them. Plan for more calories and easy-to-digest foods in the meal after your workout. The post-workout meal is the most important for your performance, even if it is not very sociable.

With this plan, you will be a happy, carb-chomping athlete. Don't congratulate yourself yet; it's only a humble beginning. We do have higher aspirations, don't we? The pre-diet diet is a prelude to more precise things to come.

CHAPTER 9

# REAL DIETING

THIS BOOK contains three distinct diets: Modern, Isocaloric and BODYOPUS. Although I recommend starting with the Modern Diet, it must ultimately be abandoned, because a low-fat, high-carbohydrate diet will not achieve your final goals. However, you should try it first because it's the easiest of the diets.

In past chapters, I've suggested ways to adjust food ratios for better performance. Most athletes will not have to change their routine very much to go on the pre-diet diet. However, people who are used to eating 3 meals a day, with low protein and 30 percent saturated fat, will be surprised when they switch to the pre-diet diet. When you adjust your diet to 30 percent protein, 10 percent essential fats, and 60 percent carbohydrates, spread out over 6 meals, you will notice a big change. Your energy will be better, you will be stronger, and you may lose body fat at the same calorie level. No applause, please, it's really a simple trick.

Explain the trick? Sure. Your body's thermostat adjusts itself to the amount of carbohydrates and proteins that you eat. By replacing dietary fats with these "thermogenic" foods, your body temperature will raise slightly, enabling you to burn fat

more quickly. Later in this book, I'll describe how to modify your body temperature more directly, but you can make minor changes now just by eating smarter.

Although the pre-diet diet will help you transform, you will notice only subtle improvements. You're not ready to snap the "after" picture yet, are you? I expect the best of you — there's still a lot of work to do.

Next, we will reduce calories and perhaps increase your activity level to burn more calories. Modern dieting (a real diet) includes both increased exercise and lowered food intake. The usual fat math applies. Each gram of fat has an energy value of 9 calories. A pound of body fat is about 3500 calories. Technically, 455 grams of fat (one pound) multiplied by 9 calories per gram is 4095 calories. However, fat cells contain some water and some of the calories are lost as you burn the fat. Now you know.

If losing fat was just a math problem, it would be elementary school arithmetic. Class, how many pounds of fat does Johnny want to lose in how many days? You could just fill in the values to determine a daily calorie debit, and then cut the calories by eating less or exercising more.

Unfortunately, there are other factors to take into account. How do most dieters determine how much fat to lose each week? Most of them wish they could get it over with as quickly as possible. Overnight, while sleeping, would be nice.

Let's explore the obstacles. First, there is your ability to tolerate hunger and anxiety. Calorie restriction is a test of emotional discipline. Although there are ways to lose fat without hunger or anxiety, they have side effects and dangers. I'll discuss these methods later in the book, but the Modern Diet includes only traditional fat-loss methods.



The next obstacle is preservation of muscle. We all want to lose only body fat and not sacrifice any lean tissue. Not only do we fear declining strength and performance levels, but also lack of energy and a slower metabolism. Whenever you eat less than maintenance calories, you will always, always lose muscle. Most of the diet information in the sports media aims to help you maintain or increase muscle when on a low-calorie diet.

For non-competing athletes, hunger, anxiety and preservation of muscle are the only obstacles. However, endurance athletes must also consider energy levels. Calorie restriction decreases energy available for performance. Lowering calories cannot be a capricious decision. Some kind of compromise must be accommodated.

Everything up to now in this text is what I consider "light reading" — a nice discussion of dieting philosophy. Nothing I've recommended so far is a struggle. It's not really a burden to eat a few more meals, is it? You won't really miss all of the congealed grease you used to eat, will you?

Crossing the threshold into *real dieting* consists mostly of reducing carbohydrates, which causes stress. Although I will show you some really cool stuff later, we will first perfect the traditional how-tos. If I couldn't inject some personal flourishes into the Modern Diet, I wouldn't include it.

CHAPTER 10

# ADJUSTING YOUR CALORIES

MANY PEOPLE try to base their diet on elementary school arithmetic. They decide how much fat they want to lose, how long the diet should take, and presto! With simple mental division, they determine how much fat they want to lose each week. If you read tabloids, or even glance at the front pages while waiting in the supermarket checkout line, you know that there are some absolutely amazing weight loss programs that cause your weight to plummet by a *pound a day*. Is it possible? Well, yeah — with really obese people who have been eating enormous amounts of food every day.

How do non-obese people set a realistic goal? Unfortunately, many athletes have the bad habit of trying to lose fat based on a too ambitious mental calendar. They think: "I want to lose 10 pounds in 4 weeks, so I *have to lose 2-1/2 pounds per week*." While the figures work out math-wise, and the goal is probably physically attainable, most dieters will not be able to fulfill their expectations.

You don't just want to lose a certain amount of weight; you want to make sure that you are losing only fat, not muscle. For this reason, you want to consider the quality of the weight loss

over the quantity. A goal of 2-1/2 pounds per week is not correct if it causes too much muscle loss. Unfortunately, some very authoritative voices echo the 2-1/2-pound weekly limit. Both bodybuilding magazines (which I've been reading for 18 years) and bicycling magazines (which I've been reading for even longer), seem to have a consensus that 2-1/2 pounds per week is a healthy goal. They imply that losing 2-1/2 pounds per week will prevent muscle loss. Many best-selling diet books by MDs also agree on 2-1/2 pounds. Well, they're all wrong. For athletes, 2-1/2 pounds is a bogus number!

Weight-training athletes who don't use any secret bodybuilder tricks and try to lose 2-1/2 pounds per week, will lose at least 8 to 12 ounces of muscle along with the fat. As you may have discovered, the muscle goes away a lot faster than it comes back.

The magical number, 2-1/2 pounds per week, started with the best of intentions as a medical recommendation to sedentary, overweight people who embarked upon a very low calorie diet. How did athletes start to think it applied to them? My best guess is that it was bodybuilders' habit of picking a contest date and backtracking to the traditional 8- to 12-week steroid — er, diet cycle. Even back in the early 1960s, steroids, thyroid hormones and diet pills helped people lose 2-1/2 pounds per week without much muscle loss.

Anabolic steroids and Insulin Growth Factor-1 (IGF-1) are the two most powerful anabolic drugs available. Since the law has cracked down on steroids, and IGF-1 is both expensive and hard to acquire, these drugs are available only to a few. Even if you *could* use them, think twice. Steroids and IGF-1 are primarily used to cover up bad dieting practices.

Our goal is to work with your metabolism, not cover up



mistakes. Although I'm the first to admit that both anabolic steroids and IGF-1 are beneficial in many situations, they allow us to forget that we didn't solve the underlying problems, but just eliminated some of the symptoms.

Losing 2-1/2 pounds per week is a bogus goal for non-chemically-assisted athletes. In the Modern Diet, with only calorie restriction and aerobic activity at your disposal, you should not try to lose more than one pound per week. In the upcoming chapters, you'll learn *all* of the secrets to boosting your weekly fat loss beyond an agonizingly slow o-n-e ... p-o-u-n-d ... per ... w-e-e-k pace. Until then, more weight loss will only cause muscle loss.

Don't rigidly try to lose one pound per week. When bodybuilding contests started testing for drugs, some former freak-of-nature drug monsters had a lot of trouble trying to diet without props. Female bodybuilders, in particular, had the worst cases of muscle catabolism, even on the pound-a-week schedule. It may be necessary to lose a glacially slow half pound per week in order to sustain training performance.

Bodybuilders who are dieting without steroids, GH or IGF-1 should not debit maintenance calories by more than 20 percent. Of the 20 percent, 10 to 15 percent should come from a decrease in calories, and 5 percent or so from additional aerobics.

For example, a male bodybuilder with a daily maintenance calorie level of 3000 calories, who debits half the calories (300 calories) through decreased food intake and half from aerobics (300 calories), will lower total calories by 600. Over 7 days, he will have debited 4200 calories, slightly more than a pound per week. This 1200 calorie margin gives him some flexibility in varying his calories and aerobics.

A female weight-trainer with a daily maintenance intake of

2000 calories should debit 400 calories. She should reduce food intake by 200 calories, and increase aerobics to burn 200 more calories. Although she will be losing less than a pound per week, she will not lose much muscle. Many women, unhappy with this rate of fat loss, will increase their aerobics, cut their calories, or both. Unfortunately, a greater calorie debit will cause women to lose more muscle than men, because women don't have as much muscle-preserving testosterone as men do. Instead of decreasing calories further, women should use one of the dirty tricks I'll describe in later chapters, such as thermogenic agents or thyroid hormones. Traditional methods will sacrifice muscle *pronto*.

