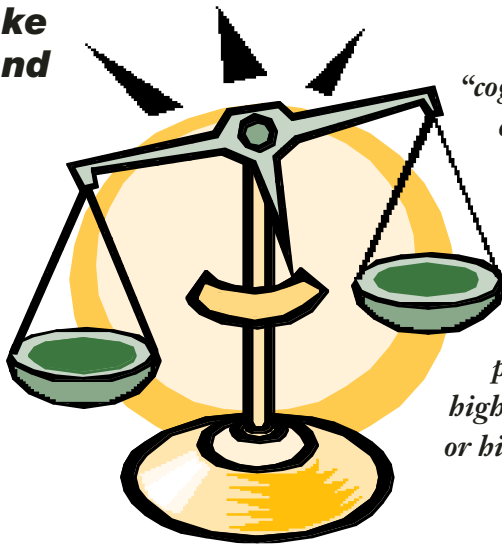


# NUTRITION

## The Health Professional's Guide to High Protein Diets

### What is a healthy intake of carbohydrate, fat and protein?


The Institute of Medicine (IOM) established an Acceptable Macronutrient Distribution Range for Healthy Diets (AMDR) in 2002. An AMDR is defined as a range of intakes that is associated with reduced risk of chronic disease while providing adequate intakes of essential nutrients. The AMDR for fat is 20-35% of energy and for carbohydrate is 45-65% of energy for all adults. The Institute of Medicine discusses the health risks of a high carbohydrate intake in their report on Dietary Reference Intakes. It is reported that *“When fat intakes are low and carbohydrate intakes are high, intervention studies and epidemiological studies demonstrate a reduction in plasma HDL cholesterol concentration, and an increase in plasma triacylglycerol concentration, all consistent with an increased risk of coronary heart disease (CHD). Conversely, intervention studies show that when fat intakes are high, many individuals gain weight. Weight gain on high fat diets can be detrimental to individuals and worsen metabolic consequences of obesity, particularly risk of CHD. By consuming fat*



*“cognitive feelings of less hunger and greater satiety were noted in subjects ingesting high protein foods vs. high carbohydrate or high fat foods.”*

*and carbohydrate within these ranges, the risk of CHD, as well as obesity and diabetes may be kept at a minimum.”*

Adequate carbohydrate intake must support the minimum recommended intake of carbohydrate needed for brain function, 130 grams daily. Carbohydrate rich foods are valued dietary components that contribute essential vitamins and minerals, highly digestible energy and are sources of fiber in the diet. An Adequate Intake (AI) for total fiber was established by the IOM at the level of 25 grams for young women and 38 grams for young men.

The AMDR for protein was then derived from the remaining percentage of energy intake as 10-35% of calories. The IOM found insufficient evidence to establish an upper level for protein and insufficient data to set an upper limit for an AMDR for protein. In their report on Dietary Reference Intakes (part 1), The IOM states *“The risk of adverse effects resulting from excess intakes of protein from foods appears to be very low at the highest intake noted (2.7g/kg/day).”* Therefore any protein intake may be considered high protein above the RDA of 0.8g/kg/day. 

### In This Issue ...

Controlling Calories and Fat on High Protein Diet  
**pg. 2**

Benefits and Concerns of the High Protein Diet  
**pg. 3**

Conclusions  
**pg. 4**

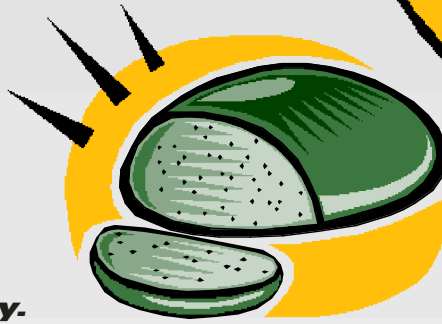
Popular Diet Continuum  
**pg. 5**

Definitions of Protein Terms  
**pg. 6**

# How to Control Calories and Saturated Fat While Following a High Protein Diet

- **Choose fats wisely.**

High protein does not have to mean high saturated fat. When choosing a snack food, it is wise to choose nuts which offer beneficial oils such as monounsaturated fat. Using canola, corn or olive oil are good choices for coating pans or making salad dressings. Many salad dressings and spreads are available that contain these beneficial fats and do not contain trans fatty acids.

