

Nutrition and Rheumatoid Arthritis **By Kristine Duncan, MS, RD, CDE**

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Rheumatoid arthritis (RA) belongs to a family of rheumatic diseases linked by inflammation and loss of function that affect joints, connective tissue, and other supporting body structures. Specifically, RA targets the lining of the joints, resulting in pain, swelling, stiffness, and deformity, though its effects are systemic.

Of the 1.3 million adults in the United States with RA, about three-quarters are women.¹ The disease most often occurs between the ages of 40 and 60, but it can be diagnosed in younger patients.²⁻⁴ All races and ethnic groups have reported cases of the condition, and while it's less prevalent than osteoarthritis, RA is associated with lower health-related quality of life.⁴⁻⁶

Causes, Symptoms, and Treatment

While the cause of RA is unknown, there are several hypotheses. It's believed certain genes make some people more susceptible to the condition and that there may be infectious triggers, such as bacteria or viruses in the environment.⁷ Other potential risk factors include age, smoking, sex, and family history, while hormones may protect some women against the condition.^{2,4,7,8}

Like multiple sclerosis and type 1 diabetes, RA is an autoimmune disease. When the immune system attacks the joint lining (synovium), the resulting localized inflammation causes common RA symptoms, but systemic inflammation appears to be present as well.²

RA first appears in the small joints of the feet and hands but can progress and involve larger joints, often in an overall symmetrical pattern. Over time, the disease process permanently damages bones and joints.² Other symptoms can range from anemia, fever, eye inflammation, infection, and fatigue to more rare conditions such as vasculitis, pericarditis, and pleurisy.^{1,2,4,8,9}

The disease can be unpredictable; it often alternates between flare-ups and periods of remission but also can be unremitting.⁸

The goals of medical management for RA include relieving pain, decreasing inflammation, slowing or stopping joint damage, and increasing a patient's sense of well-being and ability to function, with complete remission if possible. Treatment approaches vary for each patient but often consist of some combination of pharmacotherapy, surgery, and lifestyle modifications, such as rest, exercise, stress management, and diet.⁴

Considering diet as part of RA treatment is gaining ground, and while there isn't one specific RA diet, many patients are curious about how nutrition may play a role. Since there's growing interest in the idea that some particular foods may help address symptoms, dietitians can

provide needed guidance and expertise. Along with rheumatologists, orthopedists, physical therapists, occupational therapists, nurse educators, and psychologists, dietitians can be a valuable part of the treatment team for RA patients.⁴

Nutrition Assessment

RA may impair nutritional status in some patients.¹⁰⁻¹² The standard steps of a nutrition assessment, starting with anthropometrics, can serve as a guide for dietitians working with these patients.

Body Weight

BMI factors prominently in RA. Obesity is associated with poorer outcomes and more comorbidities in RA patients, while weight loss and cachexia also are common.¹³⁻¹⁵ It has been estimated that approximately 60% of RA patients have a BMI under 25, which means the other 40% would be considered overweight or obese.¹⁰

Because of the complexities of assessing weight status in an older population, it's recommended that dietitians use two or more of these assessment indicators when working with older RA patients: current weight, recent changes in weight, weight history, BMI, height, waist circumference, and body composition.¹⁶

Labs

A review of recent lab work can help dietitians create a complete picture of a patient's disease state. Commonly, the primary health care provider will order some combination of tests, including rheumatoid factor, anticyclic citrullinated peptide antibodies, complete blood count, white blood cell count, erythrocyte sedimentation rate, and antinuclear antibodies.

However, there are several other lab tests that may be of particular interest to the dietitian, including homocysteine, C-reactive protein, albumin, and lipids. Homocysteine and C-reactive protein can indicate inflammation and may be influenced by dietary choices. Albumin levels tend to be lower in RA patients, while inflammatory markers are higher, especially during periods of increased disease activity.¹⁷⁻²⁰ Other findings show elevated triglycerides⁵ and differences in lipoprotein subclasses²¹ in RA patients.