Perhaps people worry too much about how much fat they lose each week. Personally, I only look at the scale once a month when I diet. Once you know your maintenance calories, just debit that by 20 percent. It's a piece of cake (well, ditch the cake). Through trial and error, I've discovered that men do better if they achieve the 20 percent debit with 15 percent calorie reduction and 5 percent aerobic activity. Women have done best with 10 percent of each.

My personal slant on the Modern (low-fat, reduced calorie) Diet doesn't stray too far from the accepted path. Fat loss of a pound per week and aerobic activity make sense. Is this the best advice? It's a pretty good diet for people who primarily weight train and don't have to worry about temporary decreases in performance.

For endurance athletes, a 20 percent calorie debit is too enervating. Luckily, some sports nutritionists specialize in runners and their ilk, so I don't have to deal with them. Runners are usually diet crybabies who bitch about any calorie reduction.

Many impatient dieters will not be satisfied with losing only a pound of fat per week. Some athletes are lucky enough



to have a daily maintenance calorie level of 6000 or more, so a 20 percent debit will cause greater fat loss.

| | |
|---|---|
| Maintenance calories | 6000 calories |
| 15% calorie reduction | 900 calories |
| 5% aerobic activity | 300 calories |
| Total daily debit | 1200 calories |
| Estimated weekly debit | 8400 calories |
| Fat loss | 2-1/2 pounds |

See! See! That's 2-1/2 pounds per week! Although we all want the Platonic 2-1/2-pound-per-week ideal, it is reserved for the genetically gifted. If your maintenance calorie level was 6000 per day, you probably wouldn't need to read this book for advice. The daily maintenance calorie level for most non-behemoth men is 3000 per day. For women, it is only about 2000 calories per day. Most bodybuilders who lose more than one pound per week do it with thermogenic agents, thyroid hormones and repartitioning compounds.

Use the 20 percent calorie debit as a rough reference. You can debit less, but never more. If you want a "crash diet," turn to the BODYOPUS Diet section. It works better, but it's less fun.

Instead of picking an arbitrary time span, like 8 weeks, determine the length of your diet from your body fat percentage, maintenance calorie level and daily calorie debit. Calculate the number of diet weeks from these figures, instead of the other way around. You may be a male bodybuilder preparing for your first local contest. (Of course, I don't expect every reader to aspire to be a competition bodybuilder. You may be planning for an upcoming vacation or class reunion, or looking at a turning point birthday.)

However, for our male bodybuilder:

| | |
|---|---|
| Body weight | 200 pounds |
| Body fat percentage | 15% |
| Hoped-for body fat | 5% |
| Percentage to be lost | 10% |
| Body weight reduction | 20 pounds |
| Maintenance calories | 3000 |
| | |
| Debit of 20%: | |
| 15% from food restriction | 450 calories |
| 5% from aerobics | 150 calories/day |
| Projected fat loss per week | 1.2 pounds |
| | |
| Number of weeks needed to complete a 10% reduction | 17 weeks |

These are the *paper* figures, and they're kind of depressing. Most people don't want to diet for 17 weeks, especially when they're used to 8 or 12 week diets. There are 3 problems with this bodybuilder's plan. First, he started off *too fat* to diet in one stretch down to a very low 5 percent body fat, especially if he's never before shown that he can do it without problems. Male bodybuilders should never go over 10 percent body fat off-season.

Second, although a 17-week diet would accomplish the goal, I, personally, would be unhappy dieting for 17 long weeks for a measly 20 pounds of fat. I'd want to accelerate the fat loss. With common thermogenic and repartitioning agents, a neophyte dieter could "trim" 5 weeks off this schedule by losing an extra half pound of fat each week. If you have a substantial



income and a willing doctor, human growth hormone can shave off another 4 weeks. It is possible to lose 20 pounds in a very tight 8 weeks without much muscle loss.

Third, even with the prudent 20 percent calorie debit, some of the 20 pounds lost will be muscle, not fat. Some truly metabolically hapless individuals, will lose 1 pound of muscle for every 3 pounds of fat lost, no matter how slow they lose it. As you lose the 20 pounds of weight, 6 pounds might be muscle. Don't panic — and please, please, do not make a mad dash to the health food store to buy the latest dieting supplement. The BODYOPUS Diet, engineered to slow catabolism and *rebuild* muscle, was designed to work in this situation.

There's nothing really revolutionary in the Modern Diet. Most people, whether sedentary or athletic, a doctor, nutritionist, or layperson, would agree that this is a safe (healthy) and sane (follow-able) diet plan. In a nutshell, the Modern Diet à la Guru (me) is:

| | |
|---|---|
| Daily calorie debit | 20% from maintenance |
| | |
| The new ratios are: | |
| Protein | 25% |
| Fat | 10% |
| Carbohydrate | 65% |

Although most dieters consider this enough information to map out a diet strategy, those pesky bodybuilders always want more details. What kinds of protein? How much at each meal? What about *fat*? What kind of carbohydrates? How much fiber? And those are just the intelligent questions. Details, details, details. I usually deal with two types of athlete-dieters in a

coaching capacity. The very few really want to know the best food choices and are willing to accommodate many, if not all, of my recommendations. It's s-o-o-o simple: I tell them what to eat and they do it religiously. Dream clients.

And then there's ... the others. They ask for advice, but what they actually want is my *approval* of what they are determined to do. It goes something like this:

Bodybuilder: "I should eat fish and rice, right?"
Guru: "No, champ."
Bodybuilder: "But I always diet on fish and rice."
Guru: "No, champ."
Bodybuilder: "All of the champions do fish and rice."

Get the picture? Not advice, approval. Let me tell you, this happens a lot.

The next sections are for those who truly want to know the best food choices while dieting. Remember, if you're not using anabolic steroids or growth hormone, food *quality* is very important. Get ready to throw tradition out the nutritional window. Keep an open mind, be flexible, and hey, champ, "Will ya forget the fish and rice shit and *SHUT UP!*"

CHAPTER 11

# PROTEIN RECOMMENDATIONS

MOST BODYBUILDERS have been conditioned to be extremely aware of the protein in their diet. Since protein powder supplements have been a staple of weight-lifters' kitchens for decades — at least 40 years — and written about for as long, you'd think the subject of protein had been flogged to death. Not so. In fact, the hottest topic in the sports nutrition field today is, again, protein. If you want a story that includes Big Brotherism, intrigue, influence peddling, hidden agendas, special interests and abandoning the consumer, it would be about protein.

The FDA has revised the protein rating system so that soy protein is now considered as good as the best. They are trying to pretend that soy protein is as good as egg and whey proteins, the previous gold standards. Manufacturers will be replacing good proteins with soy in infant formulas and health preparations for the elderly. Sedentary adults, who do not need even as much protein as they eat now, and athletes, who will find better proteins, will not be greatly affected. Sadly, it will be years before we see the results of this flawed policy on children.

The word "militant" in this book's title illustrates my attitude toward the FDA. FDA recommendations are never intended

to benefit athletes and life extensionists. For us, the FDA is mostly a hindrance. Therefore, I'll be focusing on protein quality in this chapter, not protein politics. Sometimes, however, I can't resist; I'm not as objective as I used to be. I view those "soy power" freaks much more cynically now.

In general, I recommend that you fulfill your daily protein requirements with supplemental, refined proteins, and without meat or fish. It's scientifically valid, logical and surprisingly economical. Of course, my recommendations run counter to the accepted dogma.

With the pre-diet diet, I'm not so strict. Most refined proteins are bland, and it takes time to work them into an appetizing meal. However, on a real (low-calorie) diet, you will lose more muscle if you do not fortify your diet with the key amino acids. Animal proteins are not ideal.

The quality of protein consumed during dieting is important. Traditional fish, chicken and turkey meals do not replace the catabolized amino acids as well as refined proteins, especially if you are not reinforcing your metabolism with anabolic steroids. Steroids lower your need for protein quality because they partially block cortisol's muscle wasting effects. Since muscle proteins aren't being disassembled, replacement isn't as necessary.

Most top bodybuilders don't use protein supplements in their kitchens. They eat chicken, fish and eggs just like you. Of course, what you *don't* see is the bewildering array of steroids, growth hormones, and other "helpers" that bullet-proof their muscles against the diet assault. Even if you could raid this hidden pantry and use all of these "advantages," you should always go for the best choice. In the end, "best" wins over "good enough" every time.



In the Modern Diet, protein is 25 percent of daily calories (5 percent less than the pre-diet diet) because you will be consuming higher quality protein. At 30 percent of daily calories, any old protein, including the FDA's blessed soy, will work adequately. Instead, I recommend you consume proteins in these proportions:

| | |
|---|---|
| 30% | whey protein |
| 25% | egg white |
| 20% | casein |
| 20% | meat and fish |
| 5% | miscellaneous vegetable proteins |

Let's wake up last chapter's novice male bodybuilder from his nap and plug these figures in:

| | |
|---|---|
| Maintenance calories | 3000 calories |
| Minus 15% food debit | – 450 calories |
| Adjusted daily calories | 2550 calories |
| Protein (25% of calories) | 635 calories |
| Protein grams | 155 grams (approximately) |

If he weighs 200 pounds and 15 percent of it is fat, his lean weight is 170 pounds. 155 grams of protein does not reach the well-ingrained gram-a-pound dictum that bodybuilders diligently follow. It doesn't matter. Because the protein is high quality, 155 grams is sufficient.

