Twin Matters

A Family Newsletter from the Mid-Atlantic Twin Registry

Volume XIV

A Message From the Director

Dear Twins:

The MATR is currently conducting some very important research studies with some very remarkable twins! We want to make sure that all of our twins know how much we appreciate your willingness to take part in our research and that your participation is truly important. This version of our newsletter provides updates on our studies so you can see how your participation is making a difference. Without twins like you, this important research would not be possible!

We are also very pleased to announce the beginning of the MATR's DNA repository. With the support of Dr. Francis Macrina, VCU's Vice President for Research, and Dr. Andrea Ferreira-Gonzalez, Director of the VCU Molecular Genetics Laboratory, the MATR is currently in the process of collecting DNA samples from our twins to build a DNA repository. These samples will allow researchers to learn more about the causes of diseases and conditions and will hopefully lead to many new discoveries. We would like to thank all of the twins who have already provided DNA and to everyone here at VCU who has made this tremendous scientific resource possible.

Last, but not least, keep an eye on our website at www.matr.vcu.edu – we have been making some changes that we hope you will enjoy. If you have any suggestions how to make the website more user-friendly, please let us know!

Again, thank you for being a part of the Mid-Atlantic Twin Registry and we look forward to hearing from you!

Sincerely,

Judy L. Silberg, PhD
MATR Scientific Director

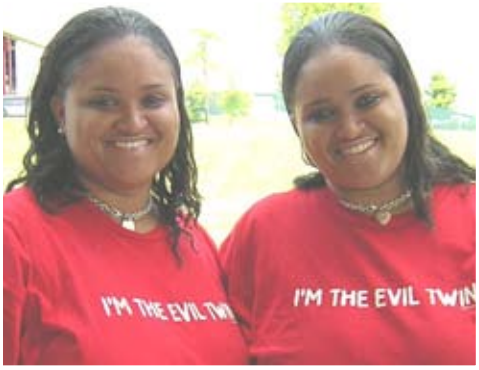
MID-ATLANTIC twin REGISTRY

STUDY UPDATES

GENES, ENVIRONMENT AND THE DEVELOPMENT OF SUBSTANCE USE DISORDER

It is widely accepted that the likelihood for someone to develop substance use disorders (SUD) is due to the interaction of an individual's environment and their genetic makeup. Long term studies show that genes account for 40% to 60% of a persons risk for developing SUD. Research also indicates that environmental influences on SUD changes throughout the developmental periods which include childhood, adolescences and young adulthood. However, we are still early in the process of identifying exactly which genes, which environments, and which developmental transitions together predict the start and progression for which drug of abuse. This study hopes to shed light on these questions. To that end, Drs. Lindon Eaves and Judy Silberg are working with researchers at Duke University to collect genetic samples from study participants. This research, "Genes, Environment, and Development Initiative" (GEDI) is being funded by the National Institute for Drug Abuse's (NIDA). MATR participants that participated in the "Virginia Twin Study of Adolescent Behavioral Development" (VTSABD) and the "Young Adult Follow-up Study" (YAFU) are being contacted by the MATR to invite them to take part in this new study.

Researchers hope findings from this study will improve our understanding of mechanisms that trigger SUD as well as our ability to predict which individuals are likely to be at risk for the development of SUD. This information would increase the likely success of intervention and prevention programs on the individuals most likely to benefit from them.



DR. KENNETH KENDLER REPORTS PROGRESS TO DATE ON THE STRESS AND COPING PROJECT

While the Stress and Coping study continues to explore several areas, one major focus has been on the development of dependence. The study is looking in to the set of factors that (cont'd on page 3)

In this Issue:

VCU

Virginia Commonwealth University

THE EFFECTS OF GENES ON DEVELOPMENT OF PSYCHIATRIC CONDITIONS

With funding from the National Institutes of Health (NIH), John M. (Jack) Hettema, M.D., PhD, is conducting a study with about 1200 MATR twins. This study is testing certain genes for their association with risk for depression and anxiety disorders.

So far, genes for two key enzymes in the brain, glutamic acid decarboxylase (GAD1) and catechol-O-methyl transferase (COMT) have shown significant effects. The first (GAD1) represents a fairly new finding while the second (COMT) confirms the findings from previous studies, including that it increases risk in women only. In the next few years, Dr. Hettema would like to obtain DNA samples from a larger group of MATR participants so he can follow-up his findings with more detailed tests to better understand the effects specific genes have on development of psychiatric conditions.

Dr Hettema is also conducting MRI scans for a study of brain differences associated with generalized anxiety disorder. We are currently trying to contact the last group of potential candidates to invite them to participate. This is the first MRI study for MATR; so far many twins have participated and we hope many more will participate in this important study.

