"The Study of the Hand & Wrist" for Symptomatic and Epigenomic R & D

The **Medical Epigenology Hand & Wrist Practice Manual** tool examines physical, visual symptoms, including **Dermatoglyphic Descriptive Indentations** of both Hands & Wrists. Each of the examination tests has a corresponding number. When a clients test is positive the Epigenologists records its corresponding number on a **worksheet**. Once completed the worksheet is then sent to a computer data base for processing. Whereby it not only interprets the assessment Interpreting extracted positive results but controls a number of infinite variations. Hence the **Epigenologists** doesn't have to acquire medical knowledge only a skill sets to perform Hand & Wrists examinations that's it. The end results is a medical report that surpasses a physicians exam skill sets. Although I'm working on a similar version just for physicians without Epigenetics. It will involve Medical Universities Geriatric Hand & Wrists Assessments but more advanced. The author calls it, "**Medical Hand & Wrists Examination**" (**MH&W- Exams**). Hence why using a global Hand & Wrists online computer Data Base allows physicians all the world to tap into it including Medical Institution access to update the DB with new research. It may one day replace the yearly physical cancelled in most countries.

But **Medical Epigenology** is a bit different in that it's Instrumental in examining the Hands and Wrists (**End Effectors**) in their entirety without the examiner requiring medical knowledge. A computer DB does it all for the **Epigenologists** including sorting complex Variations. Medical Epigenology exam process, such as: motion tests, touch, visual imagery and in some cases questionnaires.

Medical Epigenology assessment is broken down into two types they are:

1) Medical Assessment exam starting with **Geriatric Hands & Wrists examination** and with new material it'll go beyond it such as examining: fingers & Thumb motion, etc., Nails, Phalanges, Hair, Fingerprints, etc.

2) "**Dermatoglyphic Descriptive Indentation**" (**DD-Indentations**) assessment that involves **Epigenetic / Epigenomic** technology proven in 2003 supported by many global medical institution Universities. Each exam process have a been given a particular descriptive exam name and number that defines their purpose.

Epigenetics / Epigenomics is the effect our environment has on altering our original genes (HOX) for survival. Hence **Medical Epigenology Practice** is an ongoing hand & Wrist research that utilizes a computer data-bases to control positive exam interpretations and any variations.

Its purpose is mainly to be used alongside current diagnostic assessment tools in verifying and/ or enhancing medical diagnosis. **Epigenologists Practitioners** are also able work along-side Walk-in and Medical clinics including Psychology, Psychiatry, Chiropractors, natural path Doctors etc. Latest results from Universities around the world have proven in 2003 that our environment effectively alters our original genetic G-nome system for survival coined Epigenetics. So that the human race can survive their choice of environments whether it be physical or psychological and environmental in nature associated with living events.

It's **MH&W-Exams** that is able to diagnose unique G-nome (Genetic) changes in our Hands & Wrists. Only because it's medically reported that they have more nerve endings then any other part of the human body. Hence why I created an automatic process to examine the Hand & Wrists as a format that doesn't require medical knowledge but incredibly accurate in diagnosing the hands & wrists for a variety of abnormal effects without ever having to remember any medical Material and terminology.

College of Physicians & Surgeons should consider Adopting Epigenology

"Why the hand & wrist should be considered as part of our Society's diagnostic system"

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The reverent way that Medical Epigenology Practice approaches a patient / client should be considered as a critical part of our current clinician's inner state. A non-invasive diagnostic examination is a thoughtful observation revealing that hands & wrists have a high density of useful information. For example, information routinely gained includes overall vitality, inner emotional state, cerebral dominance, occupations and hobbies, past medical history, neuromuscular function, cardiovascular function, rheumatic conditions, dermatologic problems, and risk of future functional decline. Involves current new research by "U" all over the world. Interpreting Epigenetic's new unique descriptive feature, such as: Finger length which is now giving up data on defining anger, analytical skills, levels of male and female hormones and their effects as we age. Valuable data that can no longer be ignored and has always been a part of Medical Epigenology Practice Research added to its computer data base.

Nature vs Nurture argument solved.
Scientists are now determining that, "We are nurtured not natured as once thought" See the article in "Supporting Research"

Publics Concerns
Ontario Psychological Association-Well-Being new research on Symptomatic and Epigenomics of the hands & Wrists is showing compelling evidence that finger length features can be a viable source of data for physical & psychological diagnosis in determining how one acts, medical symptoms, anger situation and genetic environmental stresses to name a few. A non-invasive unbiased physical, touch and visual examination of the hands and wrists the medical preventive health community can now request, enhancing and/or verifying their current diagnosis. Medical Epigenology Practice examinations computer data-base involves data extracted from medical institutions, all over the world.

The definition of health, set out in the Preamble to the Constitution of the "World Health Organization"
(WHO), 1946 is "... a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

In light of the tangible and substantial benefits of good mental health, Ontarian's deserve greater access to psychological services.

The benefits of psychology have been well recognized in clinical and scientific research. It demonstrates that psychological intervention is a powerful tool providing people with skills that they can use throughout their lives to prevent, reduce or delay relapses and one that does not involve expensive drug therapies.

Many Ontario children and youth have been supported by psychologists to enhance their learning and social skills and emotional well-being. Psychologists are partners with parents and educators in providing cost-effective assessments, consultation and intervention.

Due to the aging population and increasing levels of stress in everyday living, the demand for psychological service will likely increase over the foreseeable future.

No one is immune
One in five people in Ontario will suffer from mental health problems in some form and to some degree in their lifetimes. In the general population, the incidence of a major depressive episode is 20%, the incidence of anxiety disorders is approximately 25% and 10% of the (population has an incident of clinical depression at least once over a 12-month period. (The societal and economic burden of psychological dysfunction in Canada is calculated at a staggering $7.8 billion annually. This is 1.5 times the cost of cancer.

Psychologists help many children, individuals and families deal with the day-to-day challenges of life by developing appropriate strategies for moving forward after stressful or traumatic events. Medical Epigenology and the medical professional community

YES! After decades of ongoing Medical Epigenology research for Epigenetic / Epigenomic medical purposes is 100% non-invasive unbiased diagnostic tool. Interpreting Symptomatic and Epigenomic unique descriptive hand & wrist features using an infinite number of Variations. All soon to be controlled by artificial intelligence in its computer DB. Finally, examining a person hands & wrists can now go hand-in-hand with the medical community' counterpart. The respect of the hand as a diagno-

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ses medium we've all been waiting for is now here.

Training to become a Epigenologists Practitioners can be easily accomplished in a few weeks without heavy emphases on medical knowledge. Having the same efficiency and experience as the original author with several decades of research and experiences behind him and it's exhilarating to say the least.

Mississauga, Ontario Newspaper Article
Avoiding the family physician path al Gutkin's February Vital Signs made me laugh. On and on we hear the incessant whining about "Family practice" (FP) shortages starting with fewer students choosing family practice. Blaming medical schools for the changing generalist:specialist mix is nonsense. The pro-FP rhetoric during my medical training was nearly nauseating (1996 graduation).

As Dr Gutkin notes, a major decline in FP production began in 1993 when rotating internships were discontinued. Furthermore, opportunities to retrain or change residencies were abolished. Apparently, multiple residencies used up too many tax dollars (residents earn about $5/hour in some programs), and the "College of Family Physicians of Canada" (CFPC) wanted more status for their program: "train more generalists!"

Exactly the opposite has happened. Students are avoiding the FP path at an alarming rate. In medical school, everyone knew that choosing family practice was a one-way street: no more options, no retraining, lower remuneration, and less respect.

Opening the doors for physicians to retrain would do more at the medical school level to increase FP numbers than cajoling the schools to promote family medicine. More students would choose the 2-year CFPC route as a means to pay off debt, mature, and explore where their strengths in medicine lie. As we all know, there would be substantial numbers of physicians who would continue as generalists, and there would be far fewer discontented FPs who have been marooned in the CFPC by the present draconian policies.programs, and (along with the university departments of family medicine) have done all we can to offer such flexibility to those wishing to transfer into family medicine from residency programs in other disciplines. Unfortunately the CFPC cannot control the lack of flexibility offered by other specialty programs.

In the practice milieu, we have explored and will continue to advocate for improved and better supported practice models as options for family physicians to consider. Contrary to Dr Whatley's insinuation, we have no interest in forcing any family doctor into any single model of practice.

We will continue to work with our members and our colleagues in other organizations to help create a high-quality, flexible system, one that will improve the professional and personal lives of practicing family physicians and attract increasing numbers of medical students to our branch of the medical profession. As we do so, we will also remain committed to helping Canada maintain the highest possible standards for training and life-long education of family physicians. I hope that what we are doing, will, in the long run, prove to be in the best interests of medical students, family doctors, and very importantly, Canadians who need well trained, well paid, professionally satisfied family physicians caring for them.

—Calvin Gutkin, MD, CCFP(EM), FCFP (Executive Director and Chief Executive Officer The College of Family Physicians of Canada

Mankind has been studying hands for thousands of years.

As early as 400 B.C.E., Hippocrates taught. Nails and other parts of the hand reflects the condition of the inner body. It is true with nails that their abnormalities can often provide early clues to common medical problems or severe systemic diseases, genetic and Epigenomic disorders and character irregularities. Geneticists early as 1970 have turned their attention to what I now call the "Dermatoglyphic Descriptive Indentations" or DD-Indentations as they have discovered various diseases and genetic conditions are associated with specific DDG-Feature formations and that behavioral disorders occur more often when unusual DD-Indentations that appear. The author and University learned institutions are just beginning to unlock the secrets contained in the hand and wrists as a whole not the sum of its parts like the DD Indentations.

However, as researchers, doctors and geneticists attempted to correlate the hands & wrists, health and behavior data, etc. there exists a seri-

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ous obstacle: they didn't have a standard data base that classifies each unique Symptomatic symptoms associated with the hand as a whole such as: finger length, phalanges, as well as Dermatoglyphic Descriptive Indentations, etc. Dar and Schmidt, two researchers studying the DD-Indentations, writes: "As the variability and possible clinical significance of DD-Indentations abnormalities receives greater attention, an accurate objective method for evaluating DD-Indentations variants is required." A crude program did exists at the time and was used by the London Health Sciences in the UK.

Obviously, researchers Lacked an acceptable system (Data Base) for Symptomatic and Epigenomic unique DD-Indentations identification and quantification. At the time of Dar and Schmidt, they limited their studies to what was available or created one themselves that would have been too cumbersome for general use, or skewed their data by lack of improper identification and data.

But, an excellent data base did exist at the time; one based on identifying all the features of the hand in its entirety, including **DD-Indentations** and their relationship to each other; a vehicle so powerful and easy to use that it could never collapse under its own weight. In fact it has been created as a standard for research and for diagnostic verification or enhancement tool currently being adopted by trained professional by the author of Medical Epigenology is now an option for the medical community.

Epigenologist Practitioners have been in development for decades by the author and researcher Gerald E. Picard. In comparison research done at Berkeley in California (US) and Liverpool UK Universities including London Health Sciences supports the author's research. In fact Genetic scientists have verified that, it is our environment that alters our original genes as we age. Epigenologist Practitioners Hand & Wrist assessment is currently at the stage of being written into a computer data base program whereby any and all medical researchers will have access to its power, all over the world.

Scientists biased view with the hand is evident in an article that appeared in the Journal of the AMA in 1974. Wilson and Mather examined 51 cadavers and statistically correlated age at death with the length of the Life crease Palmist uses. They state:

"A broken (DD Indentation 105 Life issues) Living Event Issue is not related to age at death and it is our personal expectation that it correlates with nothing whatsoever. Using a table is not the answer however if Wilson and Mather where to research other learned institutions before attempting their research they would have discovered the following.

A 100 Cadavers hand compared with death research

The Journal of the Royal Society of Medicine in London, England, reported that three doctors in Bristol studied the hands of 100 corpses, aged 30 to 90. They measured the person's DD Indentations (Life issues) in relation to the size of the hand and projected this on a graph together with the age of death. Those with a short Life (DD Indentation 105) had died young while those with a long DD Indentation had lived into old age.

Projecting Destiny Is Now A Viable Technology

Medical Epigenology Practice now has the power to project destiny based on past and current living events laid out by someone's current or past environments. Similar to IBM's, "Three Component Branch Prediction Logic" used in their computer chips, decades ago. Used to powers Apple's G5 computers long ago. It is designed to predicts the outcome of a program long before it is completed saving valuable time and energy. We discovered that the neocortex part of the brain can finish its thoughts before thinking them and records this via a single molecule attached to each gene in the body. If enough molecules are affected, the gene in question alters itself into a HOX gene changing or altering the original genes based on the effect or trauma as received by the brain at that time. The first part of the body that is affected is the Hands & Wrists because of its use as an end effector or tool used by the brain to function as a human.