Do you have to be exact to the gram and unwavering with

each percentage? Don't be foolish. You aren't going to shrivel up into a 98-pound weakling if you don't get your whey or egg whites every day. There's an expression in athletic nutrition called "all of the plumbing," which means that some individuals are more motivated if absolutely everything is laid out for them. After responding to hundreds of letters, I see a discernible pattern. They all want to know: how many grams and when should they eat it?

Athletes who haven't written a letter in years consider these questions important enough to take the time to write me. I can't respond with "kind of" and "good enough." These athletes want precision. Are *my* figures the perfect choices? Probably not. There's always some one-upmanship among nutritionists, and new discoveries are being made every day.

My recommendations come from a lot of canny tinkering. As dim as my view is of meat and fish as protein sources, athletes will work tuna or skinless, boneless chicken breasts into their diet whether I like it or not. I expect people's prejudices and work them in to make dieters happy. I'm ... acquiescent. Are you all clear on the concept? It's protein arbitration.

## 30% — WHEY PROTEIN

Most endurance athletes are fixated on carbohydrates and aren't too choosy about their protein sources. It's probably because they assumed for years that because they didn't need a lot of bulk, they didn't need a lot of protein. This is incorrect. Recent research illustrates that typical runners and cyclists actually sacrifice a significant amount of muscle during training. Pound for pound, they need more dietary protein than — gasp! — bodybuilders.

Bodybuilders have always considered themselves top dog



in protein requirements. "Meat builds meat" was the weight-lifter's creed. The story behind weight-lifters' use of non-meat proteins began at the turn of the century at Battle Creek, Michigan with a gathering of crackpots — Kellogg, Post, (Upton) Sinclair and the physical culturalists, and the McFadden brothers — all espousing the meatless life.

However, modern protein supplementation is primarily market-driven and only uses science when it suits business. Weight-lifters, bodybuilders and powerlifters don't read too widely, and surveys have shown that their average reading level is about sixth grade. Most of their protein education comes through weight-lifting magazines, such as *IronMan, Strength & Health* and *Muscle Power*, which have been influential since the 1950s.

The concept of protein supplementation originated in the muscle magazines. Magazines need advertising revenue to turn a profit. It dawned on the magazine owners that if they owned both the magazine *and* the supplements, they would make more money. From this point on, many articles became, to put it bluntly, tainted. Their goal was not primarily to educate the reader, but to condition the consumer. The absolutely nutball articles that *IronMan* presented to an increasingly gullible readership only made things worse. The early weight-lifter was bewildered by protein pills from *Strength & Health* and the Samson Milk and Honey diet in *IronMan*. Is there any reason to wonder why rational scientists thought that muscleheads were idiots?

Now, most protein supplement information for weight-lifters is disseminated through specialty periodicals which have vested interests. The recommendations in the articles are driven by prices at the wholesale level.

When eggs were cheap, egg protein was "in." Eggs are not a bargain anymore, so eggs, while not exactly "out", are just not currently "featured." Milk protein was big for a while. When prices increased, soybeans were touted as politically correct. When dairies in Ireland and New Zealand, with their heavy government subsidies, priced milk casein more attractively, soy began to languish. Then Ralston-Purina (chow-chow-chow) muscled a favorable rating out of the FDA, which boosted soy sales immensely.

Personally, I've been championing *whey protein* for years. Perhaps you remember the nursery rhyme:

> Little Miss Muffet sat on a tuffet
> Eating her curds and whey
> When along came a spider and ...

Curds and whey, a warm, honey-sweetened, pudding-like breakfast food made of cottage cheese (the curd) and the sweet runoff of the cheese-making process, whey, is still popular on British dairy farms.

Whey is one of the two proteins in milk. Most people are familiar with casein, the white-colored protein in cottage cheese. Several of the other proteins are grouped together and called whey. The milk protein at health food stores is not usually whole milk protein, but isolated casein. Milk and milk products such as buttermilk and yogurt have small amounts of whey protein. Most cheeses, from cottage to cheddar, are casein and fat, because whey is a waste product of the cheese-making process. Liquid whey is very sweet because of its high lactose content. For a long time, liquid whey, considered useless, was poured down any convenient drain. No one wanted it.



Eventually food scientists analyzed whey. They were astounded that it had protein in it. It wasn't the junky protein you'd expect from a product cheaper than soy, but a better protein than eggs, which had been considered the gold standard. Whey had better amino acid ratios, and was more digestible and soluble. This dynamite protein was cheaper than cheap — all you had to do was haul it away.

Unfortunately, whey contains a lot of lactose. For some uses, lactose doesn't cause a problem. Babies, for example, use lactose as a major source of carbohydrates, either in mother's milk or in formula. Sweet whey also worked well in hot cocoa or chocolate milk. However, protein supplements either shouldn't contain any sugar at all, or should contain a more digestible sugar. The protein from basic sweet dairy whey had to be separated from the sugar.

It's tricky to remove the lactose without damaging the protein because whey is very delicate. Removing the sugar from whey requires heat and processing, which can change the amino acid structure that makes it so desirable.

After sweet dairy whey, the most common type of whey protein is lactalbumin. To food scientists, lactalbumin is the major constituent of whey protein. To consumers, lactalbumin is a commercial term signifying that the whey has been processed and dried with high heat. Although all of the right amino acids are still there, they have been cross-linked into new bonds. Lactalbumin doesn't mix, dissolve nor disperse well. It acts like sand. A poorly-made whey supplement is worse than well-made soy or casein. Nevertheless, some manufacturers include lactalbumin because whey is currently a "happening" protein and because lactalbumin is cheap on the wholesale level.

You can do better. Well-made whey proteins are usually called concentrates or isolates. I'm familiar with two types of extraction: filtration, which is the most cost-effective, and ion-exchange, which is virtually perfect, but costly. Both preserve the amino acid bonds correctly. Filtration can achieve whey that is 85 percent protein and 15 percent lactose. However, the ion-exchange process yields a supplement that is 95 percent pure protein.

At the wholesale level, ion-exchange whey can be twice as expensive as the best filtered whey. For businesses, doubling the cost to increase the yield by only 10 percent is not very cost-effective.

There are additional processes to improve proteins or, in the case of lactalbumin, to fix it. The protein can be attacked with enzymes to break down some bonds, which sometimes improves the solubility of the protein or the dispersability of the powder. Unfortunately, extreme solubility creates practical problems. High solubility causes the protein to ball up on contact with cold liquids, like the cocoa balls that form when you stir chocolate powder into milk. You have to mash the lumps against the inside of the glass to break the still-dry cocoa free.

For example, the most soluble whey powder on the market sticks to the inside of the blender as an instantly drying "skin", enclosing still-dry powder pockets. To dissolve it, you have to scrape the sides of the blender. Extreme solubility is a pain in the ass, and wasteful if you don't take the time to scrape the powder all of the time. The ideal whey protein would also disperse easily, so it could be stirred, shaken or blended with cold liquids.

In sum, the ideal protein should be soluble, dispersible, and virtually lactose-free. You could call it a designer protein,



more than just the usual repackaging from a big bag into a little can.

Whey protein should fulfill 30 percent of your protein needs while dieting. Whey has the highest amount of non-dispensable amino acids (the word "essential" is now passé), and branched-chain amino acids (BCAAs). BCAAs are the first to be sacrificed in muscle catabolism, and you will lose less muscle if you include them in your diet. Meat and fish aren't as high in BCAAs as whey, which is 25 percent BCAAs.

Life extensionists have embraced whey protein because of its high cysteine content, which has been shown to boost the immune system. Whey is an ideal protein: it prevents muscle loss, imparts a drug-like action, is made in the United States (casein is imported) and is healthy for the environment (now used, no longer dumped).

Whey's only problem is lack of availability. Although whey is in almost all milk products, it is not very concentrated. Whey protein must be taken as a supplement. Most of the protein supplements currently on the market are made of casein, soy or dried egg white. Whey proteins are more elusive. When in doubt, read the label. Whey isolate, whey concentrate or a savvy blend of the two are your first choice. Next, choose enzyme- or acid- reduced lactalbumin. Don't choose heat-processed lactalbumin. Sweet dairy whey is cheap and contains good quality protein, but it is loaded with lactose, a sugar that dieters don't need.

Your daily portion of whey protein will be about 2 ounces, or 50 grams of protein (and about 12 grams of BCAAs). Currently, quality whey costs between $1 and $1.50 per ounce. Two ounces of whey cost about as much as 6 ounces of canned white tuna fish, and contain much better protein.

