

# The Potential Benefits of Dietary Changes in Psoriasis Patients

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## PRACTICE POINTS

- Psoriasis is affected by lifestyle factors such as diet, which is an area of interest for many patients.
- Low-calorie diets are strongly recommended for overweight/obese patients with psoriasis to improve their disease.
- Changes in dietary patterns, such as adopting a Mediterranean diet or a plant-based diet, also have shown promise.

Psoriasis is a chronic inflammatory skin disease for which several lifestyle factors—smoking, alcohol use, and psychological stress—are associated with higher incidence and more severe disease.<sup>1-3</sup> Diet also has been implicated as a factor that can affect psoriasis,<sup>4</sup> and many patients have shown interest in possible dietary interventions to help their disease.<sup>5</sup>

In 2018, the National Psoriasis Foundation (NPF) presented dietary recommendations for patients based on results from a systematic review. From the available literature, only dietary weight reduction with hypocaloric diets in overweight or obese patients could be strongly recommended, and it has been proven that obesity is associated with worse psoriasis severity.<sup>6</sup> Other more recent studies have shown that dietary modifications such as intermittent fasting and the ketogenic diet also led to weight loss and improved psoriasis severity in overweight patients; however, it is difficult to discern if the improvement was due to weight loss alone or if the dietary patterns themselves played a role.<sup>7,8</sup> The paucity of well-designed studies evaluating the effects of other dietary changes has prevented further guidelines from being written. We propose that dietary patterns such as the Mediterranean

diet (MeD) and vegan/vegetarian diets—even without strong data showing benefits in skin disease—may help to decrease systemic inflammation, improve gut dysbiosis, and help decrease the risk for cardiometabolic comorbidities that are associated with psoriasis.

## Mediterranean Diet

The MeD is based on the dietary tendencies of inhabitants from the regions surrounding the Mediterranean Sea and is centered around nutrient-rich foods such as vegetables, olive oil, and legumes while limiting meat and dairy.<sup>9</sup> The NPF recommended considering a trial of the MeD based on low-quality evidence.<sup>6</sup> Observational studies have indicated that psoriasis patients are less likely to adhere to the MeD, but those who do have less severe disease.<sup>8</sup> However, a search of PubMed articles indexed for MEDLINE using the terms *Mediterranean diet* and *psoriasis* yielded no prospective interventional studies. Given the association of the MeD with less severe disease, it is important to understand which specific foods in the MeD could be beneficial. Intake of omega-3 fatty acids, such as those found in fatty fish, are important for modulation of systemic inflammation.<sup>7</sup> High intake of polyphenols—found in fruits and vegetables, extra-virgin olive oil, and wine—also have been implicated in improving inflammatory diseases due to potent antioxidant and anti-inflammatory properties. Individually, fruits, vegetables, whole grains, and sea fish have been associated with lowering C-reactive protein levels, which also is indicative of the benefits of these foods on systemic inflammation.<sup>7</sup>

## Vegan/Vegetarian Diets

Although fruits, vegetables, legumes, and whole grains are a substantial component of the MeD, there are limited data on vegetarian or purely vegan plant-based diets. An observational study from the NPF found that only 48.4% (15/31) of patients on the MeD vs 69.0% (20/29) on a vegan

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diet reported a favorable skin response.<sup>5</sup> Two case reports also have shown beneficial results of a strict vegan diet for psoriasis and psoriatic arthritis, where whole-food plant-based diets also improved joint symptoms.<sup>10-12</sup> As with any diet, those who pursue a plant-based diet should strive to consume a variety of foods to avoid nutrient deficiencies. A recent systematic meta-analysis of 141 studies evaluated nutrient status of vegan and vegetarian diets compared to pescovegetarians and those who consume meat. All dietary patterns showed varying degrees of low levels of different nutrients.<sup>13</sup> Of note, the researchers found that vitamin B<sub>12</sub>, vitamin D, iron, zinc, iodine, calcium, and docosahexaenoic acid were lower in plant-based diets. In contrast, folate; vitamins B<sub>1</sub>, B<sub>6</sub>, C, and E; polyunsaturated fatty acids;  $\alpha$ -linolenic acid; and magnesium intake were higher. Those who consumed meat were at risk for inadequate intake of fiber, polyunsaturated fatty acids,  $\alpha$ -linolenic acid, folate, vitamin E, calcium, magnesium, and vitamin D, though vitamin D intake was higher than in vegans/vegetarians.<sup>13</sup> The results of this meta-analysis indicated the importance of educating patients on what constitutes a well-rounded, micronutrient-rich diet or appropriate supplementation for any diet.