Three Component Branch Prediction Logic

The PowerPC Chips once powered the Apple computers in the day made by IBM usually knows the answers of a program or question before it completes its task, using branch prediction and

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speculative operation to increase efficiency. Like finishing someone else's sentences, branch prediction anticipates which instruction should go next, and speculative operation causes that instruction to be executed. If the prediction is correct, the processor works more efficiently — since the speculative operation has executed an instruction before it's required, as with a conversation that seems to be a mind meld. If the prediction is incorrect, the processor must clear the un-needed instruction and associated data, resulting in an empty space called a pipeline bubble. Pipeline bubbles reduce performance as the processor marks time waiting for the next instruction, not unlike wasting time hearing how very wrong your assumptions were. IBM's processor can predict branch processes with an accuracy of up to 95%, allowing the chip to efficiently use every processing cycle.

Medical Epigenology Practice uses the same principle but in a philosophical manor by deciphering one's life issues before it is lived based on past and current environmental living events recorded in a person hands & wrists. It actually will alter one's current life pattern that could very well project new destiny. Change your environment and the active hands will record a new projection. The author has real evidence of this matter as prior to his heart surgery certain DD Indentations working together determined death at a projected time age 55. But after the surgery and months later those DD Indentations now extend beyond the projected death date. Actual evidence DD Indentation do record our past, current and projected environments. See for yourself, in the upcoming images in the this exam manual.

Research by other Scientist &
Doctors

Contrary to the report of Wilson and Mather, other scientists, by using a more thorough data base would have found a wide range of health and behavioral conditions associated with Symptomatic and Epigenomic unique Symptomatic features and DD-Indentations of the hands & wrists. If one has the time they can explore the history of this study, from the early research of Fere (19000 and Poch (1925), to Lieber's (1960) ponderous line classification system, to Milton Alter's sweeping revisions (1979). Also the work of Johnson and Opitz (1971), (Chaube, 1971), a system that has produced statistically relevant data in studies of schizophrenia, cancer, tuberculosis, diabetes and leprosy. Dar H. and Schmidt R's (1976) topographic system, reminiscent of Noel Jaquin's approach in the Journal of Medical Genetics, 13:310 1976. Life Expectancy, Wilson ME, MD CHB Mather LE PhD Journal of the AMA, Vol. 229 (11) 1421 1974.

According to the method of Bali & Chaube (1971). The Dermatoglyphic Descriptive Indentations study in a sample of Spanish people (403 males and 513 females) resulted in a Bimanual differences which are not statistically significant, but there is a sexual dimorphism. Comparing the incidence of the open "M" type defined by Tillner there are no statistical differences as compared with male German series, though they are seen in female series. It is observed that the frequency of the simian crease is in accordance with the variability of European populations.

However, scientists at the University of Barcelona have discovered that researching the hand may have some basis in scientific truth or validity. Having compared the palms of 140 children, they discovered that more arches and loops children have on their fingers, the more they are to be intellectually impaired. And the existence of a Simian DD-Indentations… a rare DD-Indentation that across the entire palm - appears to be of the most reliable indicators of mental deficiency. This may be connected with events between the thirteenth and eighteenth weeks of pregnancy, a crucial time for brain development and the period when fingerprints are formed. So maybe there is some truth to the hands and wrists after all.

The hand in ancient times including the The Bible

The ancient world recognized there are things to be learned by looking at a person's hands. In the original Hebrew book of Job (chapter 37, verse 7) we find these words: "God caused signs or seals on the hands of all sons of men, that the sons of men might know their works" (Be aware, this verse has been re-written in many ways with re-published Bibles). Nails grow at different rates due to age, nutrition, and health factors. Under the best of conditions, a nail grows about .004 inches a day or 1/8 of an inch each month. It takes about six months for a

As it is not in Dr Gutkin's best interests to

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promote this kind of flexibility, students will continue to avoid family medicine in even greater numbers. When will you learn that you cannot force physicians into practice type, location, or style?
—Shawn Whatley, MD, CCFP (Newmarket, Ont. (by e-mail

Reference
1. Gutkin C. Medical schools' accountability for physician resources [Vital Signs]. Can Fam Physician 2003;49:264, 263 (Eng.), 262-3 (Fr).
Response
Dr Whatley has put his finger on some of the key messages we are hearing from medical students regarding the decreasing numbers selecting careers in family medicine: family doctors get too little respect, are inadequately remunerated, and still do not have enough flexibility in residency training or reentry positions.

When he says it is not in the College of Family Physicians of Canada's "best interests" to address these issues or accuses us of "draconian" policies, however, his finger pointing is way off the mark. The positions the CFPC has aggressively promoted with everyone from Romanow to Kirby to our federal and provincial governments to medical school leaders clearly enunciate the need for better pay, more practice support and models of practice, more flexibility in training programs, more reentry positions, and much greater respect from governments and medical schools for the contributions of our present and future family physicians.

One of the ways to help augment the practice of family medicine in the eyes of medical students would be to have our medical schools define and support more prominent and clinically relevant teaching roles for family physicians, including those in community and rural settings, combined with a commitment to ensure that students have equal exposure to family doctors and specialists throughout their undergraduate years. We also recognize that the responsibility and accountability for creating the right balance of physicians in Canada rests with a combination of key players; medical schools are only one of them.

Far from "whining," the CFPC has, over the past few years, been calling for more opportunities for extra skills training for residents as well as for practicing family physicians who wish to reenter the training system. This has, in fact, contributed to recent increases in the numbers of these positions in various parts of Canada. We have also fought for increased flexibility within residency training new nail to grow from cuticle to tip.

In the New Revised Standard Version of the bible (chapter 37, verse 7) it says: "Serves as a sign on everyone's hand, so that all whom He has made may know it" (Be aware, this verse has been re-written also in many ways with re-published Bibles).

And with the Confraternity of Christian Doctrine, the Revised Standard 1966 Catholic edition along with the Complete Bible-University of Chicago press (Smith-Goodspeed) are these words: "He sealeth up the hand of all men, that everyone may know his works." Other bibles have dramatically altered the interpretation of this verse, severely.

Some of the greatest teachers and philosophers have come to the conclusion that fate exists for all. In the 17th article of religion in the Episcopal church it is stated in no uncertain terms that, "Predestination to life is the everlasting purpose of God" or in the 21st century under the auspice of Near Death Experience stories God is defined as "All there is... " Because everything is God as they say. It may be that the soul – which, in being part of the universal soul of all things – knows all things and through the instrument of the brain records your destiny in advance. I suggest that each of us endeavor to learn what our fate may be, accept whatever task may be required and carry it out to the best of our ability, and be willing to leave the final result to the Master who thought fit to employ us in the working out of "All there is..." design.

Medical Epigenology Practice Uses An Industry Standard Computer DB
Medical Epigenology Hand & Wrist examinations can be defined as a new industry-standard DB program, written and illustrated in a methodical, systematic order using advanced logarithms to control exam result interpretations and variations. It allows any medical professional the ability to request a partial or full hand and wrist exam very quickly and efficiently via a computer data Base. Soon our to be established internet DB examination tool in many languages, online. An interactive web site would allow anyone the ability to receive a report from a

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Registered / Licensed Epigenologist Hand & Wrist Practitioners which requires minimal medical knowledge to perform theses examinations but can be useful.

Therefore, Epigenologist can now examine any hand and wrist no matter how complex they may be in 3 easy steps. It's the Data Base that automatically controls an infinite number of variations when generating reports. Its all accomplished by doing Exams-1, 2, 3 & 4 here's how:

First (1st) physically and visually examine then identify and record unique "Symptomatic Descriptive Features" (SD-Features) and "Dermatoglyphic Descriptive Indentations" (DD-Indentations) of both hands and wrists to those in the Epigenologist Practice User Manual or in a computer even Online.

Second (2nd), record the corresponding unique descriptive Feature numbers on a worksheet, type them into or scan them into a computer data-base.

Third (3rd), This DB then automatically generates a report that is sent directly to the individual requesting the examination or via a medical professional requisition. It's that simple.

Medical Epigenology Hand & Wrist Assessment has the ability to solve complex personality conflicts, idiosyncrasies, even verifying illnesses and lifestyle issues with ease and efficiency. The author is currently working on a computer data-base that allows any medical professional to examine any hand via the internet or a computer in one process.

How does Medical Epigenology Work? Every hand and wrist has its own unique SD-Features and DD-Indentations that are either permanent or changing. They have been given a name that indicates their significance, along with an incremental Numbering system such as SD-Feature's long Fingers, phalanges, thumb and fingerprints, etc., beginning with Description 005-Texture; 010-Consistency; 015-Flexibility; 020-Colour; 023-Fingerprints; 025- Nails and so on.

DD-Indentations are 105 Heart, 100 Head and 105 Life Issues and so on. The only skill sets required is the ability to compare these unique descriptive features and other symptoms of the hand & wrists to those in the Epigenology Practice Exam User Manual and then record their corresponding numbers on a worksheet and/or enter them directly into an online computer data-bases. Its that simple. Public or professional use of Medical Epigenology Hand & Wrist Examinations must be in accordance with the latest published Declaration. In other words the hands & wrists must be examined in an incremental order by executing a sequence of events. Similar to if a person does not have short fingers, then the examiner ignores this Feature and continue on to the next one and so on.

Medical Epigenology can not only be used for Medical purposes but also for research. This can be accomplished on a global level by training thousands maybe millions of Wannabe Epigenologist Practitioners to examine hands & wrists professorially and at the same time record any unusual descriptive features and symptoms of the hands & wrists. Expanding its computer DB(s). This would be phenomenal because cross referencing all the data from different cultures and lifestyles at the same time would increase the accuracy and efficacy of the data-base(s) substantially by a 100 fold, at least, every year. The original problem medical researchers where having when it came time to studying the features of the hands & wrists was a standard research data-base format. After new data has been gathered and verified it would be easy to published revisions of existing examination DB(s) and exam tools used for both learned institutions and medical professionals alike. This concept would definitely speed up the research process in creating a massive Medical Epigenology Practice hand & wrist exam data-base accessible by all in the medical community. The author has been using this concept for decades while examining hands professionally and teaching others to do the Same. Helping thousands of people understand themselves, solve and/or ill effects of many diseases and more.

Supporting Research

UK Scientists Map the human Gnome System; Extracted from a British newspaper. It was discovered recently that about 99.7% of the human genome system is mostly junk genes and that only about 30,000 genes actually determine what a person will turn out to be, such as hair type, intelligence, dis-

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eases and strength, etc.

We have twice as many genes as a roundworm, about three times as many as a fruit fly; six times as many as a baker's yeast and more than 60,000 genes out of 100,000, 200 come from bacteria.

Human beings are very much relatives of all global species. When it comes to mapping the genome system it is now known that every human being on the planet is 99.9% the same.

New Medical Epigenology research has recently shown that Epigenetics can record itself in the hand & wrists via the conscious and subconscious mind (Hand / Mind Connection). Hands & wrists are used without conscious thought and since the hand is connected to the motor function (cerebral cortex) of the brain. Its obvious any alteration of the hands & wrists unique descriptive features eventually shows up months or even years in advance, depending on our client's personal genetic weaknesses as a direct result of the effect of our environment (Epigenetics) has in affecting or clouding our original genes with HOX Genes. Its obvious how easily we are influence and Medical Epigenology Practice exams can help understand the implications of a rigid lifestyle. It has also been discovered that outside influences, such as viruses in a person's stomach, as well as heavy social influences, particularly the influence or rigid lifestyle (environments) of a parent or guardian – religious, political and/or social lifestyle – can easily alter a person's unique descriptive hand features. Eventually altering human beings genetically in order to survive their environments.

It makes a lot of sense that the hands & wrists changes first as much as it does. The hands & wrist not only portrays a person's true nature and the effect their environment has on altering them genetically but what these influences have done to their body or mind or is about to do to them harm as they grow older and then slow down with age.

Geneticists maps what makes us different

By Gareth Cook, source: The Boston Globe, 2001

An international team of scientists announced yesterday that it has completed an ambitious map of all the common variations in the human genetic code, an advance that could accelerate the search for the genes behind a wide range of diseases.

The three-year, $138 million project scanned the DNA of 269 volunteers on three continents and found deep patterns in the seemingly random genetic variations that make one person different from another. Human DNA, they found, comes in distinct blocks, each of which can be identified by looking at only a few locations, the way a person might be able to identify a familiar quilt by examining just a handful of its cloth panels. This will greatly reduce the number of the 3 billion units of human DNA that must be checked, and allow scientists to find elusive genetic variations that cause disease.

This advance, announced yesterday by a consortium called the International HapMap Project, marks a major milestone in the quest to understand human afflictions and why people respond differently to drugs. It may also lead to new insights about human evolution, historic migrations of populations, and race.

Genetics is a powerful tool that enables biologists to study the root causes of disease, but most of the disease genes found so far are single genes linked to rare diseases. The new map should make it possible to find groups of genes that are believed to be involved in many common diseases — genes that individually play a more subtle role and are thus harder to identify.

"This is a profound step forward," said Secretary of Health and Human Services Michael O. Leavitt, speaking at a news conference in Salt Lake City, during a meeting of the American Society of Human Genetics.

The HapMap, which is described in today's issue of the journal Nature, is a follow-up to the Human Genome Project, and an attempt to make it more useful for medical research. The Human Genome Project is a catalogue of the DNA all people share, while the new project is a map of just the DNA segments that make each person different.

