management

Psychological stress can worsen many inflammatory skin diseases because it increases the release of stress hormones such as cortisol, which can disrupt immune regulation in the skin. Elevated stress levels are also known to increase skin itching and trigger disease flares in conditions such as psoriasis, eczema, and other inflammatory dermatoses.

6. Monitoring and Safety

A low-carbohydrate diet is generally very safe and many studies suggest it may reduce the risk of cardiovascular disease, metabolic disorders, and chronic inflammatory conditions. The main precaution applies to patients who take medications for diabetes, as improved insulin sensitivity and lower blood sugar levels may require adjustment of medication doses. This should be discussed with your healthcare provider.

Adequate hydration and electrolyte intake are important when starting the diet. When carbohydrate intake is reduced, the body often loses excess stored water, which can also lead to temporary loss of electrolytes such as sodium and potassium. Some people may experience mild symptoms such as fatigue, headache, or light-headedness during the first few days. This is sometimes called the “keto flu.” It is harmless and temporary, and usually improves with good hydration and adequate electrolyte intake.

7. Expected Benefits

With consistent adherence, many individuals with prediabetes experience:

- Improved fasting glucose
- Reduced insulin resistance
- Weight loss
- Lower triglycerides
- Reduced hunger and more stable energy levels

Improving metabolic health may also have **positive effects on inflammatory skin diseases**. In some patients, skin conditions may improve or respond better to medical therapy when insulin resistance and metabolic inflammation are reduced.

Summary

A low-carbohydrate or ketogenic diet focuses on reducing sugars and refined carbohydrates while emphasizing healthy fats, moderate protein, and non-starchy vegetables. This dietary approach can substantially improve insulin sensitivity and metabolic health in patients with prediabetes.

Consistency and sustainability are key. Patients should aim for gradual dietary changes that can be maintained long-term. It is best to consider a low-carbohydrate diet as a long-term lifestyle change rather than a short-term intervention, focusing on sustainable eating habits that support lasting metabolic and overall health.

Frequently Asked Questions (FAQ)

1. Is a low-carbohydrate diet dangerous for the heart?

No. Many studies show that low-carbohydrate diets can improve several cardiovascular risk factors, including blood sugar, triglycerides, and body weight.

2. Is it dangerous if I have reduced kidney function?

No. In fact, improving blood sugar control and insulin resistance may be beneficial for kidney health. As always, patients with known kidney disease should discuss dietary changes with their physician.

3. Why do I sometimes feel weak or tired when starting the diet?

This is usually due to temporary loss of fluids and electrolytes when carbohydrates are reduced. Increasing water intake and supplementing electrolytes (for example sodium, magnesium, or potassium) usually resolves the symptoms quickly.

4. Do I need supplements?

Ketogenic diet is a complete diet. However, many people on any diet benefit from magnesium supplementation. We also commonly recommend vitamin D supplementation (2,000–5,000 IU daily) unless levels are already adequate.

5. Do I need to measure ketones?

No. Measuring ketones is generally not necessary. What matters most is keeping total carbohydrate intake low, ideally below about 50 g per day.

6. Should I eat large amounts of fat?

No. Extremely high fat intake (“dirty keto”) is not recommended. Instead, aim for balanced meals based on natural whole foods, with normal portions of protein, healthy fats, and vegetables.

7. Is there an age limit for this diet?

No. A low-carbohydrate dietary approach can be used at most ages, provided it is balanced and adapted to individual health needs.

8. How long does it take to see benefits?

Initial adaptation usually takes a few weeks. In most people, about 3 months is sufficient to see meaningful benefits, including weight loss, improved metabolic markers, and sometimes improvement in inflammatory skin disease and overall well-being.