

THE LIFE SCIENCE GAZETTE

Dear “Gene-ie” ...

I wish to become a Super Athlete



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“Really, is it possible for the human body to run that fast?” I am sure that this question pondered in the minds of the audience, while watching the Beijing Olympics and that amazingly fast race of Usain Bolt. The same applies for those who have witnessed Michael Phelps breaking record after record in his “aquatic” environment. Indeed, questioning an athlete’s “natural” win is understandable as the past few Olympiads have turned from a sporting event to a doping event. Since the day sporting fame became so important and the money won in major competitions have reached six figures, shortcuts to the highest position of the podium have been sought by all means. One of the main performance enhancing routes followed by athletes, has been the use of anabolics with the assistance of doctors. However, the competition standards are running so high nowadays, that using existing therapies i.e. “conventional doping” is not enough. Athletes, now search for the physiological enhancement that will ultimately make them **Super Athletes**. What has been known up until now as gene therapy is entering the field of sports with a brand new name: Gene Doping.

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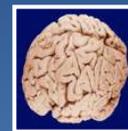
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- We are looking for Student volunteers to contribute to our Department’s Newsletter. Express your opinions and ideas through our “Student Voice” column.
- Do you have books from previous years that you need to sell? Post an add in the Life Science Gazette now!
- “Can yeast inflate a balloon?” Ask our experts any question you think they can answer.

Brain Talks

Love is in the Brain

with Dr Edna Yamasaki

It seems that we will have to replace our usual representation of eternal love, of undying love, of true love, of Valentine's cards and gifts. Why would that be? True, the thought or sight of our beloved ones makes our body react: our heart beats faster, our face gets flushed, and we get emotional.

But, is the heart really the site of love? Scientifically speaking, the heart is made of muscle, and it pumps blood. So, it does make sense that the thinking part of our body, the brain, be a better candidate for controlling love and bonding.

By investigating romantic groups, scientists were able to find that regions in the brain's reward system were active in people experiencing romantic love or maternal love. These brain areas correspond to some regions where the brain hormones oxytocin and vasopressin (or ADH - anti diuretic hormone) are active.

In prairie voles, oxytocin and vasopressin are important for social attachment. Increases in hormone levels lead to partner preference and social contact, whereas blocking the activity of either oxytocin or vasopressin does not. So, will books and movies that tear our hearts out, all our deepest emotions be translated into hormonal fluctuations or protein expression? Hardly. A lot of research and interpretation still needs to be done. Feelings and thoughts are much more complex and cannot be just explained as so.

Sources:

1. Love and the Brain, Brain Briefings, December 2005, Society for Neuroscience.

Research News

Meadow vole or swan? Male Infidelity Linked to a Genetic Variation

by Dr Evdokia Kastanos

Finally, a piece of scientific evidence that should interest a lot of men! New research suggests that male infidelity might be linked to a single genetic variation! Scientists at the Karolinska Institute in Sweden have found a genetic variation on the gene *AVPR1a* which codes for one of the receptors for vasopressin, a hormone involved in attachment behavior with mates and offspring. Three years ago scientists found that when extra copies of the *AVPR1a* gene were added to the brains of promiscuous meadow voles, the animals began acting more like monogamous prairie voles, spending more time with partners and grooming offspring. Similar results were observed in primates.



“Women married to men who carry one or two copies of allele 334 were, on average less satisfied with their relationship”

What about humans? Hasse Walum and his colleagues at the Karolinska Institute sequenced the *AVPR1a* gene in about 500 pairs of twins, all cohabiting for at least 5 years with their partners or spouses. The team found that men who carry one or two copies of a variant of this gene, allele 334, often behave differently in relationships than men who lack this variant. The incidence of allele 334 was statistically linked to how strong a bond a man felt he had with his partner. Men who had two copies of allele 334 were twice as likely to have had a relationship crisis in the past year as those who lacked this allele.

“Women married to men who carry one or two copies of allele 334 were, on average, less satisfied with their relationships than women married to men who didn't carry this allele”, says Hasse Walum. Interestingly, no connection between allele 334 and behavior was found in females. The team reported their results online in the *Proceedings of the National Academy of Sciences*.

Commenting on these results some scientists suggest that the effects of allele 334 may be even greater than reported because the study did not cover single men who presumably are less inclined to fidelity than those in relationships.