I've discussed whey protein at such length because whey will not be peddled very hard outside the bodybuilding marketplace. It's costly at the wholesale level and there aren't many quality manufacturers. Soy and casein are pushed hard to the general consumer. With the recent FDA blessing, soy will dominate in the years ahead.

I haven't settled for normal and average. Neither should you. Six years ago, the Venice Beach bodybuilders and I were making whey and egg white pancakes, whey custard and whey and rice puddings. You can sneak whey into just about any food. We even made whey-enhanced fresh pasta. Don't feel limited to boring protein blender shakes. In summary:

1. Thirty percent of your protein intake should be whey protein. Therefore, whey should be 7.5 percent of your total food intake.
2. Consider whey a main food, not a supplement.
3. Whey's solubility, digestibility and amino acid profile make it an ideal all-around protein.
4. Purchase concentrates or isolates of whey, never plain sweet dairy whey or lactalbumin.
5. Whey protein costs about 4 cents per gram, about the same as traditional meat and fish protein sources.
6. Protein powder doesn't have to be boring.

### 25% — Egg White Protein

Food scientists and vegetarians have considered egg the king of the proteins for a long time. In every scoring method, and in all of the laboratory rat chow-ins, egg was always at least royal, sometimes divine. Before the arrival of cheap foreign casein, egg white protein was competitive with domestically-



produced casein. Currently, egg proteins are too expensive to be used more than sparingly. This is good news for consumers, because egg white protein is a lousy protein source.

Egg whites are almost pure protein. The yolk has some very good protein, but lots of fat. Most powdered egg protein supplements are egg white protein, because it's difficult and expensive to extract the protein out of the yolk. *Whole* egg protein has a PER and BV of 100, but egg white has a score of only 88. The only commercial whole egg protein powder that I know of was the Rheo Blair protein that was popular with bodybuilders during the 1960s. It was a mixture of whole dried egg, casein, non-fat milk powder and lactalbumin, which had a cult following around it even though it had both fat and sugar in it.

For practical purposes, we'll discuss egg white protein only. Its spectrum of non-dispensable amino acids is very good, and its solubility and digestibility has been a standard for years. When you are not dieting, its lower levels of BCAAs aren't important. We don't even have to discuss availability: eggs are plentiful and cheap.

Egg protein powders have their place in infant formulas and liquid meals for the malnourished. For healthy athletes who eat regular food, I see *no* purpose for egg protein powder. Most American egg powders I've sampled over the years are overdried, sometimes burnt and probably old. Although a good nose can smell the slightly burnt smell of dried egg whites, you have no way of knowing what else they've done to it. What's wrong with buying fresh eggs and chucking out the yolks? Nothing. Many athletes do and many more should. It only takes about 6 eggs a day to get 25 percent of your protein calories from egg whites.

It does seem to be a big waste of the spurious yolks, and it's

a bit labor-intensive to crack them, separate them and figure out where to dump the yolks. Disposal? No, stinks it up. Trash bag, slimy. Dog? Died from heart disease. The toilet? Yeah, that's the ticket, but a little bit of a trek. Don't forget to flush, or your non-bodybuilder house guests will look at you rather oddly. And there's a legitimate health concern. Although some athletes are still plugged into the blender, liquid egg whites á la nouveau Rocky cause a slight possibility of death from bacteria. What to do?

Years ago, when I went looking for egg whites without the shells or yolks, I ended up at a bakers' supply shop that stocked frozen, pasteurized egg whites. They were wonderfully economical — half the cost of supermarket whole eggs. The only problem was the size. The frozen egg whites came in a 5 gallon block, about the size of a block of ice for an igloo when Eskimos buy them pre-fab. How big? Bigger than the freezer in my refrigerator, and there's no room in the big freezer in my basement 'cause I got my dead grandma in there. Finally, my old gym (Gold's in Venice) started to sell frozen egg whites in a convenient size. Check out the hard-core gyms in your area. If not, try the yellow pages or a helpful baker. Egg Beaters will work, but they're no bargain.

Egg white protein, like whey protein, is easily hidden and virtually tasteless. It can be used as a recipe "glue," to hold together ground beef too lean to keep its burger shape, for example. Use egg glue in pancakes and custards — or the ritual morning egg white omelette. Eggs are 25 percent of your daily protein requirements because they are easily available, cheap, palatable and make vegetables and starches more interesting to eat.

Should you scrupulously avoid all egg protein supplements? Until recently, I would have said yes. However, I've seen



a very high-tech egg protein that is made with a processing technique developed for laboratory slide preparation. Its price has been attractive enough for people to create commercial versions. It's a nice idea, but why bother?

### 20% — Milk Protein

At 20 percent of daily calories, you will only need about 30 grams of milk protein. Frankly, I don't feel that casein warrants too much attention. Compared to meat or fish, casein is deficient in non-dispensable amino acids. However, it is digestible and soluble. I've included it because most dieters will want to include milk in their diet for its calcium. Who wants to take another expensive pill to get calcium? No one I know eats eggshells like Adelle Davis did.

Dairy products used to be a no-no for bodybuilders, who claimed that dairy products "made you fat and hold water." Arnold Schwartzenegger said it best in the movie *Pumping Iron* back in the 1970s, when he proclaimed, "Milk is for babies!"

Since then, fat- and sugar-free dairy products have invaded the American supermarket. Dieters' main complaints about dairy products, milk fat and lactose, are no longer applicable.

Dairy products will make your diet much more interesting. Yogurt is a nifty medium to hide whey protein in. Non-fat cheeses liven up egg white omelets and make low-fat cheeseburgers possible. There's always cottage cheese, casein in the raw. I suppose there are people who actually like it. The Venice bodybuilders were adept at hiding cottage cheese in pasta or oatmeal.

I don't recommend supplements unless they are absolutely necessary. After disrupting someone's normal and comforting eating habits, it's easier to convince them to eat this food or that one. My suggestion that my clients dump various powders and

chemicals (all of which are at best bland) into a blender and drink most of their meals has not always been followed.

On the other hand, high-tech liquids are controllable and precise. Some dieters do best when their selection of foods is severely limited, but this has to do with discipline, not palatability. In most other cases, diets — Modern, Isocaloric or BODYOPUS — work fine with real food. Even athletes, who are used to eating things that are "good for you" (but don't taste very gratifying), usually follow supermarket food diets as opposed to health food or esoteric diets.

In addition, protein supplements, especially egg white protein and casein, are more adulterated than their fresh, whole counterpart. Fresh liquid egg whites are less damaged and burnt than egg white powder. Casein powder is never fresher than milk, yogurt and cheese.

The quality and source of any casein supplement is a mystery. Casein is a real commodity at the manufacturing level. Because most casein is imported, wholesalers are always shopping for price.

There are many factors to consider about casein. Is it sodium or potassium caseinate? What's the moisture, residual lactose and ash percentage? What temperature was the protein dried at? How long has it been sitting in the warehouse? Protein damage, the process of cross-linking amino acids, is called the Maillard effect (after the French scientist, not the duck). Cross-linking always decreases solubility and digestibility. In the most common example of the Maillard effect, meat changes color from red to brown to gray when it is cooked. Even after the heat is removed, the protein continues to degrade. Your casein is deteriorating while it sits on the warehouse shelf.

Although I don't recommend soy protein, Ralston Purina's



Supro is at least reliable. Supro, although only a fair protein, is always the same. Casein is the crap-shoot of protein powders. You have absolutely no idea whose casein is in the can.

All of these arguments also apply to whey protein, but unfortunately, the only way to get whey without lactose is in supplement form. My advice in choosing a protein concentrate (There! "Supplement" is banished) is to trust the company that sells it.

As for casein, since there are so many palatable sources available at the supermarket, why bother with a powder? Stick to yogurt, cottage cheese and the dazzling new non-fat cheeses. I do not recommend *any* casein protein powders.

### 20% — MEAT AND FISH

Traditionally, meat has been considered a muscle builder, and fish a dieting staple. Most Americans expect to eat some — make that quite a lot of — meat and fish to fulfill their protein requirements. I won't use the usual arguments that meat is unnecessary, unsanitary and uneconomical. Meat and fish are convenient protein sources. They provide texture and taste, and a nice way to exercise your jaw muscles and stomach enzymes. Many dieters find including some kind of flesh comforting and vaguely fulfilling while on low calories.

The casein, meat and fish proportions can fluctuate. Always make sure you eat 30 percent whey and 25 percent egg white protein. However, the other proteins can vary. At 20 percent of his daily calories, Joe Bodybuilder is only going to get to eat about 30 grams of meat or fish. That's not a lot of food: only a quarter pound of (very lean) beef, fowl or fish, less than one regular can of tuna fish. That's a sore point with some bodybuilders. They say: "But Serge Nubret eats ten pounds of beef a day!" or

"I live on fish and rice and water on a diet." Both might have a place, but for now, get used to not relying on flesh products. But I'm not completely heartless (I'm not a scientist). You can plunder the casein and miscellaneous percentages to increase the meat and fish allotment to about 30 percent.