### Effects on Gut Microbiome

Any changes in diet can lead to alterations in the gut microbiome, which may impact skin disease, as evidence indicates a bidirectional relationship between gut and skin health.<sup>10</sup> A metagenomic analysis of the gut microbiota in patients with untreated plaque psoriasis revealed a signature dysbiosis for which the researchers developed a psoriasis microbiota index, suggesting the gut microbiota may play a role in psoriasis pathophysiology.<sup>14</sup> Research shows that both the MeD and vegan/vegetarian diets, which are relatively rich in fiber and omega-3 fatty acids and low in saturated fat and animal protein compared to many diets, cause increases in dietary fiber-metabolizing bacteria that produce short-chain fatty acids. These short-chain fatty acids improve gut epithelial integrity and alleviate both gut and systemic inflammation.<sup>10</sup>

The changes to the gut microbiome induced by a high-fat diet also are concerning. In contrast to the MeD or vegan/vegetarian diets, consumption of a high-fat diet induces alterations in the composition of the gut microbiota that in turn increase the release of proinflammatory cytokines and promote higher intestinal permeability.<sup>10</sup> Similarly, high sugar consumption promotes increased intestinal permeability and shifts the gut microbiota to organisms that can rapidly utilize simple carbohydrates at the expense of other beneficial organisms, reducing bacterial diversity.<sup>15</sup> The Western diet, which is notable for both high fat and high sugar content, is sometimes referred to as a proinflammatory diet and has been shown to worsen psoriasisiformlike lesions in mice.<sup>16</sup> Importantly, most research indicates that high fat and high sugar consumption appear to be more prevalent in psoriasis patients,<sup>8</sup> but the type of fat consumed in the diet matters. The Western diet includes abundant

saturated fat found in meat, dairy products, palm and coconut oils, and processed foods, as well as omega-6 fatty acids that are found in meat, poultry, and eggs. Saturated fat has been shown to promote helper T cell (T<sub>H</sub>17) accumulation in the skin, and omega-6 fatty acids serve as precursors to various inflammatory lipid mediators.<sup>4</sup> This distinction of sources of fat between the Western diet and MeD is important in understanding the diets' different effects on psoriasis and overall health. As previously discussed, the high intake of omega-3 acids in the MeD is one of the ways it may exert its anti-inflammatory benefits.<sup>7</sup>

### Next Steps in Advising Psoriasis Patients

A major limitation of the data for MeD and vegan/vegetarian diets is limited randomized controlled trials evaluating the impact of these diets on psoriasis. Thus, dietary recommendations for psoriasis are not as strong as for other diseases for which more conclusive data exist.<sup>8</sup> Although the data on diet and psoriasis are not definitive, perhaps dermatologists should shift the question from "Does this diet definitely improve psoriasis?" to "Does this diet definitely improve my patient's health as a whole and maybe also their psoriasis?" For instance, the MeD has been shown to reduce the risk for type 2 diabetes mellitus and cardiovascular disease as well as to slow cognitive decline.<sup>17</sup> Vegan/vegetarian diets focusing on whole vs processed foods have been shown to be highly effective in combatting obesity, type 2 diabetes mellitus, coronary artery disease including severe atherosclerosis, and hypertension.<sup>18</sup> Psoriasis patients are at increased risk for many of the ailments that the MeD and plant-based diets protect against, making these diets potentially even more impactful than for someone without psoriasis.<sup>19</sup> Dietary recommendations should still be made in conjunction with continuing traditional therapies for psoriasis and in consultation with the patient's primary care physician and/or dietitian; however, rather than waiting for more randomized controlled trials before making health-promoting recommendations, what would be the downside of starting now? At worst, the dietary change decreases their risk for several metabolic conditions, and at best they may even see an improvement in their psoriasis.

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CONTINUED ON PAGE 96

COMMENTARY

CONTINUED FROM PAGE 69

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