Using Advanced Energy Systems WEEKLY

By Dr. Mike T. Nelson **October 2014**

Ever watch a great movie where they showed you a flashback to start it off and it kept you intrigued the entire time? Since we are talking about energy systems here and it may be as fun a watching paint dry to some of you, I am going to pull a flash back to show you the ending first.

The bullet points below are where we will end up if you are willing to hold on for the whole ride. Everyone tell Mike Tuchscherer to get his hands inside the bus for a change…..here we go.

- All 3 energy systems turn ON at the same time, but have very different RATES of flow that determine how much they are used in different exercises
- SWITCHING from one system to the next is key to progress. The faster you can move back and forth, the better you can supply the right fuel at the right time (ala metabolic flexibility).
- Set up your training to be as specific to your goal as possible as this will yield the best results via the SAID principle.
- I will present to you a 5 step process to maximize the specific adaptation you want (read, get some bad ass PRs and pick up chics).

In the Beginning…
The SAID principle seems to be the red-headed step child of fitness that shows up all the time, but is rarely ever discussed. As you know, it stands for Specific Adaptation to Imposed Demand. To get a specific result, you need specific work. While you can see some positive transfer, that is never a guarantee.

If doing burpees increases aerobic fitness, strength, flexibility, conditioning, fat burning, carb usage, and strength endurance all at the same time, that tells me either:

1. It sucks major moose balls since it is not specific or
2. The person doing burpees just motivated their large in charge butt off the couch and out of the cheese doodles bag.

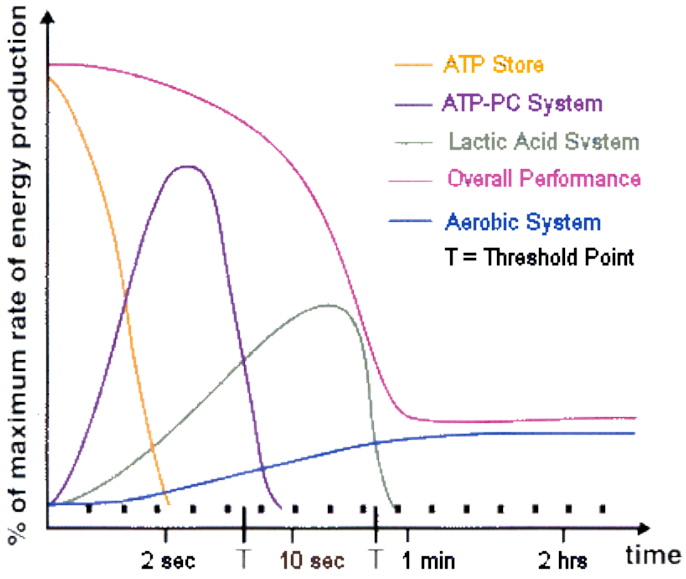
It is the whole "jack of all trades, master of none" deal. Now that is perfectly fine as long that is your goal. For most though, their goals are specific so their training needs to be specific and periodically tested against their goal to determine progress.

Energy Systems During Exercise Rant
Bioengergics is the fancy pants science of how the body supplies fuel to keep you moving and lifting. While it is true that you can *emphasize* certain aspects of energy systems, you can't *throw out* one whole system entirely like your lazy cousin who keeps passing out on your sofa.

I may hate lactate work, but I can't just throw it out since I believe the system is never working. All 3 of the main systems (alactic, lactate, aerobic) turn on at the SAME time, but their RATE of flow are very different. They are all tightly coupled together.

Energy Systems 101
For example, even high amounts of alactic work is fueled primarily by CP during the event. But once the exercise/event (say a 1 rep snatch) is done, the repayment of that ATP used is primarily from the aerobic system, fueled by mostly fat.

The systems are all tightly coupled together and it is the ideal switching from one to the next and using the right fuel for the



right task that must be taken into account with training and nutrition.

5 Step Process To Bigger PRs
Why 5 steps? Because prime numbers are cool and in every awesome program, right? Actually it just happened to work out that way.

Step 1 – What do you want to improve?
Find a task or exercise that you want to improve and test it. Let's say for you it is a farmer's walk with 200 lbs per hand for 200 feet. Grab 200 clams per hand and start walking. See how far you get. Yeah, yeah, this is very simple and basic, but this step gets skipped ALL the time!