The problem with flesh is that it contains a lot of saturated fat. On a 10 percent fat diet, the no-value saturated fats can crowd out the essential ones. Although fish oils are good for you, be realistic. You probably don't eat much high-fat oily fish.

Fourteen years ago, I would have recommended beef for its creatine content. Creatine is part of creatine phosphate, the substrate for adenosine triphosphate (ATP) production in muscles. Beef's reputation for building strength may come from creatine — or perhaps from the anti-catabolic action of the unusual fats in cooked beef. If you want to supplement with creatine, it's cheaper and less fattening to add supplemental creatine to whey and egg protein.

Have I skated on fish? Although fish doesn't have great protein, some species have excellent fats. We'll discuss fish oils in Chapters 15 and 16.

Should you use beef protein supplements? Beef supplements are highly digestible, but some amino acids need to be replaced after damage in processing. The interesting question is whether the creatine content is preserved. In addition, some people have gas problems with both whey and egg proteins. Would beef protein supplements solve this problem? Until these questions are answered, I have no definite conclusions.

### 5% — Miscellaneous Vegetable Proteins

Most starchy vegetables contain protein. A gram here and there will add up to about 5 percent of your daily calories.



Years ago, the very influential book *Diet for a Small Planet* persuaded many people to combine incomplete vegetable proteins. The book explained which proteins should be eaten together, such as rice and beans or soybeans and milk. The advice was well-intentioned, but we now know that it's not necessary to eat the proteins together. The proteins will eventually get digested into amino acids and circulate in the blood in a holding pattern until the rest of the amino acids are digested later. If you don't eat the tofu at the same time as the milk, don't worry. You'll eventually consume enough other proteins to cover the missing amino acids.

### Closing Thoughts

Frankly, I've never seen a bodybuilder with a protein deficiency. However, I've seen BCAA or glutamine dieting deficiencies due to bad protein choices. Choices that would be sufficient in other circumstances will not suffice on low calories.

My protein recommendations are much more rigorous than a doctor's or a nutritionist's would be. This is because dieters who don't use anabolic steroids or growth hormone have to be very careful which proteins they eat.

In addition, I've encountered a number of people who have tried to lower their body fat to contest bodybuilding levels and failed. They didn't fail because of lack of discipline, lack of hard work or even injury, but usually because they became discouraged by the amount of muscle they were losing. Each week they got lighter and smaller, but not leaner. It finally dawned on them that they fucked up somewhere when a friend or training partner said, "Hey bubba, you look like shit!" End of diet.

Although I can't point the finger directly at protein — there are a zillion factors that can throw a dieter off — tracking

protein in such detail makes sure that protein is not the problem. Yes, protein, the subject of so much monthly propaganda for so many decades, is in fact very important.

CHAPTER 12

# AMINO ACIDS: NON-RECOMMENDATIONS

DURING DIGESTION, proteins are broken down into amino acids. First, ingested protein is liquefied in the stomach with acids. Then the liquid protein goes to the small intestine for breakdown into peptides (small groups of bonded amino acids) and a few free-form amino acids.

From the small intestine, the peptides are taken to the liver though portal circulation. The liver then converts the peptides to free-form amino acids for release into general circulation. Research has demonstrated that of all proteins and protein fractions — whole proteins, peptides, and free-form amino acids — peptides that contain two amino acids (dipeptides) are the most easily absorbed. But does it matter? Are any amino acid supplements as good as dietary protein? I think not.

First, amino acids are quite expensive. Gram for gram, they are more costly than even the best ion-exchange whey protein.

Second, free-form amino acids don't work as well as peptide-bound amino acids. This is why most free-form amino acids started out as intravenous solutions for use in hospitals.

In addition to the economics and the science, I have a personal dislike for amino acids from years of working in the health food business. Because I occasionally design supplements, I know the back-end of the business that most consumers never see.

Most peptide-bound amino acids are reduced from whole proteins by either of two methods: enzyme processing or acid reduction. Although (unlike acid reduction) enzyme processing keeps the amino acids intact, it always creates some free-form amino acids along with the dipeptides. Are free-form amino acids so bad? Physiologically, they are probably not that bad. However, free-form amino acids have a noticeably bad smell and taste like spoiled milk when the starting proteins are casein and lactalbumin. You can imagine the odor of free-form amino acids derived from egg.

To avoid this problem, many enzyme-processed proteins are broken down into larger peptides, with more than two or three amino acids, which are not as easily absorbed.

Acid reduction is cheaper than enzyme processing, but it destroys some amino acids and has the same free-form residue problems. I'm not aware of any way to get pure dipeptides without any free-form amino acids mixed in.

Both processes are used on whole proteins. Originally, companies used liquids made from the leftover skin and hair of slaughtered animals. Even Socks' hair ball could be made into digestible amino acids. Amino manufacturers now use casein, lactalbumin and egg, usually when they are spoiled and can't be used for whole proteins. Marginal proteins that have been too heat-damaged, over-dried, old, spoiled or whatever (use your imagination) are used to make amino acids.

Although the solubility or digestibility of an adulterated



protein can be improved somewhat by reduction to peptides, I personally don't see any reason to pay for this band-aid processing. My recommendation has always been to pick a high quality, well-made (and mostly not "made") protein instead. Invest your money in ion-exchange whey protein. In an ideal world, enzyme-reduced filtered or ion-exchange whey peptides could be useful, but why bother?

Although I have faint praise for amino acid supplements in general, there are uses for specific amino acids. You might consider using the BCAAs (leucine, iso-leucine and valine), which are unusual because they need an active transport mechanism, like insulin, into the muscle cell. Other amino acids don't *need* an active transport mechanism, although more will be transported if one is present.

Once the BCAAs are in the muscle cells, they are used up surprisingly quickly. Many of the other amino acids needed in muscle are converted from BCAAs, particularly leucine. During dieting, the BCAAs are sacrificed first, either directly or conversion to other amino acids that are used to make glucose. Thirty percent of the amino acids absorbed into muscle cells (in a healthy, non-dieting person) are BCAAs. Because BCAAs convert easily to other amino acids, and can't be converted back, BCAAs are not stored for long periods in the cell.

Whey protein is about 25 percent BCAAs. Of course, because it is a whole protein, the BCAAs in whey are peptide-bound. By following my protein recommendations, you should fulfill all of your BCAA needs while dieting. However, on days when you don't follow the protein guidelines to the letter — when you eat out or run out of whey protein — BCAA supplementation can be your contingency plan.

I recommend BCAA supplements (wince) on the days

when your whey protein requirements are not met. Of course, if you get anxiety attacks over muscle loss even when you eat your whey protein, BCAA supplements can placate and soothe, perhaps better than Xanax.

I'm not completely happy with BCAA supplements because all of the commercial forms are free-form, not peptide-bound. Perhaps it's just a matter of supplement aesthetics; I always strive for the best. It reminds me of the studies which tried to show that free-form cysteine boosted immune function. In fact, only cysteine bound in whey works. I've always wondered if we aren't getting the expected benefits of BCAA supplementation for the same reason. A peptide-bound BCAA supplement is on my wish list of ideal supplements. For now, however, I recommend whey protein.

CHAPTER 13

# AMINO ACIDS AS DRUGS

THIS LITTLE CHAPTER is not about dietary proteins, but about the drug-like characteristics of high doses of amino acids. In the introduction, I explained the concept of using common substances, such as vitamins, minerals and amino acids, as drugs. For example, L-Dopa, an amino acid available by prescription, is used to combat Parkinson's disease. In addition, it has been shown to increase growth hormone when taken in doses of 1/2 to 1 g daily. In the early 1980s, Pearson and Shaw, the famous life extensionists, propounded the idea of using large doses of arginine and ornithine to enhance growth hormone secretion. More recently, ornithine keto-glutarate (OKG) has been touted as an anti-catabolic nutrient (a drug-like action). Ordinary people, from sedentary adults to the frail elderly, buy amino acids in the hope of achieving drug-like effects. I remember a particularly sly low-dose ornithine and arginine capsule that supposedly allowed one to "Lose [fat] while you snooze."

High doses of amino acids are usually not toxic nor dangerous (the FDA differs in opinion). However, pills containing small doses of amino acids never duplicate the drug-like effects of their high-dose or intravenous counterparts.

The problem (and it is *always* a problem) is the commercialization of a scientific study. Scientists can make amino acids do amazing things when using intravenous infusions, stomach tubes or staggeringly high dosages. These techniques allow them to generate a *measurable* metabolic change. However, there's a big difference between measurable and merely "feelable" changes. Tryptophan worked; people fell asleep faster. Most growth hormone enhancers do not work.