STUDY OF PARKINSON'S DISEASE IN TWINS

Do you or your twin have Parkinson's disease? If so, both of you may qualify for a study looking into how Parkinson's disease influences our brain function at a university Parkinson's Research Center. All expenses associated with the study (transportation, hotel, and food) will be paid. If interested, please contact Dr. Mechelle Lewis at Lewism@neurology.unc.edu or Dr. Xuemei Huang at Xuemei@med.unc.edu .

DOCTORS AT DUKE STUDY GENETIC AND ENVIRONMENTAL CAUSES OF PCOS

The National Institute of Environmental Health Sciences (NIEHS), part of the National Institutes of Health, is studying the genetic and environmental causes of Polycystic Ovary Syndrome (PCOS). Knowing what causes PCOS can help scientists develop new treatments and ways to lower a woman's chance of developing PCOS, especially if PCOS runs in her family. It may also lead to information on how to lower the rates of other conditions that are associated with PCOS such as obesity, diabetes, high cholesterol, high blood pressure, heart disease and certain cancers.

Participation in this study will involve one or both twins in a pair giving a small blood sample to measure their blood levels of the male hormone testosterone. The blood sample will be collected by a home health care agent in the convenience of the participant's home. Based on this result and the results from the earlier phone survey, both twins in a pair may be asked to undergo a medical exam at Duke University Medical Center (DUMC) in Durham, NC. The medical exam will involve giving additional blood for diagnostic and research purposes and undergoing an ultrasound for cystic ovaries.

The **MATR** (Mid-Atlantic Twin Registry) values its participants greatly and strives to interact with our community with consideration and respect. We have the same expectations for researchers that interact with our twins. If at any time you have concerns regarding your experiences with MATR staff or research staff for any study, please do not hesitate to call 1-800-URA-TWIN (800-872-8946) or call the Participant Coordinator for the MATR, Carol Williams, at 804-828-8116 and we will address your concern immediately.

Future Newsletters:

What would you like to know?

If there is a topic you would like to learn about just let us know and we will try to include it in an upcoming newsletter!

Do you know twins who want to register with us?

If so, please ask them to visit our website at www.matr.vcu.edu so they can join thousands of twins who are willing to consider participating in health-related research.

EXAMINING THE MATERNAL AND FETAL GENOTYPES ON RISK TO PRETERM BIRTH

Premature birth is still one of the biggest health problems facing the United States. As the rate of premature births is on the rise it is becoming more and more important to identify risk factors that could lead to a preterm birth. Family and twins studies have proven very valuable in helping researchers understand genetic and environmental factors of various human diseases. However, these studies are not often used to study premature births. Drs. Timothy York, Lindon Eaves, Linda Corey and Jerome Strauss at the Virginia Commonwealth University School of Medicine are studying the children of twins in hopes to better understand the risk factors of preterm birth.

Using a unique type of study, they hope to find out whether the genes of the mother or the genes of the baby dictate the chance of a preterm birth. Also, these researchers can examine the relationship between genes and environmental influences like tobacco and alcohol use. Knowing more about this relationship will lead to important developments in health care. The researchers hope the findings from this study will benefit women by identifying certain factors and conditions which may lead to preterm labor and birth. By pinpointing these risk factors, certain treatments and preventative measures can be taken to lower the risk of premature birth.

STUDY TO LOOK AT CHROMOSOMAL CHANGES ACQUIRED AS PEOPLE AGE

The goal of Dr Colleen Jackson-Cook, Professor and Director of Cytogenetics, in this NIH-funded study, "Aging and Genomic Changes: Role of Environment/Genetics", is to measure how frequently our chromosomes (part of our genes) change as we age and to determine to what degree these changes are influenced by genes and/or the environment. This information is important to know because changes in chromosomes are thought to be key in the development of many health conditions, including cancer, heart disease, Alzheimer's disease, diabetes and arthritis. To meet the primary study goal, identical and non-identical male and female twins from different age groups have been asked to provide a blood sample and a cheek swab sample. These samples are then evaluated by scientists. This study is ongoing but the researchers have already found some interesting results. For instance, the researchers have learned that acquired chromosomal loss happens more frequently than chromosomal gain. The study results have also shown that the overall rate of changes in chromosomes increases with age. However, this seems to be specific to certain chromosomes, with the loss of the X chromosome in females over 50 years of age to be most distinct.

As a result of these studies, it has also been discovered that the length of the tips of the chromosomes, or the telomeres , are related to the acquired chromosomal changes. People who have shorter telomeres tend to have more chromosomal changes as they age. In the twins studied so far, the identical twins showed more similarity for their tendency to acquire chromosomal changes than the non-identical twins, suggesting an overall genetic effect. However, inherited genetic factors did not account for the majority of the trait inconsistency observed, suggesting that environmental influences may also influence chromosomal changes and telomere lengths as people age. Based on the information gathered from questionnaires about the twins' health and lifestyles, a significant connection was identified between increased levels of acquired chromosomal changes and the use of tobacco products. Further studies of acquired chromosomal changes relative to additional environmental exposures are in progress.

