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| **Issue: #9** | **September 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**A New Academic Year Begins**With September already upon us and summer nearly over, it is time once again for hopeful students to enter the halls of academia. Some students interested in exercise science will start a career path without a definite outcome. Some know firmly they want to be a strength coach. Or perhaps a physical therapist. Of the underclassmen, most students probably do not presently plan to get a BA or BS degree in preparation for further schooling at a tech college (e.g. Physical Therapy Assistant programs). That may seem backward to them, but future career prospects may slowly change their minds. After all, a licensed and insurance-reimbursed profession like physical therapy (even at an assistant level) offers prestige and salary that an undirected exercise science career does not. Perhaps this is a maturing process. Perhaps this common scenario is indicative of ongoing injustice against well-trained exercise science students. In any case, there are also the recent grads across the country to consider. Their summer is now over. With school starting for a new batch of hopefuls, and professors giving them the attention they need, I wonder what last spring's graduates are feeling this month. Will any feel abandoned or cut off? Not all will be in a new classroom or university moving toward a higher goal. Sure, many recent grads are moving on to professional schooling and are very busy, but some are looking at a poor employment picture, with large student loan payments coming due. This is the case with 2011 grads across many fields of study, certainly, due to a poor economy but it is doubly tough for students in a field where they are expected to compete against personal trainers who never went to university at all. The exercise science grads may be far more knowledgeable, but the profession simply doesn't always demand such expertise. And there are hundreds of certificates in the personal training profession, which confuse many employers. Hopefully, this is where ASEP comes in. Through its web site and newsletter, ASEP offers a voice and a chance at community for university-trained exercise physiologists who do not necessarily move on to another profession. It also creates community among those who do move on but have been strongly influenced by their EP roots. So if you are a professor who is concerned where his (her) graduates are, or you are a 2011 graduate wondering "now what?", or you are a recent grad moving on toward related schooling in a regulated profession, ASEP is an organization for you.  Yours in health,Lonnie Lowery, Ph.D., RD   |
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| **Ask the EP** |  |
| **Q: What are the major adaptations to cardiovascular exercise training?**The physiological responses, specifically the chronic (long term) adaptations to cardiovascular exercise are multi-fold. The following will examine the chronic adaptation(s), along with a description/explaining for each adaptation. Decrease in sub-maximal and exercise heart rate. This is primarily due to an increase in the parasympathetic nervous system from the neurons in the cardiovascular control center in the medulla. This causes a decreases activity of the SA and AV node, therefore reducing heart rate. In addition, the sympathetic nervous system activity is also reduced. The chronic adaptations to cardiovascular exercise cause an increase in V02 max. There is approximately a 20% increase in V02 improvement due to increase in cardiac output and arteriovenous 02 difference. Resting and sub-max stroke volume also increases with the chronic adaptations to CV exercise, due to an increase cardiac output response. Stroke volume increase due to an increase in venous return due to a increase in EDV (end diastolic volume), or preload. This is primarily due to the increased stretch of the cardiac myocytes/increased stretch of the ventricles. This mechanism was developed by two pioneer research named Otto Frank and Ernest Starling, and term the Frank Starling mechanism. The chronic cardiovascular adaptations also include reductions in resting and exercise systolic blood pressure, although typically the diastolic response remains the same or decreases slightly. However, the exact mechanism(s) how chronic cardiovascular training reduces blood pressure is unclear. It is hypothesized that biochemical, neural and hormonal changes in the blood vessel walls induce a long-term blood vessel relaxation. There is also an increase in myocardial contractility. Brooks (2005) suggests the increased myocardial contractility is primarily due to an increase calcium (CA++) release and transport in the sarcoplasmic reticulum, which binds to troponin C, in addition to an increase in myosin ATPase enzyme activity, which helps determine the strength of contractility . Furthermore, there is an increase in AV02 difference. This represents the amount of 02 that is taken up from 100ml by the tissues during one trip around the systemic circuit. An increase in the amount taken up is used for oxidative phosphorylation of ATP in skeletal muscle. In addition, an increase in blood volume also occurs with chronic endurance training. This is primarily due to an increase in plasma volume.Blood flow also increases as a result of cardiovascular training. This is due to the increased number of capillaries, and greater opening of existing capillaries, which causes more effective blood redistribution, and increased vasodilation, and increased blood flow to the area of working skeletal muscle. A decreased vascular resistance also occurs. Due to an increased blood flow, this would increase vasodilation and thus reduce vascular resistance. These combinations of events and activities lead to overall chronic adaptations and responses to cardiovascular training and 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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