The biggest problems with amino acids as drugs are cost, convenience and palatability. Many people found out that 10 to 15 g of arginine or ornithine were expensive, foul-tasting and gastrically distressing. Even if the compound could have a discernible effect, it won't if the individual unconsciously avoids consuming it. Does OKG really work? Maybe, but I predict that we'll never know. Hardly anyone will use it because the optimal dosage is 10 g per serving.

I hate to be a fuddy-duddy about amino acids. I'm all for economical, convenient and legal "drugs". However, most oral amino acids are ineffective. I think it would be better to just use a real drug. Of course, some athletes want to follow a natural, non-drug philosophy, and amino acids are comforting because they somehow qualify.

Don't despair — I have lots of really nifty tricks ahead, including some new high-tech amino acid derivatives that might actually be useful.

CHAPTER 14

# ARRANGING YOUR PROTEINS

BY NOW, you must think I have a protein fetish. We just went over every possible bit of protein esoterica: grams, calories and percentages. This book includes this detailed information because my clients have asked so many questions. I have about 200 unanswered letters on my desk from just last month, some of them with page after page of queries. If a question can be asked about nutrition and protein, someone has asked it of me. I hope this book will answer them all. In the future, I'll just say: "Read the book."

In this chapter, we'll wrap up protein with a discussion of protein arrangement. What's that, you ask? Is it like flower-arranging? It's not an art form, but simple science. Protein arrangement answers the classic questions: How many grams of protein should you eat at each meal? At what time of day should you eat it?

Some people believe that one can only digest 30 grams of protein per meal. Perhaps this is true if you are eating fatty, stringy meats which take a long time to digest, but this doesn't apply to any of the diets in this book. The protein sources we've discussed, whey, egg and casein, are highly digestible, soluble

and assimilable. Although a few individuals have problems with the membrane around egg white, and others can't digest the immunoglobulin component of whey, these problems are rare.

I recommend that your hard-to-digest meals, such as meat and high-fiber vegetables, be consumed during your last meal before bed. If you fulfill your meat and fish requirement at this time, you will be consuming 20 percent of your calories before bed. The high bulk items should stave off hunger during your sleeping hours. However, you needn't be rigid. If you want a (low-fat) hamburger and salad at midday to be sociable, no points will be deducted.

Another fallacy almost as prevalent as the 30-gram myth is that proteins shouldn't be eaten with carbohydrates. Usually some kind of rationale of acid-alkaline environments is presented. This is shaman nutrition. Most of the time, it doesn't matter when or with what you eat protein. Eventually, all of the protein will reach the bloodstream as free-form amino acids.

Most amino acids are passively transported into the cells as needed. However, the BCAAs need insulin to enter the muscle cells. Because carbohydrate intake increases insulin secretion, you should eat carbohydrates with your whey protein.

The meal directly after your workout should contain higher amounts of carbohydrates and protein than the other meals. After exercise would be the perfect time to consume all of your whey protein, which is 30 percent of your daily protein. Most glycogen storage and amino acid transport takes place using the nutrients in the meal immediately after exercise. If you train twice a day, split your whey protein consumption so that 15 percent is consumed after each workout.

Between these 2 meals, you've used up 50 percent of your protein requirements. Spread the other 50 percent throughout



the day over the four remaining meals, so that you are eating about 15 percent of your protein calories at each meal (okay, it's 12.5 percent, smartass). Is it important that you eat exactly 12.5 percent of your protein at each meal? Of course not. It's convenient and logical to eat small amounts of protein at each of the remaining 4 meals, but not of paramount importance.

The post-exercise meal is the most important. Although other meals can be adjusted slightly for your convenience, eating regular meals will cause more predictable absorption and help to alleviate hunger.

CHAPTER 15

# DIETARY FATS: RECOMMENDATIONS

DIETARY FATS ARE ON shaky (jiggly?) ground in athletic research. There's a lot of information about proteins and carbohydrates, but dietary fats have been the performance duds over the years. Fats have been pretty much abandoned by both endurance and strength sports researchers. Although the Bulgarians rely on beef fat and butter fat, their choices fly in the face of convention. Saturated fats have become the great cardiovascular Satan. Even the general public has been educated about what type and amount of fat to eat, although it mostly ignores the advice. First, simple cholesterol was the demon. As time went on, we perceived a real fat conspiracy that included saturated fats and finally trans unsaturated fats. Ironically, you can ask a sub-minimum wage employee in any American fast food restaurant what kind of fat is in the French fries, and probably get an accurate answer!

None of this information will help an athlete's performance. Athletes usually choose fats by omission. Most of their mental energy is used up determining what *not* to eat.

The anecdotal evidence to support fat in athletics is not good. Ground beef fried in butter? Oh, my! It's like I've just sat

down on a nutritional whoopee cushion. The success of butter fat is pretty easy to explain. Butter fat contains some short-chain triglycerides, which are digested quickly and available for energy pronto. However, beef fat is an enigma. How much do you need to eat to get enough creatine and conjugated linoleic acid? Will eating large amounts of beef fat cause prostate tumors later in life? And would a modern bodybuilder eat 10 pounds of very fatty beef every day?

Modern dieters are usually quibbling about fat calories. They try to omit all saturated fat, or more radically, all fat. In fact, many athletes have dietary fat deficiencies. They would be healthier if they ate some essential fatty acid salad dressing every day. Usually, however, the resolute dieter suffices with just vinegar or lemon juice, and holds the oil. In the Modern Diet, you must be careful to eat only the best fats, because fat is only 10 percent of your total calories. The Isocaloric Diet is 33 percent fat. The BODYOPUS (don't try it; the exits are locked) Diet is 70 percent fat. Howzah! It's easy to fulfill these fat quotas if we blank out everything we know about cardiovascular health. But if we want to crawl out of the saturated slime, we need to become ethical fatties. Let me illustrate some choices other than the Bulgarian Death Fats.

Your first choice is the one nobody likes: fish oil. You may be familiar with the eicosapentanoic acid (EPA) and its fishy twin, docosahexanoic acid (DHA). You can remember them as the we-don't-usually-eat-fish oils. Americans are used to white fish, which is low in fat. How do I convince you to eat salmon, trout (are those two so bad?), mackerel and (uh-oh) sardines? I can't. Sardines in particular conjure up memories of the little mouse in the Tom and Jerry cartoons cruelly baiting the poor old Tom cat with enticing sardines. I still remember the vapors



rising from the turned-back lid while Jerry held his mousy nose. Oily fish is an acquired taste, unsettling on the tongue with its unusual slickness. I have consumed innumerable cans of tuna fish, disliking every one, so I think it is possible to train yourself to have one 4- to 6-ounce serving of oily fish every day. Just can the can of tuna. Maybe turn the usual can-o'-tuna into a can-o'-salmon or mackerel or ... sardines.

Why these stinky, icky fish? Because fish fats cannot readily be made in the body, but are needed by organs (especially the brain). This is your brain (see picture of a walnut). This is your brain on sardines (see movie still of The Brain From Outer Space). Any questions? Of course, plenty of people don't consume oily fish and still have healthy brains — or do they?

Humans can build these necessary fats from two polyunsaturated vegetable oils, linoleic acid and linolenic acid. Most supermarket oils, such as corn, sunflower and safflower, contain linoleic acid. Linolenic acid, on the other hand, has been elusive. Soybean oil is the only supermarket oil that contains linolenic acid. However, the ideal choice is flaxseed oil. You should take the time to find a source of it. Most health food stores that have refrigerators carry it. You can also consume whole foods that contain linolenic acid, such as walnuts and pumpkin seeds. Flaxseed oil is on my "must-have" supplement list, right next to whey protein.

Fish oils and polyunsaturated vegetable oils should cover your fat needs. On the Modern Diet, a meal of oily fish and a green salad with flaxseed dressing would fulfill your fat requirements. At 2000 calories, 10 percent fat is only 200 calories. This is less than 2 tablespoons of oil. Don't forget that part of the 200 calories will be tagalong saturated fats from other foods.

In the Isocaloric and BODYOPUS Diets, the fat require-

ments are higher. The easy way to fulfill them is to just eat more of the above. You don't have to eat essential fats exclusively; the unsaturated fats in avocados and nuts will do. Olive oil contains monounsaturated fatty acids, and there's a real buzz on the cis form of oleic acid, the main fatty acid in olive oil. It's one of those do-no-harm fats, but unless you have a real olive fetish, consuming a lot of olive oil is difficult because of its pungent flavor. I prefer the new genetically altered sunflower oils that are 90 percent oleic acid simply because I don't like the taste of olive oil. The beauty of olive oil is its neutral effect on the metabolism. While saturated fats impair insulin sensitivity, oleic acid does not.