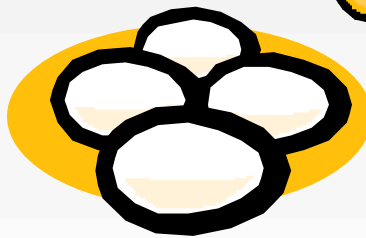
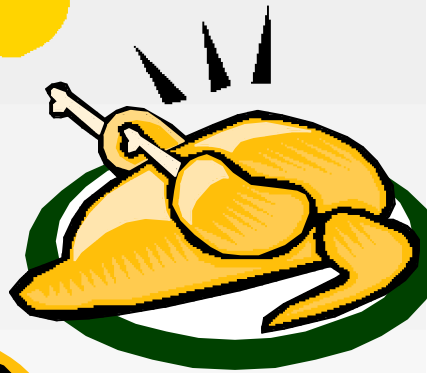


- **Choose carbohydrates wisely.**

Rather than eliminate all sources of carbohydrates, it is important to choose healthful sources of carbohydrates that provide fiber, vitamins and minerals such as whole grain pastas, brown rice, beans, whole fruits especially berries, and fibrous vegetables such as broccoli, spinach and celery.



- **Choose protein wisely.** Not all proteins are alike. Animal proteins supply all the essential amino acids that are needed to synthesize body protein. It is preferable to choose lean meats, fish, chicken, turkey, eggs and part-skim milk cheese when planning a meal to provide high quality protein, minerals and vitamins while low in saturated fat. Eggs are an excellent source of high biological value protein and are one of the least expensive sources of high quality protein. 🍳



# Benefits and concerns related to high protein diets:

## Benefits:

- **Satiety:** As good as any diet is nutritionally, it will not be a long term success without satiety. Satiety is the feeling of satisfaction from hunger that one experiences after one's physiological and psychological needs have been met. One reason for the success of high protein diet is that it is able to reduce the dieter's desire to eat and makes them more comfortable while losing weight. Many dieters who had some success on high carbohydrate weight control diets struggled with the feeling of deprivation and a frequent desire to snack. Dieters report that a higher protein, higher fat, lower carbohydrate intake makes them more comfortable between meals, satisfies appetite quicker at meals and reduces the need to snack all leading to a reduced caloric intake. Minimizing simple and refined carbohydrate intake blunts the dieter's insulin response preventing sharp increases in insulin output, thereby maintaining adequate blood glucose levels between meals, leading to a reduction of hunger sensation. Johnston et al. (*J Nutr*; 2004, 134: 586-591) found "cognitive feelings of less hunger and greater satiety were noted in subjects ingesting high protein foods vs. high carbohydrate or high fat foods."
- **Fat metabolism:** The rate of lipogenesis (adipose tissue storage) is depressed when fat intake is high or when insulin output is diminished. Fat in the diet also slows the process of lipogenesis in the liver. Additionally, insulin acts to inhibit lipolysis (breakdown of fat) in fat tissue and thereby reduces the concentration of plasma free fatty acids. High concentrations of free fatty acids in the blood are needed to inhibit lipogenesis in adipose cells. Therefore, a high protein, high fat, low carbohydrate intake will decrease fat storage and prevent insulin from inhibiting the breakdown of stored fat. (Harper's Biochemistry, 24th ed.1996)
- **Bone tissue health:** There is a strong positive correlation between protein intake and urinary calcium output. It was previously believed that the excess urinary calcium originated from the bone because the acid generated by dietary protein required buffering and bone tissue provided that buffer in the form of calcium. However the preponderance of research has found that high bone mineral density is associated with diets high in protein. In fact, Kerstetter et al. (*Clin Nutr* 2004 19: 1:57-70) in a review of the literature found that increasing dietary protein has a beneficial relation to skeletal health.
- **Blood Glucose response:** A high protein diet has been found to lower blood glucose postprandially in persons with type 2 diabetes and improves overall glucose control. When subjects with type 2 diabetes were fed a diet consisting of 30% vs.15% calories from protein the plasma glucose concentration was consistently and significantly lower after the high protein diet, particularly in the evening. (Gannon et al. *Am J Clin Nutr*; 2003, 78: 734-41)

