



# Low Carbohydrate Diets: Asset or Liability?

*By LCdr. Simon Bartlett, Ph.D.*

**“Y**ou don’t know what you are talking about,” said the young lieutenant, sitting through my stress and human-performance class. He was referring to my counter-argument about the efficacy of low-carbohydrate diets. Later, I found out he was on one, and, in my opinion, he G-LOC’d multiple times in the centrifuge because of it.

Low-carbohydrate diets recently have become popular; they promise a magnitude of benefits, from weight loss to increased athletic performance. Because I’m the department head of the Aviation Survival Center, NAS Lemoore and I have a strong background in sport nutrition and exercise physiology, TacAir pilots frequently

ask me for performance-enhancement information. I also am privy to many of their personal goals, concerns and experiences in the ever popular arena of nutrition and exercise. Pilots, being who they are, constantly look for the edge and sometimes will resort to various means to get that edge.

A year ago, my phone rang, and I recognized the voice of a commander who recently had completed centrifuge training. He asked if I remembered him from CFET training. I recalled when he attended and that he had done well with the profiles, some at 7.5 Gs.

The commander’s concerned voice told me something wasn’t right in Hornetsville, and he was about to let me in on something important. He went on to tell me he was having significant

problems with grayout and blackout at relatively low Gs. These problems had gone on for about six weeks, and he didn't know why.

Using my sleuth skills, I launched into some questions. How's your flight time?

He said, "I'm getting above normal amounts."

I asked about hydration. He replied, "I'm drinking plenty of fluids."

I asked about his exercise and sleeping habits. "Everything is normal," he said.

I was stumped; then, it struck me—illness. Had he been ill during this period of time? But he said no.

I had exhausted all possibilities and recommended he come to the centrifuge so we could evaluate his technique and possibly identify the problem. As I was about to hang up the phone, the commander made a very important revelation, "I don't know how significant this is, but I have been on the Atkin's diet for the last six weeks."

### Bingo! I had found the cause.

The Atkin's diet is designed as a rapid weight-loss diet; it is not and should not be used as a performance-enhancement diet. The commander had lost 15 pounds over six weeks. In fact, he still was on it at the time of the call.

The mechanism in these low-carbohydrate, high-protein-and-fat diets isn't rocket science. Very low carbohydrate intakes over an extended period of time result in the body going into a mild state of ketosis. In this state, the body breaks down stored fats incompletely into ketone bodies, which then are released into the circulation. Increased circulating ketones have a profound appetite-suppressing effect and, coupled with high consumption of protein (which make you feel more full than other types of nutrients), result in a substantially reduced caloric intake and hence, weight loss.

Research has shown that the type of weight lost is a combination of water, lean body mass, glycogen, and fat. A tactical aviator should not lose anything other than fat. The loss of muscle, water and glycogen runs contrary to what is needed in the high-G environment.

A pilot engaged in a resistance (strength) training program and who pulls high sustained

Gs on a regular basis, needs the right type and amount of fuel. That fuel drives the energy mechanism for sustaining the maximum muscle contractions needed under G. The optimum fuel to accomplish this physical challenge is carbohydrates. G-pulling exclusively uses glucose and glycogen to fuel the muscles in the isometric contractions that prevent blood from pooling in the lower extremities.

It is not difficult to understand how a low-carbohydrate diet would be inappropriate for a pilot in this environment. This diet could become a liability, rather than an asset. I have witnessed pilots who have G-LOC'd in the centrifuge under moderate Gs; they admitted to being on one of these diets.

I believe these diets need to be evaluated carefully and with some skepticism before a pilot straps into his aircraft. Let's practice ORM and mitigate all potential risks.

Scientific literature backs my position on this diet. Research indicates the majority of low-carbohydrate diets are potentially ergolytic (performance decreasing) to endurance and high-intensity exercise. Therefore, a low-carbohydrate diet, coupled with intense training protocols (strength training and G-pulling), results in significant suppression of muscle glycogen. You get a corresponding decrease in isometric strength, time to fatigue, and exercise-induced muscle weakness. Remember, carbohydrates—not the proteins and fats—are needed to replenish the muscle glycogen.

Perhaps a new NATOPS 3710 rule should be, "Warning: low-carbohydrate diets could be dangerous to tactical aviators performing high-G maneuvers."

Diet education is the key. Let's keep pilots abreast of the latest research, provide them resources, and help them debunk much of the unregulated, misleading information. Empower them to make informed decisions based upon science and not hearsay. The goal is to keep them fit and healthy to fly—give them the edge.

Oh, by the way, the commander took my recommendation and got off the low-carbohydrate diet. He introduced significant amounts of carbohydrates back into his regular meals and the problem went away. 

LCdr. Bartlett is a department head at the Aviation Survival Training Center, NAS Lemoore.