It's important to note that erythrocyte sedimentation rate and C-reactive protein can be significantly higher in malnourished patients.¹⁰

It's also necessary to consider the disease state when interpreting lab values. Blood lipids in particular can change during periods of active disease. Data suggest that LDL and HDL cholesterol levels can be unusually low in RA patients but will return to normal as the patient enters periods of improvement.^{5,22}

Activities of Daily Living

While dietitians rarely carry out complete physical assessments, a superficial visual evaluation of a patient's appearance may offer clues about wasting or changes in appetite. In addition, the telltale rheumatoid nodules on the hands may prompt questions about the ease of shopping, cooking, eating, and other related activities of daily living that can affect a patient's nutritional status.

For RA patients aged 65 and older, 79% report some limitation of activities related to their health compared with 67% of those with osteoarthritis and 57% of those without arthritis.⁶

Diet History

In addition to the traditional questions about food and beverage choices, allergies, and intolerances, a discussion of current and past diet strategies can be valuable in this population. Diet has been studied as a possible modifiable risk factor for RA, and many patients already may have experimented with their diets on their own. The most common eating strategies attempted by some people with RA are vegetarian, vegan, Mediterranean, elemental, and elimination.²³

RA patients often adopt dietary changes with hopes of symptom improvement.^{23,24} The idea that diet may affect inflammation is beginning to gather scientific support, which positions diet as a potential treatment for RA in particular.²⁵ As the science has advanced over the years, diet has continued to gain favor as a possible way to affect this disease,²⁴ so it may seem like a new treatment option compared with the standard choices. Patients also can be motivated to try diet modifications because pharmaceutical treatments can cause undesirable side effects.

Medications

Since there's no cure for RA, the primary treatment strategy relies on the use of drugs to try to control pain and minimize additional joint damage. During a nutrition assessment, it's important for dietitians to consider a patient's drug regimen since many can have nutritional consequences.

The three main classes of medications used to treat RA are disease-modifying antirheumatic drugs (DMARDs), anti-inflammatories, and analgesics. Because the drugs often have multiple functions, there's some overlap in how they're categorized and prescribed.

DMARDs such as methotrexate and sulfasalazine often are the first line of defense after an RA diagnosis.^{1,3} One particular class of DMARDs, biologic response modifiers, targets the immune system and works in a variety of ways. Abatacept (Orencia) interrupts communication between inflammatory cells, and rituximab (Rituxan) tries to stop the immune system's attack on the joints, while tumor necrosis factor antagonists such as adalimumab (HUMIRA) work by blocking inflammatory proteins.^{4,26,27}

Aspirin and other NSAIDs often are used in conjunction with DMARDs to control both inflammation and pain.^{1,3} Steroids such as prednisone are classified as anti-inflammatories and generally are reserved for disease flare-ups because of serious side effects.²

These drugs are powerful tools in the treatment of RA, but they aren't without difficulties. While all drugs carry some risk of side effects, a review of nutrition-related side effects in particular is advisable so dietitians can assess the impact on patients' food intake.

About 1% to 3% of patients taking methotrexate experience mouth sores (stomatitis), while other DMARDs are associated with abdominal pain, loss of appetite, vomiting, sore tongue, and nausea.^{28,29} And because of their effect on the immune system, biologic response modifiers can put patients at increased risk of infection.³

Stomach irritation, ulcers, and bleeding sometimes accompany NSAID use.^{3,4} One particular NSAID, celecoxib (Celebrex), carries some risk of heart attack and stroke, which must be considered for each individual's situation.³ When using steroids, patients often complain of increased thirst and weight gain but also can experience hyperglycemia.^{2,29}

In addition to nutrition-related side effects, dietitians should be on the lookout for drug-nutrient interactions in this population. For instance, methotrexate is a folic acid antagonist, so deficiency is a concern with ongoing use.²⁹ This can be addressed with supplements, and the use of folic or folinic acid has been shown to reduce side effects associated with this medication, specifically gastrointestinal problems, liver dysfunction, and possibly even stomatitis.^{28,30} Also, corticosteroids can reduce sodium excretion while simultaneously increasing calcium and potassium losses, so dietary adjustments may be necessary.²⁹ To minimize the risk of osteoporosis associated with long-term corticosteroid use, vitamin D and calcium supplements sometimes are recommended.^{4,29}