## Concerns and Solutions:

- **Concern: Vitamin and Mineral Adequacy:** The concern for nutritional adequacy is mainly during the initiation or early stage of the popular high protein, high fat, low carbohydrate diets. Due to a reduction in fruit, vegetable, dairy and whole grains foods it is very difficult to consume adequate calcium, riboflavin, niacin, thiamin and often vitamin C.
- **Solution:** More liberal high protein diet plans allow for tomatoes, tomato products and dark green vegetables which are good sources of vitamin C and offer some fiber as well. Although not permitted on some high fat diets, many high protein diets allow unsweetened, low fat dairy products which provide some calcium. In fact, according to Kerstetter et al. (*Top Clin Nutr*; 2004, 19: 57-70) calcium needs may be reduced due to an increase in intestinal calcium absorption with a high protein intake. A vitamin and mineral supplement is often recommended during the initial phase of most weight reduction programs.
- **Concern: Need for Fiber:** Diets lacking in adequate fiber have been associated with increased colon cancer risk.
- **Solution:** Since the high protein, low carbohydrate diets do encourage greater intake of less processed and refined carbohydrates, the result could be an increase in fiber intake for the individual that consumed highly refined carbohydrates before beginning the high protein dieting program. During the weight maintenance phase, the high protein, low carbohydrate program should encourage whole grains, beans, fresh fruit and vegetables which are good sources of fiber.
- **Concern: Need to Minimize Saturated Fat Intake:** Many of the popular high fat, high protein diets don't differentiate between lean protein sources and ones that are high in saturated fats.
- **Solution:** Although some high protein, high fat diets appear to condone unlimited intake of unhealthy fats, a closer look at other diet programs do recommend lean meats, lean poultry, eggs and seafood as their primary protein sources. Research has shown that when the carbohydrate and calorie intake is reduced, regardless of the fat intake, low density lipoprotein (LDL) and triglyceride levels improve without a concomitant reduction in high density lipoprotein (HDL) particles.
- **Concern: Potential kidney damage from excess protein intake.** Although some concern about kidney function decline has been expressed, studies that included subjects with normal kidney function did not find renal function decline associated with high protein intake. Knight et al. (*Ann of Intern Med*, 2003, 138: 460-7) found that high protein intake was not associated with renal function decline in women with normal renal function. Curhan et al., (*Arch Intern Med*, 2004, 164: 885-91) in a study of dietary factors associated with kidney stones in young women, found no indication of increased risk among women in the highest quintile of animal protein intake compared with those in the lowest quintile. 🍷

# CONCLUSIONS:

High protein and high fat diets share the common purpose of lowering carbohydrate intake. There is no definitive definition of either term.

The high protein, low carbohydrate diet has become a way of life for many Americans. Estimates are as high as 60% of the American population has recently or is currently following a low carbohydrate diet. Many have made it a permanent change in their dietary habits. Research from Mintel International shows that 3 of every 5 low-carbohydrate dieters say they plan to limit carbohydrates for life. In fact, half the people who have tried a low carbohydrate diet in the past 12 months, and 1 in 3 who tried one more than a year ago, are still limiting their carbohydrate intake.

Scientific evidence is accumulating to support the hypothesis that the high protein, low carbohydrate diet program can be a healthful way to restore a more homeostatic metabolism. When energy intake is balanced with physical activity the high protein, low carbohydrate diet can be a nutritious method for maintaining an ideal body weight. Some research shows consumers may not be able to keep the weight off over the long term, however, many consumers appear to find it an easier program than the low fat alternative, to return to once their body weight begins to approach unacceptable highs. ▮