Scientists cautioned that the utility of the new map would not be clear until it was widely applied, because the map catalogues common variations, and it is not known how important a role these play in diseases. And even where the map succeeds in tying genes to disease, it could still take years or even decades to find new treatments, said Dr. David Altshuler, one of the leaders of the project and a scientist at the Massachusetts General Hospital.

But the work has generated tremendous excitement, and institutions around the world have begun ambitious studies of a wide variety of diseases using rough drafts of the HapMap. The British charity the Wellcome Trust recently announced that it will use the HapMap to tackle eight diseases, including coronary heart disease, hypertension, and rheumatoid arthritis. In Japan, another team has said it will study up to 47 diseases. In the Boston area, a center of the new research, the Broad Institute of Harvard and MIT is organizing studies, with thousands of volunteers, to investigate diabetes and cancer, as well as psychiatric and other illnesses, according to Altshuler, who directs the Broad's program in medical and population genetics.

One of the first efforts underway at the Broad is a multimillion dollar investigation of bipolar disorder, a disease that causes patients to cycle unpredictably between periods of depression, manic behavior, and relative normalcy. More than 2 million Americans suffer from the illness, according to government statistics, and studies show it has genetic causes. There are treatments that can help, but there is no cure.

Francesca Dodd, 67, is still haunted by the memories of her mother, who had bipolar disorder at a time when even less could be done to help. Dodd said her mother suffered debilitating depressions and once fell into a catatonic state while Francesca's baby brother was breastfeeding. At other times, Dodd said, her mother would fly into manic furies that could last for weeks — picking fights, belittling friends and strangers, wailing about germs and dark plots around her.

Dodd has been diagnosed with bipolar disorder, too, and her DNA will be used in the Broad study. "I hope it will help the next generation," she said.

Bipolar disorder is like many of the diseases that researchers want to study using the HapMap: They tend to run in families, but scientists have not been able to find the genes involved because they're tools have not been sensitive enough.

The HapMap is an attempt to tackle this problem. In the nucleus of every human cell is a long strand of DNA, made up of some 3 billion units. Each unit is one of four types of molecule — labeled by scientists with the letter A, T, G, or C. The 3 billion units are known collectively as the genome.

Each person differs from someone else by, on average, 3 million of these units, but every time two people are compared, it is a different set of 3 million. To find all those differences, scientists had feared they would need to determine the full genome, all 3 billion units, of every volunteer in a study, which would be too expensive using current technology.

But then researchers began to notice consistent patterns in the DNA of different individuals that suggested a shortcut, said Mark Daly, a scientist at Mass. General and the Broad who was one of the first to discover the patterns. They found that DNA can be thought of as a series of sections, called "haplotype blocks." Each block comes in only a handful of variations, and each person has just one of the variations. (Each of these variations is known as a haplotype, which is why the map is known as the HapMap.)

To determine which block a person has, researchers have only to look at one spot where the block varieties are different, giving them a "tag" that identifies the block. The HapMap project, which was funded by an international consortium that includes the US government, has located some 3.8 million of these tags, the scientists said. The volunteers in the study came from the United States, Nigeria, China, and Japan.

To study a disease such as bipolar disorder, researchers need the DNA from large numbers of volunteers with the disease, said Dr. Pamela Sklar, who is leading the Broad study of bipolar disorder along with Dr. Jordan Smoller, both of whom are scientists at Mass. General. The researchers will check the DNA of the patients at tag locations identified in the HapMap, and see if any of the tags appear more or less often than in the general population. If a pattern emerges and is confirmed, the team will look more closely to see what genes are located near the tags, Sklar said. The same type of study could be done to see whether there are genetic reasons why some people respond well to certain medications and others do not.

All of this, in turn, could provide clues to the biological origins of bipolar disorder, which today is an utter mystery.

"We don't even know what parts of the brain are involved," said Sklar.

This ignorance makes it difficult to look for cures, or to treat patients at all. The lack of a definitive medical test for bipolar disorder has added to the difficulty Dodd has had in accepting her diagnosis. Bipolar patients know when they are depressed, but they typically have trouble recognizing their own manic behavior and often resist treatment, according to Dr. Gary Sachs, who is Dodd's psychiatrist and is also a Mass. General scientist leading a large, government funded study of bipolar disorder that collected the patient DNA that will be used by Sklar.

Dodd said that she is not sure whether she has had a manic episode. But she does remember times when she has felt euphoria and superhuman confidence, typical symptoms of mania. And Dodd tells of intense shopping trips for used books, old clocks, and other memorabilia in which she regaled sales people with her life story.

Sklar said that it is the patients who motivate her, even though she does not know what the research will reveal. "How could we not do this study?" she said.

Experimental proof, DNA molecules alters our genes

Aired on Channel 42 Nov. 28th 2004 at 10:30 PM. The Discovery Channel aired the result of an experiment on the daily Planet show. We all have a single molecule attached to each gene in our body which body to HOX genes and others on what, how and where a particular gene is supposed to grow body parts and other Unique Descriptive Features. A scientific experiment that was aired by the Daily Planet show on the Discovery Channel.

A genetic scientist took a small square patch of skin, the first layer and transplanted it on an area of his wife's forearm having no hair follicles at all in the skin itself, all layers. It is the second layer of skin that contains hair follicles growing hair as directed by our genes on certain body parts. After six weeks the small patch of transplanted skin started to grow hair as if it was on the scalp. The area around the transplanted skin had no hair at all. This is what the scientist discovered. The molecule attached to the gene in the first layer of the skin told the gene on the second layer to grow hair follicles, but only under the skin that came from the scalp in the first place.

Therefore, the molecules, of the 1st skin, had to some how communicate with the molecules or genes of the second layer and tell it to grow hair follicles. But they could only affect the skin layer below the transplanted first skin from the scalp, nowhere else. This experiment also signifies that molecules can communicate with other genetic body features directly, via physical contact and/or by electro-chemical means from our brains. For example this experiment suggests a signal from the 1st layer travelled to the brain telling it to send a signal to the 2nd layer to grow hair follicles only in the transplanted skin area because it belongs to the scalp.

The experiment also suggest these molecules are small and numerous enough to be affected by other messages from our brains as a result of our environment causing our genes to evolve further in order to alter our body features to adapt to the environment. How the molecules communicate to others genes still remains a mystery. This experiment definitely closes the gap on how our genes continue to alter our features especially the hands & wrists as a result of our environment right up until old age. Medical Epigenology Practitioners interprets these genetic feature.

IT MATTERS - What we Eat

WASHINGTON POST STAFF WRITER

Mitochondria do much more than sprinkle genetic bread crumbs along the path of our ancestors' global wanderings. Human bodies are built of trillions of cells and almost all of them contain mitochondria. These structures function like microscopic oil refineries, helping turn the "crude" food molecules produced by digestion into high-energy fuel (a compound called adenosine triphosphate) that the rest of the cell can use to do its work. Tissues that burn a lot of fuel-like heart muscles, the liver, optic nerves, and the brain can have thousands of mitochondria operating in every single cell. And they don't just matter to people: From giraffes to geraniums, every multicellular organism on Earth runs on mitochondrial power, -Lynne Warren.

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Does A Bad Gene Exists? No! We Learn It.

As Quoted in Dec. 2002 Popular Mechanics magazine; "Does a Bad Gene exist? No it doesn't!"

The belief that violence breeds violence now has an unmistakable ring of scientific truth. In 1972, researchers at the Dunedin School of Medicine in New Zealand began an ambitious data-collection effort called the Longitudinal Dunedin Multidisciplinary Health and Development Study. Psychology professor Avshalom Caspi, the head of the effort at UW-Madison, delved into this data base and studied data on 442 subjects.

"The team looked at both the MAO A genotype in all participants and also periodically assessed the subjects' history of abuse and criminal convictions, their penchant for violence and any symptoms of antisocial personality disorder," says a project spokesman, "antisocial behavior includes persistent fighting, bullying, lying, stealing and disobeying the rules during adolescence. As adults, the subjects show now remorse and act impulsively and aggressively."

What UW-Madison researchers found was nothing short of astounding. Only 12 percent of the abused children had low MAO levels and these accounted for almost half of their generation's convictions for violent crimes in New Zealand." The combination of maltreatment and the genetic variation magnified the odds by nine times," says Moffitt. The opposite appeared equally true. A surplus of MAO A may protect them against the effects of ABUSE." The genotype of high MAO A activity may promote trauma resistance," Moffitt concludes.

Moffitt says it's important that the team's work not be misapplied. "Low levels of the enzyme (MAO A) did not predict antisocial outcomes," she cautions. "Its relation to aggression only emerged when we considered whether the children had been maltreated." There is one aspect of the research that sings out with crystal clarity. The belief that violence breeds violence now has an unmistakable ring of scientific truth.

The environment, Lifestyles and Heredity

An editorial from Newsweek, United states;

A human clone might resemble, superficially, the individual from whom it was made. But it would differ dramatically in the traits that define an individual —personality and character, intelligence and talents.—"Here's the rule," says psychologist Jerome Kagan of Harvard. "You will never get 100 percent identity — never — because of chance factors and because environments are never exactly the same."

If Dolly, the cloned sheep or ewe, had been born 10 years ago, the explanations would have ended there, with comforting boilerplate about how people are more than their genes, how they are complex products of their interactions with their parents, their friends, their teachers, their culture and their times. But Dolly happened along just when behavioral geneticists and psychologists have begun to figure out exactly how genes — nature — are either turned up or turned down by their environment - nurture.

"Environmental influences can alter the physical structure of the brain, determining in part how genes express themselves in both biology and behavior." Notes psychiatrist Stanley Greenspan of George Washington University in his new book "The Growth of the Mind."

Take shyness, considered the most heritable personality trait. Harvard's Kagan has found that fetuses with fast heartbeats tend to become shy babies. In other words, these children are biologically predisposed to be super cautious and anxious. (The genes seem to have something to do with making the brain recoil from stimulation and new experiences.)

But if parents nudge their shy children into situations that they would otherwise cringe from, like playing with other children, the biochemical systems that induced shyness in the first place may somehow get dialed back. Which leads to lesson one for would-be cloners: if you clone a sociable person but then protect the precious creation with the zeal of Juliet's nurse, you may produce a quaking wall flower.

Achievement is under even weaker ge-

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netic control.

"A Mozart born into a primitive tribe in Papua New Guinea would never have written a symphony."
Says neurologist Harold Klawans of Rush Medical College in Chicago. But because Mozart's father was a composer and his older sister took piano lessons, whatever innate talent little Wolfgang possessed could be realized.

Intellectual revolutionaries are also made and not born, let alone cloned. Frank Sulloway of MIT, who has made his reputation with studies showing how birth order influences everything from political views to personality, argues that "if Darwin had been his mother's first-born, he would not have been an evolutionists."

Based on data from 600 of Darwin's contemporaries, Sulloway calculates that only 5 percent of (conformist) first-born were evolutionists, but 50 percent of (establishment-challenging) later-borns were. Moreover, Darwin came from a politically and religiously liberal family. "He's loaded to the gills with everything that could have made someone a revolutionary," says Sulloway. Lesson two: to clone an iconoclast, make him your second child.

Which is not to say that genes do not matter. They do. Genes gently nudge a baby into certain behaviors, which then shape her world by, among other things, eliciting from those around her certain kinds of reactions. But the reactions, and the baby's experiences, are hardly predestined and outside human control.

Yes, a squalling baby can make his parents angry, even abusive; but parents can recognize the destructive cycle that's beckoning and make a Herculean effort to hug, kiss, hold, talk to and coo at him. And the baby "genetically predestined" to be emotionally cold may become a loving preschooler. Conversely, parents who give in to the oversensitive baby, letting her play alone, only exacerbate innate tendencies; parents who withdraw from the difficult baby exaggerate his worst traits. Parents says Greenspan, can" "change the way they're [children's] nervous systems work and thus their personalities." Lesson three: genetic seldom means immutable.

EVEN PHYSICAL TRAITS, such as risk for a disease, can be pumped up, damped down or even snuffed out by life's experiences. About 15 percent of women who inherit BRCA1, known as the breast-cancer gene, do not get the disease. Something in their environment, perhaps dumb luck, protected them. Another gene, related to skin cancer, is turned on by exposure to radiation: if the person carrying the gene takes precautions against ultraviolet rays, he may never get skin cancer, explains Mark Feinberg of Johns Hopkins University.

More complex diseases, such as heart disease and mental illness, are even less subject to genetic control. One might clone what seems to be a well-adjusted, healthy person only to find that the clone undergoes experiences that make him hypertensive or schizophrenic. For example, the incidence of schizophrenia doubled among Dutch children born in the Netherlands'' "winter of famine" during World War II. Maternal malnutrition can trigger the disease. But a clone of one of these children, a genetic duplicate, might evade schizophrenia if born by a women who ate normally during pregnancy.

Lesson four: don't count on avoiding a genetic disease just because you clone what seems to be a disease-free person.