Now we can move into the weird fats that don't comfortably fit in any particular category and do not occur in abundance in nature. Medium-chain triglycerides (MCTs), have been the subject of much athletic research. Although they are saturated fats, they behave differently than longer-chain fats.

Think of fats as pieces of chain. The short lengths, like butyric acid, are easiest to digest. Really long fats, like wax and paraffin, are indigestible.

MCTs are found in relative abundance in coconut oil. Less than half of coconut oil is MCTs, but it is the highest source in nature. I seem to remember a Mexican wild bush that yielded high amounts of MCTs. There was an ongoing project at the University of California at Davis to domesticate it. How do you domesticate a wild bush?

MCTs are weird because, unlike longer fats, they don't need bile to emulsify them, and they go directly through portal circulation into the liver.

MCTs were originally created in the petroleum industry in the 1950s, and have been used primarily as nutritional support for individuals who cannot produce bile to digest normal fats.



MCTs have been extremely beneficial for infants with this condition, as fat is essential to good growth.

In the bodybuilding world, MCTs have had an unjustified reputation. Although MCTs go directly to portal circulation like carbohydrates and proteins, they do not elevate body temperature. I will admit that I assumed they did (about 12 years ago), and probably helped to propagate this falsehood.

Another false claim is that MCTs cannot be deposited into fat cells. This is not exactly true. Intravenous infusions of MCTs are not easily deposited in fat cells. However, digested MCTs are broken down in the liver and then reassembled into familiar long-chain triglycerides. MCTs exit the liver as regular fats.

MCTs are tasteless, but they have a startling aroma of petrochemicals when used as frying agent. MCTs should not be used for baking because the enzymes in seeds and seasonings break them down into individual fatty acids that have a soapy flavor.

MCTs have no place in the Modern Diet because 10 percent fat calories does not allow much room for anything other than essential fat.

Although MCTs are more rapidly available to the bloodstream than more complex dietary fats, people assume this means that they somehow give an athlete more strength, speed, endurance or size. Research has not shown these assumptions to be true. Although I was initially enthralled by MCTs back in the early 1980s, I now feel that if you eat a Modern Diet with moderate amounts of carbohydrates, MCTs have no useful place.

End of story? No. In the Isocalóric and BODYOPUS Diets, MCTs can be useful. To reduce insulin, you need calories that are not carbohydrates or protein. Perhaps this is MCTs' golden moment?

Ah, I wish it were that simple. Adult humans cannot digest very much MCT oil at one time without stomach upset. Most fats are digested in the small intestine by lipase. However, the stomach does have some lipase action, which breaks down MCTs before dumping them into the small intestine. Eight-carbon MCTs are the easiest to break down and cause the most stomach upset, nausea and diarrhea.

All MCTs are mixtures of C-8, C-10, and C-12 fatty acids. The C-8 component is present in large enough amounts to limit each serving to 1 or 2 tablespoons. Ideally, a highly individualized C-10 MCT oil would prevent stomachache. By the way, C-12 cannot do the job because it is only a quasi-MCT. About 35 percent of the C-12 fatty acids are transported like other longer fatty acid chains, skipping the direct route to the liver.

Unfortunately, MCTs are hard to find. There are not many brands, and the few that are available do not label the ratios of the carbon lengths they contain.

In the BODYOPUS Diet, MCTs become even more useful. During the 7-day dieting cycle, fats are converted to ketones. Because they are shorter, MCTs convert to ketones more rapidly than longer fats. Of course, your body can make ketones without MCTs, but MCTs will make you feel better when the low blood sugar from carbohydrate restriction is dragging you down.

You can use coconut oil instead of MCTs. Unfortunately, over half the longer fats in coconut oil are ordinary saturated fats. They're not the Bulgarian Death Fats, but not too far off in the public's mind. In addition, the saturated fats in coconut oil impair insulin sensitivity.

There are other weird fats. I've skipped short-chain triglycerides because they have been associated with some nasty health problems. Conjugated linoleic acid (CLA) is an anti-catabolic,



anti-oxidant fatty acid found in heated beef fat. It is one of the few good trans fats. In addition, there are a few fats intermediate in status between essential fatty acids and fish oils that could be of interest in a small group of individuals. Gamma linolenic acid (GLA), found in primrose oil and borage oil, has almost a cult following. GLA has beneficial effects on both estrogen and testosterone.

If there was more hard evidence that relates specific dietary fats to performance, I'd give firmer recommendations. Rat studies show that a diet containing 15 percent essential fatty acids improves growth. However, we need human lab rats to validate this. For now, I'm still working up the courage to roll back my first can of sardines, or not to spit the pizza out of my mouth when I inadvertently bite into an anchovy.

CHAPTER 16

# DIETARY FATS: HIERARCHY AND ARRANGEMENT

FAT IS THE NEGLECTED NUTRIENT of athletic performance. Over 12 years of coaching bodybuilding competitors, I've seen how dietary fat can make or break a pre-contest carb-up. (Carbing-up is the process of over-supplying the muscles with carbohydrates after a period of carbohydrate restriction.) Bodybuilders who cautiously increased carbohydrate intake without adding much fat had only small, disappointing muscle gains. Those who included unsaturated fats attained a muscle glycogen supercompensation beyond my predictions.

The following is the hierarchy of fats for the Modern or Isocaloric Diet, from ideal to hum-drum.

## FISH OILS

These fats are identical to the fats used in the brain and other organs. Although humans *can* synthesize these fats, this is an enzyme-driven process that can decline with age.

## ESSENTIAL FATTY ACIDS (EFAS)

Certain vegetable oils have high amounts of linoleic and

linolenic acid, the essential fatty acids. Although many animals store these essential fatty acids in carcass fat, they become adulterated when the meat is cooked. Consuming cooked animal fats will not fulfill your essential fatty acid requirement.

Many commonly available oils, such as corn oil and canola oil, contain EFAs. However, I recommend using whole unprocessed food sources, such as walnuts and pumpkin seeds, whenever possible. Cold-processed flaxseed oil, although more difficult to find, is ideal for fulfilling linolenic acid requirements. As an added bonus, 20 percent of flaxseed oil is EPA. Flaxseed oil will perhaps be your most important supplement purchase (after whey protein).

### OLIVE OIL

This monounsaturated oil is not essential. However, whole olives are surprisingly low in calories, considering their satisfying bulk. In contrast, nuts are high in fat and dishearteningly small in volume.

### UNSATURATED OILS

These nonessential oils are vehicles for the essential fatty acids in many vegetable oils.

### SATURATED FATS

We can't help it. All flesh products, and even some vegetable oils, contain saturated fats. Because they lower insulin sensitivity, it's not a good idea to eat them with carbohydrates.

### MEDIUM CHAIN TRIGLYCERIDES (MCTS)

MCTs are helpful in the BODYOPUS Diet because you will require an unusually high amount of dietary fat. As MCTs offer



fast conversion to ketones (which the body can use in lieu of glucose), they are an ideal fast energy source for BODYOPUS. As much as you might like to jam in as many MCTs as possible, the practical limit, because of stomach upset problems, is 120 to 240 calories per meal. Over 6 meals, this adds up to between 720 and 1440 calories per day.

There is only one rule for scheduling unsaturated fat consumption: Keep dietary fats away from the post-exercise meal. Because dietary fats slow gastric emptying to the small intestine, adding fats to carbohydrates will slow their absorption (which is why ice cream, which contains sucrose, is a low glycemic food). This property can be useful in stabilizing blood glucose throughout the day. After a workout, however, you need foods that can be digested rapidly.

CHAPTER 17

# CARBOHYDRATE RECOMMENDATIONS

CARBOHYDRATES are the fundamental test of any fat-loss diet. To arrive at a suitable food debit, you must cut carbohydrates. You can't blame excess body fat exclusively on dietary fats. Of course, dietary fat does affect weight gain. However, most dieters automatically lower dietary fat — and they still fail. Cravings for dietary fat are easily subdued, but carbohydrate cravings always persist. Even moderate reductions in carbohydrate intake will cause anxiety. When body fat drops to between 3 and 10 percent, the influence of carbohydrate quality becomes especially apparent.

Carbohydrates are not some evil, drug-like substance. Eventually all digestible carbohydrate sources reduce to ordinary glucose or triglycerides. However, they do affect insulin secretion, which profoundly influences fat loss.

Frankly, the total amount of insulin secreted over a specific period, say 24 hours, doesn't vary substantially with a fixed carbohydrate amount. If we ingest X amount of carbohydrates over 24 hours, the pancreas will secrete Y amount of insulin. The total insulin amount will be similar, whether the 500 g are a complex starch or liquid glucose.

Why do we bother to judge the quality of carbohydrate sources? Because insulin secretion depends on carbohydrate quality. Fat and muscle cells accept glucose at different insulin thresholds; if they were the same, glucose would be driven equally into both.