Supplements

Even though RA medications are effective, many people try supplements or other therapies with the hope of reducing inflammation and pain. One-quarter of the RA patients participating in a nutrient intake study were taking vitamin supplements when they began the trial, and a significant number of adults older than age 75 took more than one dietary supplement.^{10,16} However, the scientific evidence regarding the effectiveness of most supplements, such as feverfew, stinging nettle, and cat's claw, is limited or preliminary or has failed to demonstrate definitive benefits for RA patients.^{4,31}

Dietitians should keep in mind that there are safety concerns, side effects, and drug interactions associated with supplements.^{31,32} For example, even though thunder god vine has demonstrated positive effects on the immune system, its significant list of serious side effects makes it too risky to justify its benefits.³²

There's promising early research on boswellia, ginger, green tea, and turmeric for addressing RA symptoms but not enough to recommend them as treatments, especially in supplement form.³² However, it would be safe to include food items such as ginger, green tea, and turmeric in the diet, with measured expectations.

Ultimately, because of the FDA's limited ability to regulate or verify effectiveness or safety, the American College of Rheumatology doesn't recommend using herbal remedies to treat RA.³¹

Fluids

Regular fluid intake in RA patients should be addressed for several reasons. First, intake for older adults often falls short of recommended targets, possibly due to diminished perception of thirst or changes in cognitive status. Also, patients consciously may limit intake to minimize trips to the bathroom to avoid the associated arthritis pain.¹⁶

Because of concerns about liver damage and gastrointestinal bleeding, alcohol should be avoided while taking acetaminophen, NSAIDs, and methotrexate, and possibly other medications used to treat RA.^{4,28,33}

Other Considerations

Patients' sex, economic status, and mental health status also should be considered as part of a nutrition assessment. Women can experience more adverse effects from RA than men, particularly with regard to disease severity, work disability, and remission rates.³⁴ The disease can negatively affect employment,⁸ which can significantly impact finances. In fact, one study found that self-reported weight-related disability and arthritis correlated with twice the risk of being food insecure.³⁵

Coping with chronic pain can be a heavy burden. Besides affecting adherence to a treatment plan, the depression and anxiety reported among RA patients can impact nutritional status.^{8,9}

Nutrition Diagnosis

Using data collected during the nutrition assessment, dietitians can prioritize nutrition-related concerns to formulate a plan of intervention for RA patients.

Several comorbidities can present with RA, the most common and well documented being cardiovascular disease. It's estimated that 40% of deaths in RA patients can be traced to cardiovascular disease, though it's unknown whether this comorbidity results from the disease process, the medications used to treat the condition, or another link, including inflammation.^{5,8,20,36-38} Possible causes of cardiovascular disease in patients with arthritis include undesirable lipid values paired with chronic inflammation, endothelial dysfunction, or abnormal homocysteine metabolism.^{18,19,21,37} Also, hypertension, dyslipidemia, and arthritis are the three most prevalent health conditions among older adults,³⁹ so there's a strong possibility of risk factor overlap in this age group.

Osteoporosis is a risk because of RA itself but can be compounded by the addition of medications commonly used as part of RA treatment, such as oral glucocorticoids.^{2,4,40} Again, systemic and localized inflammation likely are the culprits of osteoporosis, as there appears to be bone loss not only in affected joints but in other areas of the body as well. Fracture risk is higher for patients with longstanding RA or a low BMI.⁴⁰

Two issues of special interest with this population are rheumatoid cachexia and weight loss. Rheumatoid cachexia is the loss of body cell mass, principally in skeletal muscle.³⁶ While the exact etiology is unclear, hypermetabolism and reduced energy intake have been suggested.^{12,14} In particular, there seems to be a significant loss of fat-free mass influenced by the frequency, duration, and intensity of disease flare-ups.¹⁴ There also appears to be a higher resting energy expenditure during times of increased disease activity, possibly tied to levels of interleukin-6.¹⁵

There are consequences of extreme weight loss, as a BMI below 20 is tied to increased cardiovascular mortality.³⁶ Nutrition intervention can help achieve a BMI in the normal range, though controlling disease activity may be more effective.¹⁵

Temporomandibular disorder, which affects the muscles and joints used to move the jaw, and Sjögren's syndrome, an autoimmune disease that diminishes production of saliva and tears, can be present with RA as well.^{1,3,9,12,29} The likely nutrition-related concerns are difficulty chewing or dry mouth, respectively.²⁹

Nutrition Intervention

For nearly 90 years, diet has been suggested as a possible treatment for RA.²⁴ As with diabetes, some research suggests that metabolic and cellular changes occur early in the disease process, even before diagnosis, and that cardiac events affect young adults with RA early on.^{18,20,38} Whether or not a specific nutrient or diet can influence this disease, correcting nutrient deficiencies and addressing comorbidities are sensible priorities.⁴¹ Assessing and adjusting nutritional intake soon after a diagnosis is ideal.