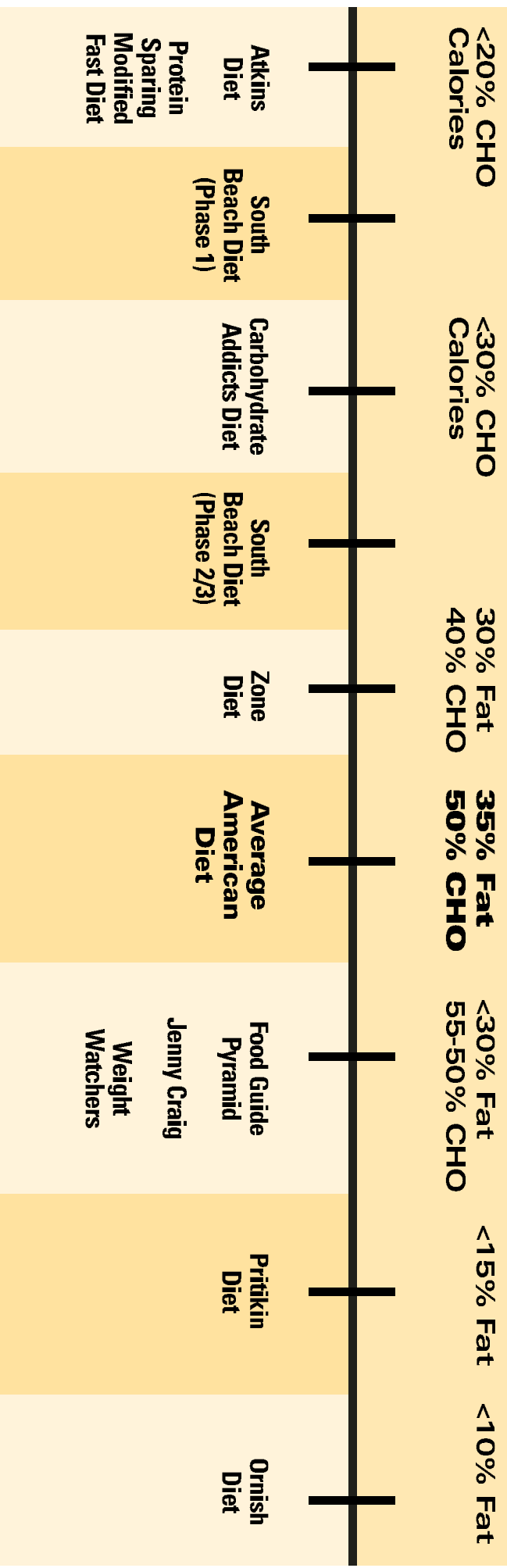


# Realities

# Popular Diet Continuum

Anticarbhydrate

Antifat



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# DEFINITIONS OF PROTEIN TERMS

(WARDLAW, G. & KESSEL, M. (2002).

*PERSPECTIVES IN NUTRITION, 5TH ED., NY, MCGRAW HILL.)*

## **Biological Value (BV):**

The biological value of a protein is a measure of how efficiently food protein once absorbed from the gastrointestinal tract can be turned into body tissues. If a food possesses enough of all nine essential amino acids, it should allow a person to efficiently incorporate the food protein into body proteins. Egg white protein has a biological value of 100, the highest biological value of any single food protein. In other words, essentially all nitrogen that is absorbed from egg protein can be retained.

## **Protein Efficiency Ratio (PER):**

The protein efficiency ratio is a means of measuring a food's protein quality. FDA uses this method to set standards for labeling of foods intended for infants. The PER of a food reflects its biological value, since both basically measure protein retention by body tissues. Plant proteins, because of their incomplete nature, generally yield low PER values, whereas the values for animal protein are higher, often above 2.0.

## **Protein Digestibility Corrected Amino Acid Score (PDCAAS)**

The most widely used measure of protein quality is the Protein Digestibility Corrected Amino Acid Score. This is used in foods intended for children over 1 year of age and for nonpregnant adults. To calculate the PDCAAS of a protein, its chemical score is determined (chemical score=actual milligrams of each essential amino acid per gram of protein divided by the required milligram needs of that essential amino acid per gram of protein). The score is then multiplied by the digestibility of the protein to determine the PDCAAS. The maximum value is 1.0 which is the value of milk, egg and soy protein.

## **High quality (complete) proteins**

Dietary proteins that contain ample amounts of all nine essential amino acids.

## **Lower quality (incomplete) proteins**

Dietary proteins that are low in or lack one or more essential amino acids.



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