In summary, the results of this study, to date, show that all chromosomes can be lost or gained as people age, but that chromosome loss is more frequent than chromosome gain. Furthermore, the pattern of acquired chromosomal losses and gains varies between chromosomes, having a non-random pattern. The frequency of acquired chromosomal loss also varies between individuals, with both genetic components and environmental exposures contributing to the observed variation between individuals. Thus, acquired aneuploidy appears to be a complex trait that is influenced by both genetic and epigenetic factors . The information gained from this study should enable the investigators to recognize frequencies or chromosomal patterns of acquired changes that can hopefully be used for preventative health screenings.

[1]Chromosomes - a rod-shaped structure, usually found in pairs in a cell nucleus, that carries the genes that determine sex and the characteristics inherited from parents. A human body cell usually contains 46 chromosomes arranged in 23 pairs.

[2]Telomeres - a region of DNA at the end of a chromosome that protects the start of the genetic coding sequence against shortening during successive replications.

[3]Aneuploidy - a cell with fewer or more chromosomes than usual.

[4]Epigenetic factors – factors having an external rather than a genetic origin.

DR. KENDLER REPORTS PROGRESS TO DATE ON THE STRESS AND COPING PROJECT (continued from page 1 STUDY UPDATES)

increase the risk for teenagers to experiment with alcohol, tobacco and illegal drugs and the set of factors that influence whether or not they will develop drug-related problems and dependences. Using twin studies we have been able to show that as a person grows older they play an important role in influencing their social environment. We have tried to determine why people select certain sets of friends during their adolescence. Do the similarities occur because people seek out others like them ("birds of a feather flock together") or do a person's friends influence the kinds of behavior a person exhibits in their youth? This is a very important question because prior evidence suggests that the pattern of friendship in adolescence plays a big role in influencing the path a person will take later in life. The results of the Stress and Coping study suggests, not surprisingly, that both factors are at work. Genetic influences seem to mostly support the idea that an individual chooses his friends while environmental factors mostly support the idea that an individual's group of friends influences their behavior.

A second line of studies has used molecular tools to clarify the biological basis of nicotine dependence. Prior studies in the Stress and Coping project have, along with reports from other twin populations throughout the world, shown strong genetic components to dependence on nicotine. A series of exciting results have emerged that identify particular genes that may play a role in the risk for nicotine dependence. One of these genes is a nicotine receptor in the brain. This result, which has been supported by other groups, suggests that the way nicotine interacts with the brain is different for different people. This variation may play a role in who is at risk to becoming addicted to cigarettes. This work is potentially so important because new and more effective treatments could be developed for nicotine dependence on the basis of the results from this study.

ATTENTION TWINS: EMAIL ADDRESSES NEEDED!

We would like to thank everyone who has already sent us their email addresses. We are still collecting email addresses from members over 18 years old and parents of younger twins in an effort to start conducting web-based surveys and hope more of you would like to take part in this process. If you are interested, please visit our website at www.matr.vcu.edu and drop us a note or call us at 1-800-URA-TWIN (800-872-8946) and leave a message. As with all information you provide us, we will not share your email with anyone and you may ask to be removed at any time.

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MID-ATLANTIC *twin* REGISTRY

Twin Matters

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Volume XIV

VCU

Virginia Commonwealth University

KIDS CORNER!

Across

3 The MATR's hometown is _____, Virginia
5 The MATR's toll free telephone number is 1-800-URA- ____
7 Palmetto is a type of . . .
11 Nicknamed 'The Palmetto State'
12 The abbreviation for Mid-Atlantic Twin Registry
13 The MATR's email address is matr@ ___.edu
14 Monozygotic twins are commonly called . . .
15 The MATR is part of _____ Commonwealth University
16 The MATR Newsletter is called 'Twin ____'

Down

1 Dizygotic twins are commonly called . . .
2 In order to keep in touch with you by mail, the MATR needs your current . . .
4 Things you inherit from your mom and dad are said to be . . .
6 The 'A' in MATR stands for . . .
8 MATR participants take part in scientific . . .
9 Half-identical twins are called . . .
10 The State bird of Virginia and North Carolina

Answers may be found on the MATR website – www.matr.vcu.edu

MOVING? Please remember to contact the MATR if your name, address or telephone number changes by calling our toll-free number 1-800-URA-TWIN or visiting our website at www.matr.vcu.edu.