Calories

To avoid the pitfalls of both obesity and underweight, care should be taken when estimating energy needs for RA patients, as there may be subtle metabolic differences between those with and without the disease. Calorie needs decrease with age, but it's possible that they may increase to some extent for individuals with RA, mirroring changes in disease activity.^{14,15}

One study reported that patients with active RA experienced a resting energy expenditure only 1% higher compared with control patients. But when corrected for fat-free mass, the difference in resting energy expenditure was significant, with 62 kcal/kg of fat-free mass per day for those with RA compared with 46 kcal/kg for the controls.¹⁵

Even though resting energy expenditure is elevated due to hypermetabolism, physical activity expenditure can be 250 kcal lower in women with RA, which would affect total energy expenditure.^{42,43} As a result, increased energy intake isn't advised, especially with the risk of fat accumulation, leading to possible overweight or obesity, which can be especially risky in these patients.^{13,42}

Some research has shown that lower fat-free mass is responsible for lower BMI in RA patients, and that increased disease and metabolic activity may speed the loss.¹⁵ In rheumatoid cachexia, loss of fat-free mass often occurs without weight loss or a reduction in calorie intake and, in some cases, occurs with a gain in fat mass.⁴³

Whatever the cause, preserving fat-free mass is essential, particularly to minimize the risk of infections and death and to maintain quality of life.^{14,43} This generally can be achieved with exercise, diet, and pharmacological interventions.⁴³

Determining the appropriateness of weight-loss intervention in older adults takes careful consideration of risks vs benefits, with attention given to patients' classification as overweight or obese, the presence of comorbidities, physical and cognitive function, attitude toward longevity, lifestyle, desired quality of life (eg, improved mobility) and, ultimately, personal feelings about undertaking weight loss. While it may seem obvious to initiate weight loss for an obese client, muscle loss can be augmented in older adults, which can negatively affect their capacity for independent living.¹⁶

Protein

While the Recommended Dietary Allowance for protein is sufficient for most seniors, some experts advocate that they consume as much as 1 to 1.6 g/kg of body weight to minimize the loss of muscle mass.¹⁶

So far, an optimal protein intake for the RA population hasn't been identified.⁴³ Dietitians can rely on the available guidelines to establish an individualized target for their clients.

Fats

Healthful monounsaturated fats may benefit RA patients, particularly olive oil, which often is credited with some of the health benefits associated with the Mediterranean diet, possibly due to its antimicrobial, anti-inflammatory, and antioxidant properties.⁴⁴⁻⁴⁷ Oleocanthal, along with other phenolic compounds in the oil, may be responsible for the benefits, as it's been shown to inhibit some of the same inflammatory pathways as does ibuprofen.^{44,45}

Based on their reputation for possibly modulating the inflammatory response, omega-3s also have been touted as a possible treatment for RA.⁴⁸ Study participants have reported improvement in morning stiffness and tender joints when taking omega-3 supplements, which also may result in less reliance on NSAIDs or corticosteroids.^{32,48-50} However, according to the American College of Rheumatology, the results aren't dramatic and may take weeks or months to occur.³¹

Because of the positive effects related to cardiovascular disease and inflammation,^{48,51} fish or fish oils could offer a double benefit for this population. However, studies on the specific dose needed to positively affect the inflammatory process are lacking.⁵² One study examined the effects of 1-g fish oil supplements in female RA patients and found an increase in their HDL cholesterol levels.⁵³ However, a review of nondrug treatments concluded that diets rich in omega-3 fats, as well as other therapeutic diets, shouldn't be recommended for RA patients because of inconsistent and modest results improving pain and stiffness and the risk of deficiency from being "unbalanced."⁴¹

There are no specific guidelines for saturated fat intake for patients with RA, although its consumption has been positively associated with inflammatory markers such as C-reactive protein and interleukin-8.^{54,55}

