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| **Issue: #6** | **June 2011** |  |

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| **Dear Exercise Physiologist,** Thank you for being part of our community. **ASEP is the specific voice for (historically under-represented) Exercise Physiologists.** Please use this Newsletter as a link to ASEP resources from scientific journals to professional papers, to employment and related opportunities. And be sure to click on "More On Us" at the left for the ASEP-Newsletter's parent web site.Yours in health, -Lonnie Lowery and Jonathan Mike, ASEP-Newsletter Editors  |

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| **Editor's Corner** |  |
| editorial**Exercise Physiology Dilemma!****Preface** *This month as summer begins, I am reprinting an editorial from one year ago. In the past year I have indeed been teaching exercise science students and I do indeed feel an element of an ethical dilemma. I have even had discussions with fellow faculty about the precarious future awaiting the ones without future plans in Physical Therapy, Athletic Training, or other licensed professions. One capable exercise science student, who presented at an international conference with me just a month ago, is considering more schooling in a Physical Therapy Assistant  program, which feels a little like a step backward, as this is not even a Bachelors degree. Another will be in a holding pattern for a year as she contemplates possible grad school in Physical Therapy. A third is going to switch gears and attend graduate school in nutrition, a (non-EP) field in which there is also licensure. Yet another student is unsure but will take his chances in a training center in the the Twin Cities. I see a clear pattern: use exercise science as a stepping stone and change fields or settle for uncertainty...***What Now?** I just spoke to a couple of students who are slowly losing the glow of a successful graduation and looking toward the future. One will seek employment in pharmaceutical sales, the other has perhaps shorter term plans to work at a diabetes-related summer camp. But teaching in a dietetics department for the past six years has left me with one comforting thought for my students: whatever they choose, at least they have the option to seek an internship and become a licensed dietitian. They have solid choices when June and July roll around and they start asking themselves "What now?" As I contemplate future teaching in exercise physiology, though, **I wonder how intensely I will feel the ethical dilemma of preparing EP students who have no license to pursue upon graduation**. I'm aware that they can seek further education in physical therapy or nursing or some other aspect of medicine. And I know that they could become strength coaches after taking the CSCS exam. But I will probably continue to wonder why they can't receive a "livable salary" and the respect of others due to having their own license in Exercise Physiology. What will they do when they graduate? My understanding is that entry level dietitians earn $46,000 (national average, not in all locations) but despite **rapid growth in exercise professions reported by the U.S. Department of Labor**, I'm guessing grads of exercise science-specific programs have entry level salaries far lower than $46K. Why? Their training is quite similar and sometimes even more rigorous; I'm living proof. The difference lies in having a large, specific, coordinated organization (or organizations) championing them (for several decades) and, of course, a license to practice. There are not 300 different credentials toward becoming a dietitian, nor are the major nutrition organizations at odds with each other, diluting and confusing the profession. In Ohio, one needs a license to do nutrition assessments or give prescriptive nutritional advice. The governmental intent is to protect the public. In Ohio one also needs a license to cut hair - but not to put an obese, hypertensive, arrhythmic man on a speeding treadmill. Graduates of exercise science programs thus enter a largely unregulated market where evidence based practice is replaced by the opinions of gurus and all manner of "proprietary systems" concocted by under-educated trainers. I wonder how many current students in exercise science programs really consider this future. So as late May leaves us and June comes upon us, bringing a dawning realization of "What now?" to many exercise science grads, I hope they find **ASEP** - and for that matter the National Strength and Conditioning Association (**NSCA**) and the American College of Sports Medicine (**ACSM**). Their strong and unique background deserves continued professional and political support. Lonnie Lowery, PhDASEP-Newsletter Editor  |
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| **Ask the EP** |  |
| **Q: Can you briefly describe the Cross-Over Point during high intensity exercise? What accounts for the biochemical conversion from fat to carbohydrates during high intensity exercise?**In the post-absorptive state, the majority of the energy utilization is derived from fat. During lower intensity exercise (i.e. 30-50% V02 max) the majority of energy production comes from lipid oxidation. However, at greater exercise intensities (i.e. >60% V02 max) energy production comes from carbohydrate metabolism. Therefore, at high exercise intensities, there is a progressive drop in lipid oxidation and a significant increase in carbohydrate metabolism. This phenomenon of the influence of exercise intensity and substrate utilization is termed the "Cross-Over Point". This concept was developed by Brooks and Mercier (1994) and describes the crossover effect from fat metabolism to carbohydrate metabolism. The CrossOver point is the intensity that is usually expressed as a percentage of V02 max, where fat and carbohydrate intercept with the energy from fat being reduced and carbohydrate metabolism increasing. There are many biochemical conversions and adaptations that contribute to this phenomenon. This section will briefly examine these factors. First, there is the contraction-induced rate of glycolgenolysis. As the exercise intensity increases, glycogen breakdown occurs via calcium/calmodulin mechanism, in addition to epinephrine catalyzing the formation of cAMP. This stimulates the phosphorylase B -enzyme (inactive) and phosphorylase -A enzyme (active), and glycogen breakdown occurs.  A second factor involves fast twitch motor unit recruitment. As the intensity increases, so does the glycolytic rate/flux, and the energy demand and force output. Fast twitch motor units are recruited in order to maintain or increase power output levels, in addition to an increase in sympathetic nervous system activity. A third factor involves epinephrine. Epinephrine intensifies the contraction- induced rate of glycolgenolysis, which involves the breakdown of glycogen (see above). The fourth factor involves lactate. As the intensity increases, the glycolytic rate also increases which increases the production of lactate. Lactate inhibits free fatty acid mobilization, and decreases uptake into the muscle. The increase lactate production inhibits the hormone sensitive lipase (HSL) enzyme and FFA is not released into circulation, and becomes trapped in the adipose tissue (Hodgetts 1991). In addition, lactate is also liked to an alpha glycerol phosphate, which is the activated form of glycerol need to make triglycerides. These activities inhibit lipolysis and fat breakdown. Brooks (2005) reports that acetyl CoA from pyruvate inhibits B-ketothiolase (end-enzyme of beta oxidation) and decreases lipid metabolism. Furthermore, other explanations include a reduced blood flow to the adipose tissue. A reduced blood flow would decrease transport to the muscle. According to Hodgetts (1991), there are inadequate amounts of albumin; a plasma protein needed to transport the FFA into the plasma is also reduced. These combination of activities result in increased carbohydrate utilization and a decrease in fat utilization during high intensity exercise.Jonathan Mike, MS, CSCS, USAW, NSCA-CPTDoctorate StudentCo Editor, ASEP Newsletter    |

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| Thank you for perusing our opinions, facts and opportunities in this edition of the ASEP-Newsletter.  **Sincerely,** Lonnie LoweryAmerican Society of Exercise Physiologists  |

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