What you clone may not be what you get for an even more basic reason: the cell being cloned has undergone years of mutations. These changes in its genes — caused by radiation, chemicals or just chance — might not have caused any apparent problem. If a gene for a brain chemical is mutated in a skin cell, it's not even detectable. But what if a lab happened to be unlucky enough to choose that cell to clone? The baby would be born with horrible or even fatal defects. "[Mutations are] a problem with every cell, and you don't even know where to check for them." Says reproductive biologist Ralph Brinster of the University of Pennsylvania. Aging also affects the cloned cell and perhaps the animal grown from it. Although Dolly looks like an 8-month-old lamb, is she, biochemically, really 6 years old, the age of the ewe from whose cell she came?

Our Licensed Epigenologists Practitioners – Give's clients back their right to exist, naturally. If nothing extreme or detrimental exist in their examination than clients with their counsellors can use their awareness to excel, otherwise clients must change for the better.'

Nature vs Nurture Argument

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A Time magazine article on genetics June 2nd 2003 issue, By MATT RIDLEY Which is stronger-nature or nurture? The latest science says genes and your experience interact for your whole life

"Early Puberty – Girls raised in FATHER-LESS HOUSEHOLDS experience puberty earlier. Apparently, the change in timing is the reaction of a STILL MYSTERIOUS set of genes to their ENVIRONMENT. Scientists don't know how many SETS OF GENES act this way."

"Divorce – If a FRATERNAL TWIN gets divorced, there's a 30% CHANCE that his or her twin will get divorced as well. If the twins are identical, however, one sibling's divorce BOOSTS THE ODDS to 45% that the other will split."

Crime Families – GENES may influence the way people respond to a "crimogenic" ENVIRONMENT. How else to explain why the BIOLOGICAL children of criminal parents are more likely than their ADOPTED children to break the law? By MATT RIDLEY

THE PERENNIAL DEBATE ABOUT NATURE AND NURTURE-WHICH IS the more potent shaper of the human essence is perennially re-kindled. It flared up again in the London Observer of Feb. 11, 2001:

Revealed: THE SECRET OF HUMAN BEHAVIOR, read the banner headline.

ENVIRONMENT, NOT GENES, KEY TO OUR ACTS. The source of the story was Craig Venter, the self-made man of genes who had built a private company to read the full sequence of the human genome in competition with an international consortium funded by taxes and charities. That sequence-a string of 3 billion letters, composed in a four-letter alphabet containing the complete recipe for building and running a human body-was to be published the very next day (the competition ended in an arranged tie). The first analysis of it had revealed that there were just 30,000 genes in it, not the 100,000 that many had been estimating until a few months before.

Details had already been circulated to journalists under embargo. But Venter, by speaking to a reporter at a biotechnology conference in France on Feb. 9, had effectively broken the embargo. Not for the first time in the increasingly bitter rivalry over the genome project, Venter's version of the story would hit the head-lines before his rivals'. "We simply do not have enough genes for this idea of biological determinism to be right," Venter told the Observer. "The wonderful diversity of the human species is not hard-wired in our genetic code. Our environments are critical."

In truth, the number of human genes changed nothing. Venter's remarks concealed two whopping non sequiturs: that: fewer genes implied more environmental influences and that 30,000 genes were too few to explain human nature, where-as 100,000 would have been enough. As one scientist put it to me a few weeks later, just 33 genes, each coming in two varieties (on or off), would be enough to make every human being in the world unique. There are more than 10 billion combinations that could come from flipping a coin 33 times, so 30,000 does not seem such a small number after all. Besides, if fewer genes meant more free will, fruit flies would be freer than we are, bacteria freer still and viruses the John Stuart Mill of biology.

Fortunately, there was no need to reassure the population with such sophisticated calculations. People did not weep at the humiliating news that our genome has only about twice as many genes as a worm's. Nothing had been hung on the number 100,000, which was just a bad guess.

But the human genome project-and the decades of research that preceded it did force a much more nuanced understanding of how genes work. In the early days, scientists detailed how genes encode the various proteins that make up the cells in our bodies. Their more sophisticated and ultimately more satisfying discovery-that gene expression can be modified by experience-has been gradually emerging since the 1980s. Only now is it dawning on scientists what a big and general idea it implies: that learning itself consists of nothing more than switching genes on and off. The more we lift the lid on the genome, the more vulnerable to experience genes appear to be.

This is not some namby-pamby, middle-of-the-road compromise. This is a new understanding of the fundamental building blocks of life based on the discovery that genes are not immutable things handed down from our parents like Moses' stone tablets but are active participants in our lives, designed to take their cues from everything that hap-

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pens to us from the moment of our conception.

For the time being, this new awareness has taken its strongest hold among scientists, changing how they think about everything from the way bodies develop in the womb to how new species emerge to the inevitability of homosexuality in some people. (More on all this later.) But eventually, as the general population becomes more attuned to this interdependent view, changes may well occur in areas as diverse as education, medicine, law and religion. Dieters may learn precisely which combination of fats, carbohydrates and proteins has the greatest effect on their individual waistlines. Theologians may develop a whole new theory of free will based on the observation that learning expands our capacity to choose our own path. As was true of Copernicus's observation 500 years ago that the earth orbits the sun, there is no telling how far the repercussions of this new scientific paradigm may extend.

To appreciate what has happened, you will have to abandon cherished notions and open your mind. You will have to enter a world in which your genes are not puppet masters pulling the strings of your behavior but puppets at the mercy of your behavior, in which instinct is not the opposite of learning, environmental influences are often less reversible than genetic ones, and nature is designed for nurture. Fear of snakes, for instance, is the most common human phobia, and it makes good evolutionary sense for it to be instinctive. Learning to fear snakes the hard way would be dangerous. Yet experiments with monkeys reveal that their fear of snakes (and probably ours) must still be acquired by watching another individual react with fear to a snake. It turns out that it is easy to teach monkeys to fear snakes but very difficult to teach them to fear flowers. What was inherit is not a fear of snakes but a pre-disposition to learn a fear of snakes-a-nature for a certain kind of nurture.

Before we dive into some of the other scientific discoveries that have so thoroughly transformed the debate, it helps to understand how deeply entrenched in our intellectual history the false dichotomy of nature vs. nurture became. Whether human nature is born or made is an ancient conundrum discussed by Plato and Aristotle. Empiricist philosophers such as John Locke and David Hume argued that the human mind was formed by experience; nativists like Jean-Jacques Rousseau and Immanuel Kant held that there was such a thing as immutable human nature.

It Charles Darwin's eccentric mathematician cousin Francis Galton who in 1874 ignited the nature-nurture controversy in its present form and coined the very phrase (borrowing the alliteration from Shakespeare, who had lifted it from an Elizabethan schoolmaster named Richard Mulcaster). Galton asserted that human personalities were born, not made by experience. At the same time, the philosopher William James argued that human beings have more instincts than animals, not fewer.

In the first decades of the 20th century, nature held sway over nurture in most fields. In the wake of World War 1, however, three men recaptured the social sciences for nurture: John B. Watson, who set out to show how the conditioned reflex, discovered by Ivan Pavlov, could explain human learning; Sigmund Freud, who sought to explain the influence of parents and early experiences on young minds; and Franz Boas, who argued that the origin of ethnic differences lay with history, experience and circumstance, not physiology and psychology.

Galton's insistence on innate explanations of human abilities had led him to espouse eugenics, a term he coined. Eugenics was enthusiastically adopted by the Nazis to justify their campaign of mass murder against the disabled and the Jews. Tainted by this association, the idea of innate behavior was in full retreat for most of the middle years of the century. In 1958, however, two men began the counterattack on behalf of nature. Noam Chomsky, in his review of a book by the behaviorist B.F. Skinner, argued that it was impossible to learn human language by trial and error alone; human beings must come already equipped with an innate grammatical skill. Harry Harlow did a simple experiment that showed that a baby monkey prefers a soft, cloth model of a mother to a hard, wire-frame mother, even if the wire-frame mother provides it with all its milk; some preferences are innate.

Fast-forward to the 1980s and one of the most stunning surprises to greet scientists when they first opened up animal genomes: fly geneticists found a small group of genes called the HOX genes that seemed to set out the body plan of the fly during its early development-telling it roughly where to put the head, legs, wings and so on. But then colleagues studying mice found the same HOX genes, in the same order, doing the same job in Mickey's world-telling the mouse where to put its various parts. And when scientists looked in our genome, they found HOX genes there too.

HOX genes, like all genes, are switched on and off in different parts of the body at different times. In this way, genes can have subtly different effects, depending on where, when and how they are switched on. The switches that control this process-stretches Of DNA upstream of genes-are known as promoters.

Small changes in the promoter can have profound effects on the expression of a hox gene. For example, mice have short necks and long bodies; chickens have long necks and short bodies. If you count the vertebrae in the necks and thoraxes of mice and chickens, you will find that a mouse has seven neck and 13 thoracic vertebrae, a chicken 14 and seven, respectively. The source of this difference lies in the promoter attached to HoxC8, a hox gene that helps shape the thorax of the body. The promoter is a 200-letter paragraph Of DNA, and in the two species it differs by just a handful of letters. The effect is to alter the expression of the HoxC8 gene in the development of the chicken embryo. This means the chicken makes thoracic vertebrae in a different part of the body than the mouse. In the python, HoxC8 is expressed right from the head and goes on being expressed for most of the body. So pythons are one long thorax; they have ribs all down the body.

To make grand changes in the body plan of animals, there is no need to invent new genes, just as there's no need to invent new words to write an original novel (unless your name is Joyce). All you need do is switch the same ones on and off in different patterns. Suddenly, here is a mechanism for creating large and small evolutionary changes from small genetic differences. Merely by adjusting the sequence of a promoter or adding a new one, you could alter the expression of a gene.

In one sense, this is a bit depressing. It means that until scientists know how to find gene promoters in the vast text of the genome, they mill not learn how the recipe for a chimpanzee differs from that for a person. But in another sense, it is also uplifting, for it reminds us more forcefully than ever of a simple truth that is all too often forgotten: bodies are not made, they grow. The genome is not a blueprint for constructing a body. It is a recipe for baking a body. You could say the chicken embryo is marinated for a shorter time in the HoxC8 sauce than the mouse embryo is.

Likewise, the development of a certain human behavior takes a certain time and occurs in a certain order, just as the cooking of a perfect soufflé requires not just the right ingredients but also the right amount of cooking and the right order of events.

How does this new view of genes alter our understanding of human nature? Take a look at four examples.

LANGUAGE – Human beings differ from chimpanzees in having complex, grammatical language. But language does not spring fully formed from the brain; it must be learned from other language-speaking human beings. This capacity to learn is written into the human brain by genes that open and close a critical window during which learning takes place. One of those genes, FoxP2, has recently been discovered on human chromosome 7 by Anthony Monaco and his colleagues at the Wellcome Trust Centre for Human Genetics in Oxford. Just having the FoxP2 gene, though, is not enough. If a child is not exposed to a lot of spoken language during the critical learning period, he or she will always struggle with speech.

LOVE – Some species of rodents, such as the prairie vole, form long pair bonds with their mates, as human beings do. Others, such as the montane vole, have only transitory liaisons, as do chimpanzees. The difference, according to Tom Insel and Larry Young at Emory University in Atlanta, lies in the promoter upstream of the oxytocin- and vasopressin-receptor genes. The insertion of an extra chunk of DNA text, usually about 460 letters long, into the promoter makes the animal more likely to bond with its mate. The extra text does not create love, but perhaps it creates the possibility of falling in love after the right experience.

ANTISOCIAL BEHAVIOR – It has often been suggested that childhood maltreatment can create an antisocial adult. New research by Terri Moffitt of London's Kings College on a group of 442 New Zealand men who have been followed since birth suggests that this is true only for a genetic minority.

Again, the difference lies in a promoter that alters the activity of a gene. Those with high-active monoamine oxidase “A” genes were virtually immune to the effects of mistreatment. Those with low-active genes were much more antisocial if maltreated, yet if anything slightly less antisocial if not maltreated. The low-active, mistreated men were responsible for four times their share of rapes, robberies and assaults. In other words, maltreatment is not enough; you must also have the low-active gene. And it is not enough to have the low-active gene; you must also be maltreated.

HOMOSEXUALITY – Ray Blanchard at the University of Toronto has found that gay men are more likely than either lesbians or heterosexual men to have older brothers (but not older sisters). He has since confirmed this observation in 14 samples from many places. Something about occupying a womb that has held other boys occasionally results in reduced birth weight, a larger placenta and a greater probability of homosexuality. That something, Blanchard suspects, is an immune reaction in the mother, primed by the first male fetus, that grows stronger with each male pregnancy. Perhaps the immune response affects the expression of key genes during brain development in a way that boosts a boy’s attraction to his own sex. Such an explanation would not hold true for all gay men, but it might provide important clues into the origins of both homosexuality and heterosexuality.