Fat intake may influence inflammation in the body in other ways as well. The high ratio of omega-6 to omega-3 fatty acids common in the Western diet is considered proinflammatory,⁵⁶ while the omega-6 gamma-linolenic acid is thought to be potentially anti-inflammatory. Gamma-linolenic acid is found in black currant, borage, and evening primrose supplements but needs more study before being suggested for RA patients to address inflammation.³²

Given this information, a safe course of action for dietitians likely would be recommending the standard levels of dietary fat appropriate for preventing or treating cardiovascular disease or at least attempting to manage existing dyslipidemia if present,¹⁸ giving special attention to management of cardiac risk factors in RA patients with low BMI or who are losing weight.³⁶

Vitamins and Minerals

Although clinical practice guidelines lack strong support for treating RA with nutritional supplements,⁵⁷ it makes sense for patients to maximize their nutrient intake from food and possibly rely on supplements to address RA comorbidities.

Low vitamin B₆ and high homocysteine levels have been found in older women with RA. It's believed that a low intake or low blood values of folate and vitamins B₆ and B₁₂ correlate with elevated homocysteine, which is a risk factor for cardiovascular disease. In addition, some medications commonly prescribed for RA can positively or negatively affect homocysteine levels.¹⁹

Some women with RA also report suboptimal intakes of vitamin B₆, calcium, folic acid, zinc, magnesium, iron, and vitamin B₁₂ compared with the Dietary Reference Intakes (DRIs), and serum levels of zinc, selenium, and vitamins A and E can be low.^{10,11,25}

As mentioned earlier, adequate folate intake especially is important for RA patients being treated with methotrexate, so folate supplementation may be necessary.³⁰ Because of the increased risk of osteoporosis, adequate vitamin D and calcium intakes are an important part of any nutrition intervention for the condition.⁴

Antirheumatic treatment is suggested for anemia associated with RA, and iron supplements are contraindicated.^{58,59} At this time, there's no evidence to support recommending to patients vitamin or mineral intakes higher than the DRIs.

Fruits and Vegetables

Older adults can encounter unique barriers to increased fruit and vegetable consumption, including financial and functional limitations, dental problems, and difficulty shopping and cooking. Antioxidant intake may be of particular importance for this age group, as appropriate intake is tied to fewer degenerative diseases and improved physiologic function.¹⁶ In addition, foods rich in antioxidants, including fruits and vegetables, can help mediate inflammation⁵⁵ and provide important vitamins and minerals.

Cherries have received particular attention for their possible health benefits associated with RA, including lowering inflammatory markers such as C-reactive protein and nitric oxide.⁶⁰ More research is needed before cherries can be considered a viable treatment for the condition,⁶¹ but they can be included in the diet to increase fruit consumption.

Dietary Patterns

In addition to highlighting individual nutrients, overall dietary strategies have shown some success in improving RA symptoms. While the research on vegetarian, vegan, Mediterranean, elemental, or elimination diets—those most commonly tried by this patient population—has been described as inconsistent, inadequate, modest, uncertain, inconclusive, not indicated, and having no definite benefit, dietary strategies in general have been noted as inexpensive, promising, worth trying, achievable, feasible, and a useful addition to traditional therapy.^{4,23,24,32,41,46,47,50,57,62} Hypotheses for the diet's role in addressing RA include changes in antioxidant or fat intake, body weight, and gut flora; limiting exposure to particular foods that exacerbate arthritis symptoms; and reduction in gut permeability to bacteria and antigens.^{24,47,63}

Earlier studies have found that some RA patients experienced pain reduction by following a vegetarian- or Mediterranean-style diet after a period of fasting.^{23,47,62,64} It's possible that dietary choices either suppress or enhance the inflammatory process through effects on individual markers in the blood or the immune system.^{25,55,65,66}

The Mediterranean diet, which is rich in plant foods, fish, and olive oil and low in red meat, has shown a reduction in pain and disease activity with a simultaneous increase in physical function and vitality.²⁴ Specifically, this type of eating, which is considered nutritionally adequate, may offer RA patients a key benefit since it also can improve cardiovascular risk

factors.^{46,47} Similarly, a vegetarian eating pattern is thought to provide a higher intake of fruits, vegetables, and antioxidants and a lower intake of saturated fat.²⁴