Step 2 – What main energy system is it working?
To know this one, look at the time it takes to complete your selected exercise.

Let's say you can grab 200 lbs per hand, but you only make it 100 feet. Bad strongman, you must post 23 comments in the

forum, hahaha, just kidding. Your goal is 200 feet so take a lighter load that will allow you to make 200 feet with a fair amount of effort and record the time. This will give you a pretty close approximation of the time it will take for your goal. The time is one of the primary ways to determine energy system use. Remember, we are emphasizing one system here, not isolating it.

Step 3 – Is there any switching?
Do you have to switch from one energy system to another and back? In this case, yes, especially if you are doing it as part of a strongman competition or for multiple trips as the repayment of energy between events is primarily aerobic. Pretty much anything other than a 1 rep attempt will result in some type of switching of energy systems.

Step 4 – Match your training nutrition to the main fuel used
This one is a bit tricky as it will be all 3 systems again, but you can simplify it to 1) CP, 2) carbohydrates 3) fat. Remember, if there are no carbohydrates used at all (such as in Mcardle's disease), very little lactate is formed. Any exercise that produces that burning sensation (from the H ions and lactate being produced) is primarily fueled by carbs.

Insulin can be thought of as the fuel selector switch. Higher levels of insulin push the body to use carbohydrates. Lower levels of insulin push the body to use more fats.

Your training would be set up to match nutrition to the goal of that session. For example, if you need to bring up your aerobic capacity, you need to emphasize fat as a fuel. Since fat is used more readily under low insulin conditions, some of you training should be done in a fasted state (low insulin release) as this will work to increase all the metabolic pathways associated with aerobic metabolism. Of course this is not the only way, but I've found it to be very efficient. If your training is primarily carbohydrate driven, taking in a carbohydrate/protein shake before training will help increase insulin release and push the body to use carbs during training.

Step 5 – Can any supplements help?
The reality is that most high level athletes will use supplements and there are a few that can help.

- Multiple studies have shown that creatine-monohydrates will help increase 1 rep max and power (Buford, et al., 2007).

- Beta alanine binds with the amino acid histidine to form intramuscular carnonsine, which is a powerful buffer of H ions that are created when the lacate system is used. Remember that lactic acid is actually lactate plus H ions with lactate serving as a great fuel which can be used directly by the brain, heart, and muscles or converted back to glucose via the Cori Cycle in the liver.

- Caffeine may help with lipolysis (Acheson, et al., 2004) but there is little evidence that it increases the rate of fat oxidation.

- Asataxanthin had some early data showing that it decreased the breakdown of the CPT-1 enzyme which is crucial to help fat flow to the mitochondria, but a recent study did not increases performance (Aoi, et al., 2008), Various types of L-carnitine have been suggested to help fat use, but they too have been a bust in the literature. In the end, for increasing fat usage it appears fasted training is the best.

Summary

- All three systems activate simultaneously, but have very different flow rates that determine how much they are used in different exercises.

- Switching from one system to the next is key to your progress.

- The faster you can move back and forth between energy systems, the better you can supply the right fuel at the right time (ala metabolic flexibility).

- Set your training to be as specific to your goal as this will yield the best results via the SAID principle.

- Use the 5 step process above to maximize the specific adaptation you want to achieve then retest again to determine your progress. Rinse and repeat.

- This process will increase metabolic flexibility so your body will automatically pick the right fuel while lifting (better performance) and then switch back to using fat during most of the day (thus burning more fat so you are leaner and can pick up chics).

About the Author
Dr. Mike T. Nelson has spent more than a decade of his life learning how the human body works, specifically focusing on how to properly condition it to burn fat and become stronger, more flexible, and healthier. He has a PhD in Exercise Physiology from the University of Minnesota in addition to a BA in Natural Science, and an MS in Mechanical Engineering (Biomechanics). He's an adjunct professor and a member of the American College of Sports Medicine. He's been called in to share his techniques with top government agencies. The techniques he's developed, and the results Mike gets for his clients have been featured in international magazines, in scientific publications, and on websites across the globe. Get more information on him at http://www.miketnelson.com

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