TO BE SURE, EARLIER SCIENTIFIC DISCOVERIES – had hinted at the importance of this kind of interplay between heredity and environment. The most striking example is Pavlovian conditioning. When Pavlov announced his famous experiment a century ago this year, he had apparently discovered how the brain could be changed to acquire new knowledge of the world - in the case of his dogs, knowledge that a bell foretold the arrival of food. But now we know how the brain changes: by the real-time expression of 17 genes, known as the CREB genes. They must be switched on and off to alter connections among nerve cells in the brain and thus lay down a new long-term memory. These genes are at the mercy of our behavior, not the other way around. Memory is in the genes in the sense that it uses genes, not in the sense that you inherit memories.

In this new view, genes allow the human mind to learn, remember, imitate, imprint language, absorb culture and express instincts. Genes are not puppet masters or blueprints, nor are they just the carriers of heredity. They are active during life; they switch one another on and off, they respond to the environment. They may direct the construction of the body and brain in the womb, but then almost at once, in response to experience, they set about dismantling and rebuilding what they have made. They are both the cause and the consequence of our actions.

Will this new vision of genes enable us to leave the nature-nurture argument behind, or are we doomed to reinvent it in every generation? Unlike what happened in previous eras, science is explaining in great detail precisely how genes and their environment - be it the womb, the classroom or pop culture - interact. So perhaps the pendulum swings of a now demonstrably false dichotomy may cease.

It may be in our nature, however, to seek simple, linear, cause -and- effect stories and not think in terms of circular causation, in which effects become their own causes. Perhaps the idea of nature via nurture, like the ideas of quantum mechanics and relativity, is just too counterintuitive for human minds. The urge to see ourselves in terms of nature versus nurture, like our instinctual ability to fear snakes, may be encoded in our genes.

Author of **Medical Epigenology** Gerald Picard would say that the hands & wrists alters dramatically and acts as a very good reference to what we are doing to ourselves as we age.

Big Finger Theory

A Globe & Mail article, Aug. 22nd 1998, ET CETERA – Big-finger hormone theory

“**Men have higher levels of the sex hormone testosterone if their third finger is longer than their first**,” says a scientist from an English university who appeared at a Vancouver conference recently. New Scientist magazine reported recently that Liverpool University’s John Manning discovered that women, however, have higher levels of estrogen if their first finger is longer than their third.
Mr. Manning said the relative length of the two fingers could predict fertility. In tests of 60 men and 40 women at an infertility clinic, Mr. Manning also found that men who have asymmetrical hands produce

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fewer sperm. “Digit asymmetry predicts the number of sperm per ejaculate, he told delegates at the conference. The more asymmetry, the fewer sperm.”

Berkeley University (California-USA)

A study released by Berkeley University ...found that the length of fingers can point to whether a person is gay, lesbian or straight because certain finger-length patterns indicate that a person was exposed to high levels of male hormones while in the womb. Heterosexual men tend to have first and third fingers of different lengths while in gay men the difference is third longer than first. Heterosexual women tend to have first and third fingers of similar lengths while lesbians tend to have a longer first finger. See **DDG Feature** number 040_01 to 040_05 in the manual.

The prestigious U.S. magazine New Scientist reported that a researcher at Liverpool University in England tested 60 men and 40 women at an infertility clinic and discovered that men whose third finger is longer than their first finger have higher levels of the male sex hormone testosterone and that men with asymmetrical hands produce fewer sperm. Women whose first finger is longer than their third finger have higher levels of the female sex hormone estrogen.

An editorial in Newsweek stated, A human clone might resemble, superficially, the individual from whom it was made. But it would differ dramatically in the traits that define an individual – personality and character, intelligence and talents.

“**Here’s the rule**,” says psychologist Jerome Kagan of Harvard. “You will never get 100 per cent identity – never – because of chance factors and because environments are never exactly the same.”

And a decade later a study by the University of California at Berkeley found that the length of fingers can point to whether a person is gay, lesbian or straight because certain finger-length patterns indicate that a person was exposed to high levels of male hormones while in the womb. Heterosexual men tend to have first and third fingers of different lengths while in gay men the difference is third longer than first. Heterosexual women tend to have first and third fingers of similar lengths while lesbians tend to have a longer first finger. Again back ub the UK scientist reported that a researcher at Liverpool University in England tested 60 men and 40 women at an infertility clinic and discovered that men whose third finger is longer than their first finger have higher levels of the male sex hormone testosterone and that men with asymmetrical hands produce fewer sperm. Women whose first finger is longer than their third finger have higher levels of the female sex hormone estrogen.

Index fingers point to rational male thought

Source: Deutsche Presse-Agentur (dpa)

London (dpa) - An unusually long index finger is an index of male superiority at rational scientific thought and reasoning, according to a team of British scientists, all of whose first digits presumably meet the qualifications.

Their findings showed that male scientists are good at research because they have higher than average levels of the female hormone oestrogen which aids analytical skills.

The survey, conducted on academics at the University of Bath, found that male scientists tended to have longer index fingers than other men, indicating high levels of oestrogen present in their bodies.

Men studied had levels of oestrogen as high as their testosterone levels, which caused the right side of their brains responsible for spatial and analytical skills, to develop more strongly.

Because of the high levels of oestrogen, male scientists were less likely to have children and were more likely to have relatives with dyslexia which may be in part caused by hormonal levels.

Findings also revealed that female social scientists tended to have higher than average levels of testosterone, making their brains similar to those of males.

The study drew on past research which has found that finger length is genetically linked with the sex hormones oestrogen and testosterone.

A person whose index finger is shorter than their ring finger will have received more testosterone while in the womb than a person with a longer index finger who will have had more oestrogen.

Psychology lecturer Dr. Mark Brosnan studied 100 male and female academics at the University of Bath.

He found that men teaching traditional sci-

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ence subjects such as maths and physics had index fingers at least as long as their ring fingers, meaning they had high levels of oestrogen.

Men teaching social science, such as psychology and education had ring fingers longer than their index fingers.

Dr. Brosnan, whose index finger is the same length as his ring finger, said: “The results are fascinating insight into how testosterone and oestrogen levels in the womb can effect people’s choice of career and how these levels can show up in the length of fingers on our hands.

“In the general population, men typically have higher levels of testosterone than women, but the male scientists at the University of Bath have lower testosterone levels than is usual for men their oestrogen and testosterone tend to match those of women generally.

“This research now suggests that lower than average testosterone levels in men lead to spatial skills that can give a man the ability to succeed in science.

“Other research in the past also suggested that an unusually high level of testosterone can do the same thing by encouraging the development of the right hemisphere.”

Dr. Brosnan said that the lack of women working in science was a mystery.

He added: “Science has been male-dominated in the past and this may be putting women off entering it, even though they are able to.”

Fear Could Be Linked To Cancer
By Robert Roy Britt LiveScience Managing Editor
posted: 19 October 2006

Personality might affect cancer risk
A new study is showing that Medical Epigenology Practice should be an acquired service in our society.
Apprehensive rats got cancer tumors sooner in a new study that suggests human personalities might affect cancer risk.should be apart of our society.
The study?

Young female rats afraid of new environments developed cancer tumors sooner than their more adventuresome sisters, a new study finds.
The researchers called the difference “striking.”

The apprehensive rodents died sooner than others in the study because they got cancer earlier in life, on average. Importantly, however, the study found no difference in the length of time between onset of cancer and death in the two sets of rats.
Implications for humans?

The findings suggest research is needed into the possibility that human personality (See “Fear Factor Gene Discovered” at bottom of this story) could predict cancer risk, the researchers write in the current issue of the journal Hormones and Behavior.

“Human studies may need to consider more basic behavior traits than those already considered,” said Martha McClintock of the University of Chicago.

The scientists studied 81 female rats of a type known to develop breast and pituitary tumors. The researchers measured how far each one, at 20 days old, was willing to venture into a new, non-threatening environment.

By middle age, which is 390 days for these rats, 80 percent of the fearful females had mammary cancer, compared to just 38 percent of the adventuresome rats.

“This is the first evidence that infant temperament among rats predicts the time at which these tumors appear and the age at which the females will die,” said the study’s lead author, Sonia Cavigelli, a former University of Chicago researcher who is now at Pennsylvania State University. Possible reason, During puberty, the fearful rats were twice as likely as the adventuresome rats to have irregular reproductive cycles, the study showed. The cycles stabilized during adulthood but then became irregular again for the fearful rats during middle age.

Fear Factor Gene Discovered

By Robert Roy Britt LiveScience Managing Editor
posted: 17 November 2005.

If there is a gene for FEAR then it should also have developed in the hand. Medical Epigenology Practitioners will be researching this gene if we don’t already have it recorded and interpreted. I think we do, Author

Some people just don’t seem to make a connection between danger and fear. You know the type: They climb sheer cliffs and jump out of airplanes that are working just fine.

All well and good if you like that sort of thing.

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But there’s a flip side that’s truly problematic. Some people are so afraid of even the slightest danger that anxiety overwhelms them.

With the discovery of a fear factor gene, announced today, scientists have moved a step closer to being able to moderate extreme reactions to fear and also soothe trauma victims.
No fear

The researchers identified a gene in mice that controls reactions to impending danger by firing certain neurons in the brain. Mice that don’t have the gene, called stathmin, simply don’t react to situations that should scare the rodent pants off them.

Human brains are known to work similarly in the age-old fight-or-flight response to things that raise neck hairs.

“For those who experience fear too much, stathmin-based drugs may provide an important relief,” Rutgers University scientist Gleb Shumyatsky told Live Science. “Also, after trauma these drugs may help to forget bad experiences.”

More research is needed, of course. And Shumyatsky points out that very little is known about the intricacies of fright in the human mind.

“While one of the best understood memory-related neural circuitries within the mammalian brain is that which controls fear conditioning, little is known about the molecular mechanisms underlying fear reactions,” he said. The study is detailed in the Nov. 18 issue of the journal Cell. Key to survival.

Genetic Discrimination Public fear.
By Steve Mitchell, Source: United Press International

WASHINGTON (United Press International via COMTEX) — The largest survey of it’s kind to date indicates a significant proportion of the public fears the possibility of genetic discrimination.

“This study supports the view that public concerns about genetic discrimination are substantial,” a team of researchers from 10 centers reported in the May-June issue of the journal Genetics in Medicine.

The researchers, led by Mark Hall, a law and public health sciences professor at Wake Forest University School of Medicine, surveyed nearly 87,000 people in the United States and Canada undergoing genetic testing for a condition called hereditary hemochromatosis, which can lead to organ damage and other health problems.

Among respondents, 40 percent said they were concerned the results of the testing could prevent them from getting or keeping health insurance.

“Despite this concern, people were willing to be tested, and we didn’t see any clear sign that this concern was a large deterrent to being tested,” Hall said in a statement. However, the researchers noted, this might be a skewed result because the population they surveyed had already made the decision to be tested for a genetic condition.

Genetic testing — which can determine who may have a heightened risk of developing a particular disease, such as cancer or Alzheimer’s — rapidly is becoming routine and scientists continually are discovering new genetic mutations linked to disease. The legal protections, however, have not kept up.

Although nearly every state now has some legislation that protects individuals against genetic discrimination, there still have been cases of alleged discrimination, said Sujatha Byravan, a molecular biologist and president of the Council for Responsible Genetics, a watchdog group in Cambridge, Mass.

In one such case, BNSF Railway Company in 2001 doled out a settlement of $2.2 million after being accused of genetic testing blood samples from 23 employees without their consent.

“We need a federal law” to establish a national standard to prevent genetic discrimination, Byravan told United Press International.

Congress may be close to reaching that goal. The Senate passed legislation that would prohibit health insurance companies and employers from discriminating against individuals based on genetic information and a similar bill is pending in the House. The bills also would help ensure the results of genetic testing remain confidential.

Current legal protections leave loopholes, Susannah Baruch, policy analyst at the Genetics and Public Policy Center, which is affiliated with The Johns Hopkins University, told UPI. The center takes no position on genetic discrimination, but rather serves as an information source on policy issues involving genetics, Baruch noted.

“What’s out there is a lot of patchwork and there’s gaps,” Baruch said.

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Federal law prohibits insurance companies that provide coverage to groups, such as that offered by employers, from discriminating against individuals based on genetic information. The companies still can raise premiums on the entire group, however, or drop them altogether, and there is no protection for people in the individual insurance market, Baruch said.

There also is no national protection against employer discrimination, she said.

Ultimately, genetic testing may push the country toward establishing universal health-care, Byravan said, adding this is because "we're all going to have genes that in some way or other are linked to diseases."

According to the National Human Genome Research Institute, every person probably has at least six genetic mutations that place him or her at an increased risk for a particular disease.

"That means that virtually all people are potential victims of genetic discrimination in health insurance," the NHGRI, a component of the National Institutes of Health, states on its Web site.

At least one health insurance company, Aetna Inc., has pledged not to raise rates or drop coverage based on genetic information, but such voluntary policies may not be enough, Byravan said. They could change as genetic testing becomes more widespread, she said.

"Insurance companies function by pooling the risk for different groups, so when you start having individuals who are getting tested for genetic mutations, you can't really give insurance to anyone because everyone will have some level of risk," Byravan said.