Though no single diet has emerged as a successful strategy for treating RA patients, it's possible that individuals may have unique intolerances or allergies to particular foods that contribute to their RA symptoms.^{3,32} Results are mixed for elimination diets,^{23,24} though some researchers have concluded they aren't advised for the RA population.^{41,57}

However, if patients keep food records for an overall dietary assessment, dietitians can review them for potential problem foods. One follow-up study of subjects with RA identified an increase in symptoms after the reintroduction of meat, coffee, sweets, and refined sugar to the diet.²⁵ Other researchers identified rice, cornmeal, cornbread, hydrolyzed milk, fresh pineapple, and cooked apple as hypoallergenic, and wheat, eggs, milk, strawberries, acidic fruits, chocolate, shellfish, and dried fruit as allergenic in a diet trial for RA.⁶⁷ Though no significant improvement resulted for this group as a whole, there were individual subjects who responded well, and the authors highlighted the importance of individualized treatment.

Two studies reported on using an elemental diet, a liquid diet of easily absorbable nutrients that provides amino acids in place of intact proteins, as a short-term treatment for RA and found some improvement in disease symptoms. Unfortunately, the benefits were lost once regular diets were reinstated, and there was a high drop-out rate.²⁴ Another study found a two-week elemental diet to be as effective as corticosteroids in affecting subjective measures of disease activity but not in laboratory tests such as erythrocyte sedimentation rate and C-reactive protein.⁶³

As with many hopeful treatments for chronic disease, diet therapy for RA requires more and longer studies before specific practice guidelines can be developed. Nevertheless, dietitians can provide guidance and encouragement and also can help ensure nutritional adequacy for clients wanting to experiment with diet changes. For some patients, taking this type of action can offer a feeling of control over what often is an overwhelming diagnosis.^{24,50} It's common for people with RA to gravitate toward foods that are easy to prepare and eat,⁶⁸ so providing new ideas for healthful recipes that meet these criteria may be especially well received.

Even if there isn't a unique food pattern that improves RA, a balanced diet is recommended for optimal health. So it makes sense for dietitians to review with clients recommendations such as the 2010 Dietary Guidelines for Americans while stressing that they achieve or maintain an appropriate body weight and include plenty of fruits, vegetables, whole grains, and calcium-rich foods in their diets.¹⁰ As with any nutrition intervention, dietitians should discuss the possible benefits and risks while also considering patients' readiness to change.

Associated Difficulties

Helping clients prepare for the difficulties associated with dietary change can be effective. A review of 15 studies warned that the types of diets patients with RA often experiment with may be challenging to maintain, and that many result in approximately 6 lbs of unintended weight loss.^{23,47} Depending on a patient's status, this weight loss could be positive or negative. Of course, if the patient undertook significant dietary changes without adequate preparation, deficiencies could surface as well.

It's recommended that dietitians involve the patient's whole family in the discussion of food and cooking, as social relationships can be the primary obstacle to sustained dietary change among RA patients. Although not unique to RA, altering established eating and shopping patterns inside and outside the home because of medical issues can embarrass and inconvenience a patient and may result in disapproval or resistance from family members or social circles.⁶⁹

Referrals and Resources

Making appropriate referrals and offering additional resources also is an important part of dietitians' work with RA patients. For instance, an occupational therapist can recommend assistive devices for the kitchen, and a fitness expert can encourage exercise with necessary adaptations. The Arthritis Foundation and American Heart Association also have useful diet information available for patients such as choosing foods to fight inflammation and identifying sources of healthful fats and oils.

Nutrition Monitoring and Evaluation

Ongoing monitoring will allow dietitians to reevaluate RA patients' nutrition care plans. Changes in patients' medication regimens may necessitate additional counseling on nutrition-related side effects and medication-nutrient interactions.

The following are basic nutrition management goals for RA, but variations are possible based on individual patients:^{3,4,6,14,38,41,70}

- achievement of nutritional adequacy and correction of nutrient deficiencies;
- management of medication side effects and medication-nutrient interactions;
- achievement and maintenance of a healthy BMI while preserving fat-free mass;
- prevention or treatment of comorbidities such as cardiovascular disease and osteoporosis;
- reduction of pain and inflammation; and
- optimization of food-related activities of daily living and quality of life.