To gauge carbohydrate quality, we use the same scale that diabetics use to estimate their requirements for injected insulin: the glycemic index. The glycemic value of a carbohydrate is the rate at which it is converted to blood glucose, as compared to liquid glucose, the reference value of 100. Other carbohydrates usually have lower glycemic values than liquid glucose. The glycemic index is not a reliable indicator of the amount of insulin secreted because most people don't eat carbohydrates exclusively at each meal. Other nutrients will interfere with absorption and alter the glycemic value.

Total carbohydrate intake has the greatest influence on insulin secretion over a 24-hour period. Both the Isocaloric Diet and the BODYOPUS Diet work by reducing insulin secretion by reducing overall carbohydrate intake.

The next (and very important) step is to decrease the insulin peaks caused by fast (high-glycemic) dietary carbohydrates. These insulin peaks will, of course, rapidly drive glucose (and amino acids) into both muscle and fat cells. However, muscle cells don't need as much insulin as fat cells. As you can imagine, these high insulin levels will drive glucose preferentially into fat cells. To make things worse, high insulin levels also interfere with fat cell disassembly. Chronic high insulin levels will also eventually reduce insulin sensitivity in muscle cells.

Sometimes even normal blood glucose levels can cause high insulin peaks if you have faulty insulin transport mechanisms. There are two broad categories of insulin transport malfunction: insulin resistance and low insulin sensitivity.



Insulin resistance is primarily a deficit at the insulin receptor level, while insulin sensitivity involves both receptor and post-receptor mechanisms. These deficits cause you to secrete too much insulin, which sledgehammers glucose into the fat cells. This condition is called hyperinsulinemia. The BODYOPUS Diet works spectacularly well for middle-aged and older people, because hyperinsulinemia is a fact of growing old.

Insulin sensitivity is highest in the morning and declines during toward evening as cortisol levels rise. For years, bodybuilder coaches recommended that their athletes eat meals low in carbohydrates at night. Now you know why.

My suggestions will not be readily accepted outside of the bodybuilding community. Many food items from Slimfast or Jenny Craig contain the worst possible carbohydrate choices.

There are three broad categories of carbohydrates: starches, sugars and glucose polymers. Starches come in many configurations. Some molecules are laid end to end, like strings of pearls, while others look like ragged tumbleweeds. Enzymes break down all of these complex carbohydrate structures — breads, pastas, cereals and vegetables — into simple glucose.

Many factors will slow absorption, either delaying gastric emptying into the small intestine or slowing transport across the small intestine to the liver. We already know that dietary fat will slow gastric emptying. In addition, the amount (and type) of fiber in the starch source will slow absorption. For most dieting situations, slowing gastric emptying is a good thing because it evens out the insulin peaks.

I don't engage in nutritional quarrels over which complex carbohydrates to choose for a low-calorie diet. There are too

many interesting choices to try to limit complex carbohydrates to single items, like brown rice, beans or vegetables. Some nutritionists split hairs over the lower glycemic rating of, for example, sweet potato versus white potato. Ultimately, the quantity of starch will have more impact on the number of insulin peaks than the quality.

However, I do not recommend bread, processed cereal or other highly refined starch sources. Instead, choose more complex, high-fiber items like sweet potatoes, brown rice, beans and raw green vegetables. However, nothing is absolute. I love bread. Others crave rice cakes. Technically, there are better carbohydrate choices, but a bowl of Alpha Bits will not throw off your whole diet. Just don't eat the whole box like I do.

Highly refined starches will have a different glycemic rating than their unprocessed counterpart. Those bodybuilding diet staples, rice cakes, are actually rated over 100, above liquid glucose. Corn flakes have a glycemic rating in the 90s, much higher than whole corn. For most complex carbohydrates, insulin oversecretion is not too much of a problem, unless, of course, you have a compulsion like I have with Alpha Bits.

Sugars, however, do present problems. All sugars — sucrose, glucose and lactose — cause insulin to peak rapidly.

Most savvy dieters try to avoid concentrated sugars simply because they don't alleviate hunger for very long. However, some dieters do include fruit, which contains both fructose and sucrose. In its favor, fruit has nice amounts of fiber, vitamins and minerals. However, removing fruit from a diet always causes visibly greater fat loss, especially towards the end.

Fructose isn't too much of a problem, for a variety of reasons. First, fruit does not have terribly high amounts of fructose. Most fruit actually contains more sucrose and glucose than



fructose. Second, fructose is used by the liver in two ways: it can be converted to glycogen or to triglycerides. Ideally, all fructose would be transformed into liver glycogen and eventually converted to glucose for use. Remember, though, that all conversions are enzyme-driven. The liver has very little fructose-converting enzyme. Most individuals can only convert about 200 calories (50 g) of fructose to glycogen over a 24-hour period. Then, the fructose is converted to fat.

Most of the insulin peaks that occur after eating fruit are caused by the tag-along sucrose. Sucrose is a disaccharide (two simple sugars bonded together) of glucose and fructose. Insulin has a greater effect when you eat disaccharides because not all of the sugar reaches the bloodstream at the same time, but much of the insulin does. Although fruit seems appetizing, I recommend that dieters, especially women dieters, avoid copious amounts of fruit. About 200 calories or so each day will replenish your liver glycogen, but 200 calories is not much fruit.

Sugar is often hidden in foods. All frozen milk desserts, such as yogurt and ice cream (especially the new no-sugar ones), contain lactose, another high-glycemic sugar. If you consume these foods late at night when insulin sensitivity is reduced, you can be sure that blood glucose will transport into your fat cells.

Sugar consumption greatly affects fat loss on a low-calorie diet. Of the three macronutrients, dieters crave carbohydrates the most. The current term (and it is quite correct) is "carbohydrate addiction." I recommend that you consume no more than 200 calories of simple sugars (including fruit) per day. Plan your meals so that you eat high-glycemic foods when your insulin sensitivity is highest, in early morning or immediately after a workout. Since these sugars reduce insulin sensitivity, it

would be a good idea to take insulin sensitivity boosters like chromium, vanadyl sulfate and magnesium along with the sugar.

I suppose I should discuss powdered carbohydrate supplements, although I feel they are uninteresting and unfulfilling. When I embarked on the path of Guru-dom back in the early 1980s, I was a strong advocate of high carbohydrate consumption in general and maltodextrins in particular. I now know that I, along with the majority of nutritionists and athletes, was just wrong-wrong-wrong about carbohydrates. Most other "experts" are still in stepping in time to the ill-advised eleventh commandment: Thou shalt eat copious amounts of complex carbohydrates.

Maltodextrin is actually a trade name for a particular glucose polymer derived from corn. However, glucose polymers can be created from just about any vegetable starch material, such as potato, pea or rice. The starch is isolated, then cut to a length between a simple sugar and a full-length starch. Shortening the starch changes its pourability in dry form, its solubility in liquids and its perceived sweetness.

Before the early 1980s, maltodextrins (the most popular of the glucose polymers) were relegated to use as binders, fillers and glues (such as the glue on postage stamps). Many in the food industry erroneously thought that all maltodextrins were sugars. It was Michael Zumpano, working with the Weider organization, and then with Unipro, who noticed that certain maltodextrins are a blessed combination of the best qualities of starches and sugars.

His ideas and the introduction of the CARBOPLEX nutritional supplement revolutionized the not only the health food industry but mainstream food preparation as well. Today, maltodextrins can be found in baby food, cocoa, diet products, sports drinks and even reduced-fat peanut butter.



Do I have any objections to glucose polymers other than that they are boring and bland? Consuming carbohydrates that have a higher glycemic value than cornstarch won't help non-endurance athletes. Most maltodextrins cause a sharp dip in blood glucose after 2 hours. Although the glucose polymer market has become more sophisticated, the real solution to the drop in blood sugar was the creation of a new class of soluble starches called amylopectins.

The chief problem in using a product that includes glucose polymers is that you have no idea what its glycemic rating is. Maltodextrins, for example, can have chain lengths as short as 3 glucose molecules or as long as cornstarch. The selection is based on manufacturing needs, not the need of an athlete to avoid high-glycemic foods.

Here's a new trick you can use to slow absorption of any carbohydrate, including glucose polymers. While dietary fat will slow the absorption of carbohydrates, soluble fibers or gum will turn the whole carbohydrate-protein-fat matrix in the stomach into a gel-like mass. I prefer guar gum because scientific research has documented that it heightens insulin sensitivity and increases thermogenesis. I imagine that other gums, like locust bean gum or one of the pectins, would have similar benefits. You can take up to 10 g of guar gum 3 times per day. I have had no digestive problems from ingesting guar gum, but you may want to start with 5 g and work up to 10 g. Of course, combining guar gum with dietary fats will slow gastric emptying even more. By the way, many individuals whose stomachs cannot tolerate even small amounts of MCTs can consume them with carbohydrates, protein and guar gum, which will hold the