The findings of the study tend to support Byravan's call for universal health coverage. The researchers found that those with government mandated health insurance —Canadians and U.S. participants covered by Medicare— had less concern about the possibility of genetic discrimination.
Steve Mitchell is UPI's Medical Correspondent. E-mail: sciencemail@upi.com

Scientists find clues to memory health

By K.L. Capozza, UPI Science Writer, Source: United Press International

SAN FRANCISCO (United Press International via COMTEX) — Misplaced keys, faltering name recall, incomplete thoughts — by age 50, many otherwise healthy adults begin to notice these insidious symptoms, all signs of short-term memory loss. Indeed, as we age, our memory function can decline by as much as 45 percent, researchers have found.

Much remains to be learned about the processes that underlie memory loss, but science is beginning to discover ways to abate — and possibly to halt — cognitive decline.

According to Michael Merzenich, chief scientific officer with Posit Science in San Francisco, the key to memory longevity is lifelong learning.

"Often, as people age, they engage in less and less learning," Merzenich told United Press International. "They rest on their laurels, and their environments, even if stimulating (such as a job or hobbies), do not drive new learning."

Merzenich's company is pioneering brain-training exercises for aging adults that, like calisthenics, keep the organ flexible, in good physical shape and functioning well into the golden years. The company's computer-guided exercises — which are being marketing to assisted-living and retirement communities — aim at augmenting memory and improving visual acuity and hearing. The memory exercises should be practiced five days a week for an hour a day for eight weeks — a demanding regimen, but one that researchers think may mitigate memory loss.

"As the brain gets into ruts, it is not challenged with new learning, and without crucial stimulation, the brain's function can gradually erode over time, leading to decreased memory and cognitive function," Merzenich explained.

Undertaking a rigorous "brain fitness" program later in life may be only part of the answer, said Dr. Thomas Crook, former chief of the National Institute of Mental Health's Geriatric Psychopharmacology Program. Diet plays an absolutely key role in determining brain function later in life, he said, and establishing healthy eating habits early on can deliver dividends in old age.

Updated Feb. 25th, 2023

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"Diet is very important. A generalization would be that those things that are good for the heart are good for the brain as well," Crook told UPI. "We eat such massive amounts of food in this country that we end up with obesity and diabetes, which are in themselves problematic for memory."

Likewise, exercise appears to contribute to better brain health, he said.

"A lot of research is showing that aerobic exercise is particularly helpful," Crook said. "Even 30 minutes of walking per day can help. We know that vascular changes in the heart also apply to the brain, and exercise benefits both."

The cartoon character Popeye may have been on to something, with his enthusiastic endorsement of spinach. According to a 2005 study by Harvard University researchers, fruit and vegetable intake is inversely related to cognitive decline — the more fresh foods you eat, the better your chances of maintaining brain health.

The Harvard group followed a cohort of female subjects from 1976 to 2001 and tracked their eating habits along with mental function over four decades. They found that the women who ate the highest amounts of green leafy vegetables (such as broccoli, greens and spinach) had the slowest mental decline.

"The finding with cruciferous vegetables, we believe, may be because they are nutrient dense — good source of vitamin C, beta carotene, B vitamins, which have all been found in some studies to be associated with better cognition," said Jae Hee Kang, lead author of the Harvard study.

Crook also noted that a new compound of neuropeptides marketed as a dietary supplement appears to enhance nerve-cell synaptic and dendritic growth — a process associated with improved memory.

"We think the supplement is a useful addition to a heart healthy diet that includes low-fat food and modest portion sizes," he said.

Crook conducted clinical trials on the compound, which has not yet hit the market. Despite his enthusiasm for the new supplement's potential benefits, however, he said most "nutriceuticals," including the much-touted gingko biloba, do not work.

"There's no sound evidence that Ginkgo, nor any of the witch's brews sold under clever names, improves learning and memory," Crook said. "I'm really quite negative about nutriceuticals in general."

Before adults over age 50 start popping supplements and loading up on spinach, they should consult their physicians, who can assess if their perceived forgetfulness is, in fact, attributable to age-related memory loss. Sometimes, absent-mindedness may not be serious and can be confused with something as simple as fatigue, University of California, San Diego, researchers have found. They wrote in the July 2005 issue of the Journal of the American Geriatric Society that senior adults have more difficulty getting a good night's sleep because the body's circadian rhythms change with age. Seniors also may experience insomnia as a side effect of one of the many medications prescribed to older adults.

The bottom line is that a good memory — like a fabulously fit body — requires good habits, diligence and discipline, Crook said.

"It doesn't happen magically," he said. "It's like being in shape; you have to do a lot of work and exercise to get better at it."

K.L. Capozza covers health matters for UPI Science News. E-mail: sciencemail@upi.com

The Hands of a Child

If we could go back in time to your birth and compare your hands to your parents, we would make a remarkable discovery. Your hands would look very similar to your parents, or parent if one is genetically dominant.

However, after the ages of five one has already developed their adult behavior and personality under the influence of the parent or guardian. If this influence is abnormal, even traumatizing, the genetic features of the hands will begin to alter and remain or will change based on how one heals physically and emotionally.

Because the child is easily influenced, a parent or guardian should educate themselves on child behavior and on how a child needs the perspective of both genders to develop their ideology of human nature. Without either gender a child becomes imbalanced, sexually and emotionally. Hence, why we have BIG brother and sister programs built into our society. After puberty when the child takes full control of his or her life, based on good up-bringing, a child should be able to make correct rational and

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normal decisions. The body's hormones, especially during puberty, interfere with the guardian's teachings and during this course of a few years they should be patient with their children, but natural traumas usually remain in the hand as a permanent feature. One may still find interesting similarities between their hands and those of the parent or guardian, but the changes really depend on how the overall environment, lifestyle and influences have affected a child or individual over all, altering the features of the hand and creases in the palm during childhood.

Predicting Addiction

Behavioral genetics uses twins and time to decipher the origins of addiction and learn who is most vulnerable, Lisa N. Legrand, William G. Iacono, Matt McGue; Lisa N. Legrand, Email: llegrand@tfs.psych.umn.edu

Why do some people get hooked on alcohol, tobacco or gambling, while others can sip, puff and bet—or not—with indifference? Lisa Legrand dissects this question and its now-familiar overtones of nature-vs.-nurture with new data that compare identical and fraternal twins as they grew from preadolescence to adulthood. Her article describes the behavioral and neurological signatures that may point to biochemical susceptibility and provide a way to distinguish those at greatest risk. These findings may also help to identify what kind of environment—including parenting strategies, peer interactions and neighborhood influences—can tip the scales toward or away from addiction.

In 1994, the 45-year-old daughter of Senator and former presidential nominee George McGovern froze to death outside a bar in Madison, Wisconsin. Terry McGovern's death followed a night of heavy drinking and a lifetime of battling alcohol addiction. The Senator's middle child had been talented and charismatic, but also rebellious. She started drinking at 13, became pregnant at 15 and experimented with marijuana and LSD in high school. She was sober during much of her 30s but eventually relapsed. By the time she died, Terry had been through many treatment programs and more than 60 detoxifications.

Her story is not unique. Even with strong family support, failure to overcome an addiction is common. Success rates vary by treatment type, severity of the condition and the criteria for success. But typically, fewer than a third of alcoholics are recovered a year or two after treatment. Thus, addiction may be thought of as a chronic, relapsing illness. Like other serious psychiatric conditions, it can cause a lifetime of recurrent episodes and treatments.

Given these somber prospects, the best strategy for fighting addiction may be to prevent it in the first place. But warning young people about the dangers of addiction carries little force when many adults drink openly without apparent consequences. Would specific warnings for individuals with a strong genetic vulnerability to alcoholism be more effective? Senator McGovern became convinced that his daughter possessed such a vulnerability, as other family members also struggled with dependency. Perhaps Terry would have taken a different approach to alcohol, or avoided it altogether, if she had known that something about her biology made drinking particularly dangerous for her.

How can we identify people—at a young enough age to intervene—who have a high, inherent risk of becoming addicted? Does unusual susceptibility arise from differences at the biochemical level? And what social or environmental factors might tip the scales for kids at greatest risk? That is, what kind of parenting, or peer group, or neighborhood conditions might encourage—or inhibit—the expression of "addiction" genes? These questions are the focus of our research.

Abstract This study sought to expand the modest literature investigating gene ◊ environment interactions in the prediction of substance use. Our sample consisted of 591 male twins from the Minnesota Twin Family Study. Their relative genetic risk was estimated from their parents' substance-related diagnoses and their environmental risk from their affiliations at age 11 with social groups likely to either encourage or discourage substance use. At age 14, the boys' own substance use was assessed. We hypothesized both main effects and an interaction between our genetic- and environmental-risk variables in the prediction of substance use by this young age. We further theorized that the boys' inherited risk might take the form of temperament, specifically externalizing tendencies. Using regression analyses and biometrical modeling, we corroborated earlier research by finding evidence for a significant interactive effect in the etiology of substance use. Our results suggest that low levels of environmental risk may buffer against the potentially unfavorable effects of high familial risk; however, when environmental risk is high, the degree of familial risk is consequential. We were not able to support our second hypothesis; rather, temperament predicted substance use only through shared environmental factors.

Researchers isolate gene

World book Encyclopedia - Comparing Molecules, Atoms and DNA

A molecule is one of the smallest basic units of matter which a substance can still maintain its original chemical identity. For Example water can be divided into molecule fragments or atoms. The chemical elements of water is hydrogen and oxygen.

Individual atoms held together in certain arrangements can form a molecule. The size and number of atoms determines a molecule's size and shape. E.G.: A water molecule has three atoms called a triatomic molecule. Nitric oxide (NO) has two atoms called a diatomic molecule. A large DNA molecule contains millions of atoms linked together through strong attractive forces called a, "bond." A molecule shape depends on two factors. The strength of the bond relative to one another and those that don't bond at all and move apart. For example, an ammonia is tetrahedron (a pyramid with four faces) shape molecule composed of three hydrogen atoms attached to one nitrogen. And a normal butane is a zigzag chain shape molecule composed of 4 carbon atoms attached to 10 hydrogen. Therefore, large protein molecules can form long spiral chains.

World Book Encyclopedia on Molecules

Molecule is one of the basic units of matter. It is the smallest particle into which a substance can be divided and still have the chemical identity of the original substance. If the substance were divided further, only molecular fragments or atoms of chemical elements would remain. For example, a drop of water contains billions of water molecules. If one of those water molecules were separated from the rest, it would still behave as water. But if that water molecule were divided, only atoms of the elements hydrogen and oxygen would remain.

Individual molecules. Molecules are made up of atoms held together in certain arrangements. Scientists use chemical formulas to show the composition of molecules. For example, a water molecule consists of two hydrogen atoms and one oxygen atom, and it has the formula H2O. A molecule's size and shape depends on the size and number of its atoms. A molecule that consists of two atoms, such as nitric oxide (NO), is called a diatomic molecule. A molecule made up of three atoms, such as water, is called a triatomic molecule. A large molecule, such as DNA, can contain millions of atoms.

Atoms link together in molecules through strong attractive forces called bonds (see BOND). The shape of a molecule depends upon two factors: (1) The atoms tend to take up positions relative to one another such that the bonds formed are the strongest of all the bonds that this particular group of atoms could form. (2) Atoms that are not bonded to each other tend to move far apart. For example, an ammonia molecule has the shape of a tetrahedron (a pyramid-like figure with four faces). It consists of three hydrogen atoms attached to a nitrogen atom. Normal butane molecules have 4 carbon atoms arranged in a zigzag chain with 10 hydrogen atoms attached. Large protein molecules can form long spiral chains.

The mass (amount of matter) of a molecule is indicated by its relative molecular mass. You can find the relative molecular mass of a molecule by adding the relative atomic masses of all the atoms in the molecule. An atom's relative atomic mass equals its mass divided by 1/12 of the mass of an atom of carbon 12, the most abundant form of carbon.

Suppose, for example, you wished to calculate the relative molecular mass of a molecule of carbon dioxide (CO2) that consists of one atom of carbon 12 and two atoms of the most abundant form of oxygen. The relative atomic mass of the carbon atom would be exactly 12, and the relative atomic mass of each of the oxygen atoms, rounded to five figures, would be 15.995. Your calculation would be 12.000 + 15.995 + 15.995 = 43.990. A molecule's mass can also be measured with an instrument called a mass spectrometer. Carbon dioxide has a molecular mass of about 44.

Genetic screening: physical, mental baggage
By Jackie Jadrnak, Source: Albuquerque Journal
The question probably has occurred to many of us when we learn a family member has been diagnosed with cancer: Does this mean I'm going to get it, too?

Science is coming closer to answering that question but only in a few cases, and never with a simple "yes" or "no." Instead, a look at certain genes might bring news that you have a 15 percent to 45 percent risk, for example, of developing ovarian cancer.

You're left to decide how to play those odds. "Geneticists are now the new fortune-tellers. But like the fortune-tellers of old, they don't always get it all right," said Dr. Funmi Olopade.

A professor of hematology/oncology at the University of Chicago, Olopade gave a presentation on breast cancer genetics last month in conjunction with the opening of a genetic counselling and testing program at the Santa Fe Cancer Center at St. Vincent Hospital.