Sources:

1. Hasse Walum, *et al.*, Genetic variation in the vasopressin receptor 1a gene (AVPR1A) associates with pair-bonding behavior in humans. *PNAS* published ahead of print September 2, 2008
2. Constance Holden, Why men Cheat. ScienceNOW Daily News, *Science* 321: 1129-1232, 2008
3. Cartoon picture by Mark Parisi, <http://www.offthemark.com/>



DID YOU KNOW.... that if the genome was a book, it would be the equivalent of 800 dictionaries? It would take a person typing 60 words per minute, eight hours a day, around 50 years to type the human genome.

Source: Facts About DNA by Dr. Hsien-Hsein Lei

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Dear “Gene-ie” ...I wish to become a Super Athlete

As defined by the World Anti-Doping Agency, Gene Doping is "the non-therapeutic use of cells, genes, genetic elements, or of the modulation of gene expression, having the capacity to improve athletic performance". Gene therapy involves the insertions of extra copies of particular genes into the body for therapeutic purposes. These extra copies, known as “transgenes”, may cover for a faulty gene or regulate gene activity. On the other hand, introduction of genes in gene doping aims to enhance muscle growth, red blood-cell formation etc.

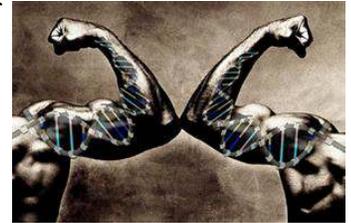
A famous candidate for gene doping has been erythropoietin. Also known as EPO, it acts so as to accelerate erythrocyte production, thus increasing the blood's oxygen carrying capacity. This fact has been well known in the athletic community, and thus, EPO has been banned by WADA and is easily detected in the lab. By inserting extra gene copies of EPO in the body, however, EPO will be produced by the athlete's body and will not be detected. Similarly with EPO, gene doping can be done with the vascular endothelial growth factor. VEGF induces red-blood cell formation and increases oxygen supply to the tissues, therefore also enhancing athletic performance.

In the case of muscle enhancement, growth factor IGF-1 is seen as a very good candidate. As shown in mouse models, by injecting the gene that encodes IGF-1 into a particular muscle you can play “God”; only the particular muscle is affected allowing for selective enhancement. One should wonder why would such specificity be of interest. Well, imagine javeline throwers or race kayakers that need to enhance specific muscles with out waisting training time or stressing other muscles. The use of IGF-1 would basically turn them into undefeatable super athletes. Should they still be considered athletes though?

The issue of gene doping will always be surrounded by a variety of ethical questions like the one raised above. As cheating by any means has never been appreciated in good sportsmanship, gene doping seems to be the ultimate form of cheating, as it can alter an athlete's performance permanently without being easily detected. Altering DNA portrays dangers that are still unexplored and an athlete's health is far more important than all the money and fame a victory can provide.

Sources:

1. H. Lee Sweeney **June 2004** Can it be long before gene doping changes the nature of sports? *Scientific American*
2. Genetically Modified Olympians? **July 31st 2008** *The Economist*
3. Photo illustration: Newsweek.com



“Contrary to conventional doping, gene doping is permanent”

The Student Voice



Amal V Thomas is a Nursing major student from India at the University of Nicosia

What factors influenced your choice of Cyprus as a study destination?

Cyprus is part of the European Union and thus, the main reason I chose to study here is the European Nursing registration.

Why did you choose Nursing?

Nursing is one of the professions that are related to providing services to people. In my opinion, life is a gift of God, and we have to make our life useful to our own kind. Since I was a child, it has been my ambition to find a job in the medical field and I really like the fact that I will be in a profession whose main purpose is to serve and help people in need.

How is it for a student to live and study in a foreign country? Did the environment of the University of Nicosia help you adjust to your new life here?

Certainly it is difficult for a student to be away from his family and friends. It takes a bit of time but eventually I think most of the International students adjust to the living standards and lifestyle of the country they are studying in. The university environment plays an important role in making the international students' life easier. The friendly approaches of the teachers, their positive responses to solving difficulties like finding jobs, housing etc, smoothens our adjustment here.

How do you find the social relationships between international students themselves and those of international students with Cypriots?

I have a very good relationship with both internationals and Cypriots. However, there is still a small gap between the two groups of students. So I think a series of events organised by the University to promote different cultures and an Open Chat between the Cypriot students and Internationals will give a chance for better understanding of eachother.

What are your future plans? To become a good nurse. I plan to continue my studies until the Doctorate level. My ultimate goal is to become a good university professor.

Ask Andrea Editorial

Welcome to the first issue of our Departmental Newsletter, “*The LifeScience Gazette*”. Our aim is to produce something that all the members of the department both students and faculty, can enjoy . We hope you will embrace the idea, and contribute articles, ideas and suggestions and make every issue better than the previous one.

Andrea Pavlou