Final Thoughts

While comprehensive nutrition practice guidelines are limited for RA, there are areas within dietitians' scope of practice that can be targeted to help patients. But RA is a costly diagnosis,⁸ so it's possible that nutrition counseling may be considered an unnecessary cost and left out of the treatment plan unless the dietitian advocates for it. And diet change can be challenging for anyone, let alone for those struggling with a debilitating chronic disease. Despite successful education, an overburdened patient who's trying to cope with multiple comorbidities and medications may have limited success. Motivational interviewing, for example, may help patients identify what change they're ready to make to help improve their diagnosis and daily lives.^{71,72} This client-centered counseling can shift decision making away from the clinician to the individual. When executed skillfully, this can guide the client to find internal motivation instead of relying on the dietitian exclusively to foster external rationale for change.⁷²

Moreover, there are some areas of research on the horizon that may affect nutrition practice and RA in the future. The relationship of gut flora to inflammation and the immune system is gaining scientific ground.^{66,73,74} And some scientists have suggested that each person's gene profile will determine his or her response to various interventions, even dietary approaches.^{75,76} Epigenetics and genetic testing may someday lead to the ultimate in personalized nutrition recommendations for RA.

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[Click here](#) for tip sheet "Nutrition Considerations for Patients With Rheumatoid Arthritis."

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Examination

1. Jordan's rheumatologist added a new medication to her regimen one month ago because of a particularly bad flare-up of her rheumatoid arthritis (RA). Since then, she's gained about 5 lbs and has been experiencing higher-than-normal blood sugar. What medication likely is responsible for her new onset of symptoms?

- A. Abatacept
- B. Celecoxib
- C. Prednisone
- D. Sulfasalazine

2. Wendy has been taking methotrexate for two years to treat her RA. During your initial nutrition assessment, Wendy reports that she's not taking any vitamin or mineral supplements and instead tries to eat well. What supplement could you recommend to minimize a medication-nutrient interaction and possible deficiency?

- A. Folic acid
- B. Selenium
- C. Zinc
- D. Vitamin A

3. Which nutritionally adequate diet that is high in plant foods, fish, and olive oil, and low in red meat has been studied as a treatment for RA and also may improve cardiovascular risk?

- A. Elemental
- B. Gluten-free
- C. Mediterranean
- D. Vegan

4. As part of an individualized nutrition assessment of an RA patient, in addition to body weight, labs, activities of daily living, diet history, and medications, which of the following should you also consider?

- A. Protein efficiency ratio
- B. Sex
- C. Season/time of year
- D. Sleep habits

5. Which highly individualized and variable factor can affect lab values, resting energy expenditure, and rate of fat-free mass loss in an RA patient?

- A. Activities of daily living
- B. Age at diagnosis
- C. Alcohol intake
- D. Level of disease activity

6. Which of the following has been suggested as the primary obstacle to sustained dietary change in RA patients?

- A. Allergies and intolerances
- B. Cost of special foods
- C. Mental health status
- D. Social relationships

7. Which of the following could be considered an appropriate nutrition management goal for most RA patients?

- A. Correction of nutrient deficiencies
- B. Increase in gamma-linolenic acid intake
- C. Minimization of carbohydrate intake
- D. Prevention of gallstone formation

8. Since retirement, Sheena has gained more than 30 lbs. Now she's wondering if losing weight would help her RA symptoms. What is one possible unintended consequence of implementing weight loss in an obese older adult?

- A. Associated muscle loss
- B. Increased fat-free mass
- C. Decreased HDL cholesterol
- D. Decreased C-reactive protein

9. What seems to be the most likely condition linking RA with cardiovascular disease and osteoporosis?

- A. Fever
- B. Hyperalbuminemia
- C. Inflammation
- D. Pellagra

10. After an initial assessment of a patient who's had RA for more than 20 years, you note a BMI of 18.5. What three comorbidities would be your primary concern for further assessment and possible intervention?

- A. Anemia of chronic disease, eye inflammation, and infection
- B. Bone fracture, cardiac death, and rheumatoid cachexia
- C. Depression, heartburn, and nausea
- D. Malnutrition, pericarditis, and vasculitis