"Genetics doesn't walk in isolation," she said. "You give the numbers to begin to have a conversation with that patient."

That conversation begins well before the testing is ever done for a genetic trait linked to cancer and can continue well afterward, according to genetics counsellors.

"Informed consent is a big part," said Lori Ballinger, a certified genetics counsellor with the Cancer Research and Treatment Center at the University of New Mexico. "Not everyone should be tested. And you have to deal with the social and emotional issues."

Testing doesn't just tell you your risks; it raises implications for your whole family.

The most common cancers tested for are breast cancer and colon cancer, although defects in those genes also are linked to other cancers. People with certain genetic traits linked to breast cancer, for example, also have higher risks for ovarian, prostate and pancreatic cancers, Olopade said.

A genetic defect related to colon cancer also carries higher risks for uterine cancer, said Lynn Noell, clinical care coordinator and genetic educator for Santa Fe Cancer Centre's program. That center also expects to test people for genes linked to melanoma, the most deadly form of skin cancer, she said.

A host of other genes have been identified that have some link to cancer, "but some are fairly rare and very specific," Ballinger said. People are tested only when evidence is available to raise suspicions about hereditary syndromes.

In general, genetic testing might be called for if you have a strong family history of the same type of cancer (or different cancers linked to the same genetic mutation), as well as cancer that comes at an early age, Noell said.

"You can't hang your hat entirely on family history," said Dr. Maury Blitman, medical oncologist with Santa Fe Cancer Center. "But if someone develops cancer before 50, that raises a red flag."

Insurance generally covers genetic counselling sessions, with reimbursement for genetic screening tests approved on a case-by-case basis, Ballinger said. Tests can range in price from $300 to $3,000, she said.

People who do get tested are warned that a negative result is no guarantee that they won't develop a particular cancer. Only one in 10 cancers is thought to stem from an inherited gene.

However, some cancers might be inherited but researchers haven't found the culprit genes yet. Ballinger said she is working with a family in which 12 members have developed breast cancer, some as young as 23 years old when the disease was identified.

Yet they test negative for the known breast cancer genes, she said. They very well may have an inherited cancer "they just don't carry the mutations we know about," she said.

Ballinger said she tells clients considering testing to ponder the "so what" question. Once they get the test results, then what?

In some cases, it means people can take steps to prevent a cancer or catch it early. "If it's a clear positive, it's back to the physician to see what can be done," Noell said.

Women with the identified genes for breast cancer have different risks, Olopade said.

With BRCA1, the risk for early onset breast cancer is 50 percent to 85 percent, along with a 15 percent to 45 percent risk for ovarian cancer, she said. With BRCA2, the risk for breast cancer is the same, but the ovarian cancer risk is 10 percent to 20 percent.

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Women with one of these genes, if identified early, might choose not to postpone childbirth and then have their breasts and/or ovaries removed after they have their children, she said. They may opt to take tamoxifen or other drugs that are thought to reduce breast cancer risk.

They should start breast self-exams by the time they are 18 and begin screening mammograms or perhaps MRIs (magnetic resonance imaging), which may see more clearly through young, denser breast tissue at an earlier-than-usual age, Olopade said.

They also could refrain from smoking, which makes them more susceptible to a related pancreatic cancer, she said.

Similar prevention or early screening steps could be taken for people who show a genetic predisposition toward other cancers, Blitman said. People with a tendency toward melanoma, for example, could get thorough, regular skin examinations, as well as avoid sun exposure.

People at high risk for colorectal cancers could get early and regular screening for polyps.

This is a case in which knowing someone doesn't have the suspect gene may be as important as knowing they do, Ballinger said. One version of the gene brings colon cancer on at such a young age that even children undergo colonoscopies to look for the cancer, she said.

"You want to know who you should not be screening," she said, noting the colonoscopy is quite invasive and does carry some small risk of complications, such as a tear in the colon.

Genome may improve your health

By Robert S. Boyd, Source: Knight Ridder Washington Bureau

WASHINGTON — How would you like to get your own personal genome — a collection of all the genes you inherited from your father and mother, which make you who you are?

Such a scientific tool could help you and your doctors learn which diseases you're especially susceptible to and figure out how to avoid or prevent them.

The technology to accomplish that feat at a reasonable cost may be possible in the coming decade, thanks to the Personal Genome Project, which is getting under way at Harvard Medical School in Boston.

The PGP is an offshoot of the Human Genome Project, the massive government effort to read and put in proper sequence all 3 billion bits of human DNA. The project was completed in 2003 at about $3 billion — about $1 for each of the tiny chemical units, called bases, that make up the human genome.

Since then, better technology and greater efficiency have brought down the cost to $10 million — less than a penny per base — for a complete DNA sequence, according to Jeffery Schloss, the director of technology development at the National Human Genome Research Institute, a federal agency in Bethesda, Md.

The institute is financing a campaign to cut the cost of sequencing a genome to $10,000 by 2009 and drive it all the way down to $1,000 by 2014. An affordable $1,000 genome is biology's next dream.

A number of laboratories are working on low-cost DNA-sequencing technology projects, but the Harvard group is the first to set a goal to make personal genomes possible for individuals within the next 10 years.

The privately financed project is the brainchild of George Church, 50, a leading genome expert at Harvard Medical School.

"The goal is to reduce costs to the point at which the genomes of individual humans could be sequenced as part of routine health care," Church wrote in the journal Nature Reviews/Genetics.

So far Church is working to sequence the genome of only one person: himself. He has two other volunteers ready to go in March. "About 50 have volunteered for the next round," he said in an e-mail message.

Church predicted that a "tipping point" will be reached in the next two or three years when people recognize that the benefits of the project outweigh the costs, and it will grow and gain momentum.

"Eventually PGP may require millions of volunteers," he said.

Under Church's plan, individual genomes,

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along with the names and photographs of the donors, will be placed in a public government database, where scientists and anyone else can see them. He acknowledged that such extraordinary openness carries risks as well as benefits.

"The prospect of this new type of personal information suddenly becoming widely available prompts worries about how it might be misused — by insurers, employers, friends, neighbors, commercial interests or criminals," he acknowledged in the current issue of Scientific American.

Among the risks are exposing genetic flaws that could affect a person's ability to get insurance or hold a job. A sequence might reveal a disease that lacks a current cure, a devastating finding for anyone. A curious or hostile person might uncover an individual's hidden racial background.

Church even speculated that someone with sufficient knowledge could use the data to "make synthetic DNA corresponding to the volunteer and plant it at a crime scene."

To meet these fears, the project gives volunteers the option of keeping their data private.

Church said the advantages of knowing a personal genome outweighed the drawbacks. He noted that personal genetic tests already are being used to determine the best kinds of drugs to use for breast or lung cancer.

Gene testing is "expanding rapidly to include personalized nutrition and lifestyle decisions," he said.

After Church put his own genetic information in a public database, for example, a heart doctor on the West Coast saw it and warned him that he was overdue for a test of his cholesterol medication. "The tip led to a change in my dose and diet and consequently to a dramatic lowering of at least one type of risk," he said.

To launch his project, Church spent more than a year seeking approval from a panel of experts convened by Harvard Medical School. He had to promise, for example, to report any "positive or negative events" affecting the volunteers or their close relatives, such as misuse of their DNA data.

"Like all human research subjects, participants must be informed of potential risks before consenting to provide their data," Church said. "These initial participants are heroes and human guinea pigs paving the way for potentially increasing utility for the general public."

The director of the National Human Genome Research Institute, Dr. Francis Collins, said he thought that most people would be glad to have their DNA made available to their doctors, but not to outsiders.

"The general public is not ready for that," Collins said. "You can get the medical benefits without requiring very open disclosure."

The genome institute hasn't endorsed Church's project, but it's contributing a small amount of money to support his research into the ethical and legal risks of putting individuals' DNA on the Web.

"It's a good opportunity to learn something as a research project with volunteers who understand the risk and consent to it," Collins said.

Church likened the beginning phase of his ambitious project to the introduction of "revolutionary new tools" such as personal computers or the Web.

"We hope to explore possible rewards and risks of personal genomics by recruiting volunteers to make their own genome data openly available," he said. "No one can predict what living in an era of personal genomics will be like until the waters are tested."

For information on the Personal Genome Project, go to http://arep.med.harvard.edu/PGP.
Sinister finding; Tom Blackwell National Post 07-15-2005, Sinister finding: Pediphlilia & Left hands. Byline: Tom Blackwell; edition: All But Ottawa & Toronto, Section: Body & Health, Type: News; Crime Memo: tblackwell@nationalpost.com

A new Canadian study that found pedophiles have a strong tendency to be left-handed could help change decades of thinking about such sexual deviants — and lead to new ways of combating the problem, says one of the researchers behind it.

Most experts have theorized that pedophiles are motivated by psycho-social factors such as their early upbringing or sexual history, and treatment has responded accordingly.

But the study published this month in Archives of Sexual Behavior indicates there is a strong neurological factor, perhaps triggered by birth defects, that one day might be prevented.

The researchers at Toronto's Centre for Addiction and Mental Health now plan to peruse MRI

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images of pedophiles for signs of brain abnormalities.

"For more than a century, we've been putting a great deal of energy and effort into one class of theories about pedophilia and essentially ignoring biological components," said Dr. James Cantor, the study's lead author. "This is the first evidence that those theories can't be the whole story."

Pedophiles present a formidable challenge to therapists, scientists and correctional authorities, with no evidence to date that their penchant for sex with children can ever be cured. Treatment often focuses on drugs that lower their libido and teaching strategies to avoid situations in which they victimize young people.

There has not been much of a nature-versus-nurture debate in the field, either, said Dr. Cantor, and little research to explore the possible role of the brain.

After previous work suggested a link between left-handedness and pedophilia, he and other scientists at the Toronto centre set out to examine the question more closely. They surveyed more than 400 sex offenders, using phallometric testing — measuring blood flow in their penises when shown different images of potentially erotic stimuli — and questions about their handedness.

Among those whose primary sexual interest was children under 12, more than 30% were left-handed — three times the rate in the general population or among sex offenders who favor adult victims.

Similar associations have been found between left-handedness and major neurological disorders such as Down's syndrome and autism, the paper said. Although left-handedness has been linked to mathematical geniuses and musicians, it is more often associated with negative outcomes.

The latest findings suggest there is a neurological component in pedophiles that may interact with psycho-social factors to distort their sexual behavior, the study says.

The brain problem may have occurred while their mothers were pregnant, Dr. Cantor said.

"This is going to give us a clue as to what, in utero, went wrong. And this might be very helpful in preventing it in the first place," he said.

"That would be of greater use to society [than a cure] because treatment only happens when the person has a victim, is apprehended and is more or less forced into treatment. If we can prevent it ahead of time, we not only prevent the repeat crimes, we prevent it in the first place."

More research could eventually reveal factors — such as drinking during pregnancy — that cause such harm, said Dr. Martin Lalumiere, a forensic psychologist at the University of Lethbridge in Alberta.

The new study is "very convincing," he said.

"It makes a lot of sense that something like pedophilia would have a neurological basis," Dr. Lalumiere said. Pedophilia is almost exclusively a problem of men, he noted, and the male brain tends to be more fragile during development than that of the female.

Dr. Cantor said he hopes other researchers will take the notion of a neurological cause of pedophilia more seriously and conduct further research to explore the connection.

He and his colleagues plan to study brain scans of people who commit sexual offenses against children and compare them to the brains of non-sexual offenders for signs of differences.

The scientists hope to be able to identify parts of the brain that are different in pedophiles.

The study also found a link, though less strong, between left- handedness and hebephiles — men whose primary sexual interest is in pubescent children.

How Dermatoglyphic Descriptive Indentations are formed

Skin is not an impermeable barrier. The mechanical structure of the outermost layer of the skin (the stratum corneum) is able to select and transport vital materials such as water while protecting itself from harmful foreign materials. The stratum corneum's "keratinocytes" can be thought of as bricks and the "lipid-bilayers" - an excitable, soluble, flexible compound that holds it together - as the mortar. The lipid-bilayers repel water and block water-soluble compounds. It's as though the mortar is so sensitive to our emotional behavioral patterns (lifestyle), attitudes and traumas, etc., via the sensitive nerve endings in our hands - a greater concentration of nerve endings than any other part of the body - they

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cause the bricks to line up in different directions. The Hox genes (promoters) not only affect the body as a whole, but the features of the hand, including lipid-bilayers of the skin, causing the stratum corneum's "keratinocytes" to form creases in an orderly direction based on our emotional lifestyle. Why the hand? Because of the direct connection the hand has with the brain. We can subconsciously use our hands without thought. The thumb opposes the 4 fingers and takes up 60% of the gray matter of our brain for its function. Could this be why our hand features record traumatic emotional incidents (data) via sensitive weak and strong genes? What may happen is this: Because the stratum corneum runs in both directions, the electrical-chemical energy from our emotional brain may excite the tiny bubbles in the mortar, causing them to expand and contract for a short period of time, forcing the bricks to create creases until the next emotional bolt of energy. As we age the mortar becomes weak and Dermatoglyphic GrooveFeatures remain or disappear based on the metabolic deterioration of the skin.

Also, when life is not lived actively, such as when a person is bedridden, no matter how old, Dermatoglyphic Descriptive Indentations disappear. The most startling evidence was discovered when studying victims of paresis, a disease that causes a softening of the brain. When the brain becomes soft, the changing genetic features of the palm fade and disappear in the same proportion as the mind is destroyed.

These scientific findings show that the operation of the hands occupies and records a large portion of the brain's psyche that can be easily identified and interpreted via Medical Epigenology Hand & Wrists exam computer DB(s).

A doctor can look at your tongue and tell that you have liver problems. The liver and tongue are not connected through the alimentary canal, but the tongue reflects the liver. Heart disorders can be diagnosed through fingernails and skin color. Medical Epigenology exams works in much the same way, by identifying the characteristics of the two phalanges of the thumb to show if a person is lacking in willpower or reason. The brain is directly connected to the thumb, and willpower and reason are a mental qualities. The German philosopher Immanual Kant tersely called the hands an externalized brain.

Medical Epigenology Hands & Wrist Assessments Overview

"When I use a word," Humpty Dumpty said in rather a scornful tone, "it means just what I choose it to mean — neither more nor less." - Lewis Carroll; "It is a capital mistake to theorize before one has data." - Sir Arthur Conan Doyle.

Medical Epigenology examination Sequence of Examination:

1) Shaking hands
2) Checking the nails
3) Inspect the fingers
4) Examine the joints
5) Survey the palms for crease defects
6) Evaluate neuromuscular function
7) Compare hands for similar genetic features.
8) Note skin conditions

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Visual distortion effect affects consumer purchases

WORCESTER, Mass. (UPI) -- U.S. scientists said the amount of a store's discounted price might be less important to consumers than the numerical value of the farthest right digit.

Researchers Keith Coulter of Clark University and Robin Coulter of the University of Connecticut discovered "right-digit effect" influences consumer perception of sale prices. When the right digits are small, people perceive the discount to be larger than when the right digits are large.

Therefore, said the researchers, an item on sale for $211 from the original price of $222 is thought to be a better deal than an item on sale for $188 from an original price of $199, even though both discounts are $11.

"When consumers examine multi-digit regular and sale prices in an advertisement, they read those prices from left-to-right," the researchers said. "If the left (hundreds) digits are identical, consumers will pay less attention to those digits, and instead will focus primarily upon the disparate right-most digits in the price comparison process.

"Our findings indicate comparative price advertising can distort consumers' perceptions in ways unintended by the seller." The study appears in the Journal of Consumer Research. What is Epigenetics? (CDC)

Genes play an important role in our health

Your genes play an important role in your health, but so do your behaviors and environment, such as what you eat and how physically active you are. Epigenetics is the study of how your behaviors and environment can cause changes that affect the way you're genes work. Unlike genetic changes, epigenetic changes are reversible and do not change your DNA sequence, but they can change how your body reads a DNA sequence.

Gene expression refers to how often or when proteins are created from the instructions within your genes. While genetic changes can alter which protein is made, epigenetic changes affect gene expression to turn genes "on" and "off." Since your environment and behaviors, such as diet and exercise, can result in epigenetic changes, it is easy to see the connection between your genes and your behaviors and environment.

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In biology, epigenetics is the study of heritable phenotype changes that do not involve alterations in the DNA sequence. The Greek prefix epi- (ἐπι- "over, outside of, around") in epigenetics implies features that are "on top of" or "in addition to" the traditional genetic basis for inheritance. Epigenetics most often involves changes that affect gene activity and expression, but the term can also be used to describe any heritable phenotypic change. Such effects on cellular and calphenotypic traits may result from external or environmental factors, or be part of normal development. The standard definition of epigenetics requires these alterations to be heritable in the progeny of either cells or organisms.

The term also refers to the changes themselves: functionally relevant changes to the genome that do not involve a change in the nucleotide sequence. Examples of mechanisms that produce such changes are DNA methylation and histone modification, each of which alters how genes are expressed without altering the underlying DNA sequence. Gene expression can be controlled through the action of repressor proteins that attach to silencer regions of the DNA. These epigenetic changes may last through cell divisions for the duration of the cell's life, and may also last for multiple generations, even though they do not involve changes in the underlying DNA sequence of the organism; instead, non-genetic factors cause the organism's genes to behave (or "express themselves") differently.

One example of an epigenetic change in eukaryotic biology is the process of cellular differentiation. During morphogenesis, totipotent stem cells become the various pluripotent cell lines of the embryo, which in turn become fully differentiated cells. In other words, as a single fertilized egg cell – the zygote – continues to divide, the resulting daughter cells change into all the different cell types in an organism, including neurons, muscle cells, epithelium, endothelium of blood vessels, etc., by activating some genes while inhibiting the expression of others.

Historically, some phenomena not necessarily heritable have also been described as epigenetic. For example, the term "epigenetic" has been used to describe any modification of chromosomal regions, especially histone modifications, whether or not these changes are heritable or associated with a phenotype. The consensus definition now requires a trait to be heritable for it to be considered epigenetic.

How Does Epigenetics Work?

Epigenetic changes affect gene expression in different ways. Types of epigenetic changes include:

DNA Methylation

DNA methylation works by adding a chemical group to DNA. Typically, this group is added to specific places on the DNA, where it blocks the proteins that attach to DNA to "read" the gene. This chemical group can be removed through a process called demethylation. Typically, methylation turns genes "off" and demethylation turns genes "on."

Histone Modification

DNA wraps around proteins called histones. DNA wrapped tightly around histones cannot be accessed by proteins that "read" the gene. Some genes are wrapped around histones and are turned "off" while some genes are not wrapped around histones and are turned "on." Chemical groups can be added or removed from histones and change whether a gene is unwrapped or wrapped ("on" or "off").

Non-coding RNA

Your DNA is used as instructions for making coding and non-coding RNA. Coding RNA is used to make proteins. Non-coding RNA helps control gene expression by attaching to coding RNA, along with certain proteins, to break down the coding RNA so that it cannot be used to make proteins. Non-coding RNA may also recruit proteins to modify histones to turn genes "on" or "off." Your epigenetics change as you age, both as part of normal development and aging and in response to your behaviours and environment.

1) Epigenetics and Development

Epigenetic changes begin before you are born. All your cells have the same genes but look and act differently. As you grow and develop, epigenetics helps determine which function a cell will have, for example, whether it will become a heart cell, nerve cell, or skin cell.

Example: Nerve cell vs. Muscle cell

You're muscle cells and nerve cells have the same DNA but work differently. A nerve cell transports information to other cells in your body. A muscle cell has a structure that aids in your body's ability to move. Epigenetics allows the muscle cell to turn "on" genes to make proteins important for its job and turn "off" genes important for a nerve cell's job.

2) Epigenetics and Age

Your epigenetics change throughout your life. Your epigenetics at birth is not the same as your epigenetics during childhood or adulthood.

Example: Study of newborn vs. 26-year-old vs. 103-year-old

DNA methylation at millions of sites were measured in a newborn, 26-year-old, and 103-year-old. The level of DNA methylation decreases with age. A newborn had the highest DNA methylation, the 103-year-old had the lowest DNA methylation, and the 26-year-old had a DNA methylation level between the newborn and 103-year-old.

3) Epigenetics and Reversibility

Not all epigenetic changes are permanent. Some epigenetic changes can be added or removed in response to changes in behaviour or environment.

Example: Smokers vs. non-smokers vs. former smokers

Smoking can result in epigenetic changes. For example, at certain parts of the AHRR gene, smokers tend to have less DNA methylation than non-smokers. The difference is greater for heavy smokers and long-term smokers. After quitting smoking, former smokers can begin to have increased DNA methylation at this gene. Eventually, they can reach levels similar to those of non-smokers. In some cases, this can happen in under a year, but the length of time depends on how long and how much someone smoked before quitting.

Epigenetics and Health

Epigenetic changes can affect your health in different ways:

1) Infections

Germs can change your epigenetics to weaken your immune system. This helps the germ survive.

Example: Mycobacterium tuberculosis

Mycobacterium tuberculosis causes tuberculosis. Infections with these germs can cause changes to histones in some of your immune cells that result in turning "off" the IL-12B gene. Turning "off" the IL-12B gene weakens your immune system and improves the survival of Mycobacterium tuberculosis.

2) Cancer

Certain mutations make you more likely to develop cancer. Likewise, some epigenetic changes increase your cancer risk. For example, having a mutation in the BRCA1 gene that prevents it from working properly makes you more likely to get breast and other cancers. Similarly, increased DNA methylation that results in decreased BRCA1 gene expression raises your risk for breast and other cancers (4).While cancer cells have increased DNA methylation at certain genes, overall DNA methylation levels are lower in cancer cells compared with normal cells. Different types of cancer that look alike can have different DNA methylation patterns. Epigenetics can be used to help determine which type of cancer a person has or can help to find hard to detect cancers earlier. Epigenetics alone cannot diagnose cancer, and cancers would need to be confirmed with further screening tests.

Example: Colorectal Cancer

Colorectal cancers have increased methylation at the SEPT9 gene. Some commercial epigenetic-based tests for colorectal cancer look at DNA methylation levels at the SEPT9 gene. When used with other diagnostic screening tests, these epigenetic based tests can help find cancer early.

3) Nutrition During Pregnancy

A pregnant woman's environment and behaviour during pregnancy, such as whether she eats healthy food, can change the baby's epigenetics. Some of these changes can remain for decades and might make the child more likely to get certain diseases.

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Example: Dutch Hunger Winter Famine (1944-1945)
People whose mothers were pregnant with them during the famine were more likely to develop certain diseases such as heart disease, schizophrenia, and type 2 diabetes. Around 60 years after the famine, researchers looked at methylation levels in people whose mothers were pregnant with them during the famine. These people had increased methylation at some genes and decreased methylation at other genes compared with their siblings who were not exposed to famine before their birth. These differences in methylation could help explain why these people had an increased likelihood for certain diseases later in life.

Embryology Introduction

The integumentary system is synonymous with the skin and its derivatives: sweat glands, nails, hair, sebaceous glands, arrector pili muscles. Also included in the system are the mammary glands and teeth. This webpage will focus primarily on the embryological origins of all the above components of the integumentary system except for the teeth – we'll leave them for the dentists!

Learn.Genetics: Genetic Science Learning Center at the University of Utahprovides a detailed explanation and interactive tutorial about epigenetics

Have you looked at your hands, lately?

An elderly man probably some ninety plus years, sat feebly on the park bench. He didn't move, just sat with his head down staring at his hands. When I sat down beside him he didn't acknowledge my presence and the longer I sat I wondered if he was ok. Finally, not really wanting to disturb him but wanting to check on him at the same time, I asked him if he was ok. He raised his head and looked at me and smiled.

"Yes, I'm fine, thank you for asking," he said in a clear strong voice.

"I didn't mean to disturb you, sir, but you were just sitting here staring at your hands and I wanted to make sure you were ok?" I explained to him. "Have you ever looked at your hands?" he asked. " I mean really looked at your hands." I slowly opened my hands and stared down at them. I turned them over, palms up and then palms down. No, I guess I had never really looked at my hands as I tried to figure out the point he was making. Then he smiled and related this story:

Stop and think for a moment about the hands you have, how they have served you well throughout your years. These hands, though wrinkled, shrivelled and weak have been the tools I have used all my life to reach out and grab and embrace life. They braced and caught my fall when as a toddler I crashed upon the floor. They put food in my mouth and clothes on my back. As a child my mother taught me to fold them in prayer. They tied my shoes and pulled on my boots. They dried the tears of my children and caressed the love of my life. They held my rifle and wiped my tears when I went off to war. They have been dirty, scraped and raw, swollen and bent. They were uneasy and clumsy when I tried to hold my newborn son. Decorated with my wedding band they showed the world that I was married and loved someone special. They wrote the letters home and trembled and shook when I buried my parents and spouse and walked my daughter down the aisle. Yet, they were strong and sure when I dug my buddy out of a foxhole and lifted a plow off of my best friends foot. They have held children, consoled neighbours, and shook in fists of anger when I didn't understand. They have covered my face, combed my hair, and washed and cleansed the rest of my body. They have been sticky and wet, bent and broken, dried and raw. And to this day when not much of anything else of me works real well these hands hold me up, lay me down, and again continue to fold in prayer. These hands are the mark of where I've been and the ruggedness of my life. But more importantly it will be these hands that God will reach out and take when he leads me home. And He won't care about where these hands have been or what they have done. What He will care about is to whom these hands belong and how much He loves these hands. And with these hands He will lift me to His side and there I will use these hands to touch the face of Christ.

No doubt I will never look at my hands the same again.

I never saw the old man again after I left the park that day but I will never forget him and the words he spoke. When my hands are hurt or sore or when I stroke the face of my children and wife I think of the man in the park. I have a feeling he has been stroked and caressed and held by the hands of God. I, too, want to touch the face of God and feel his hands upon my face. Laughter is the best medicine, G. Picard, author of Handology™

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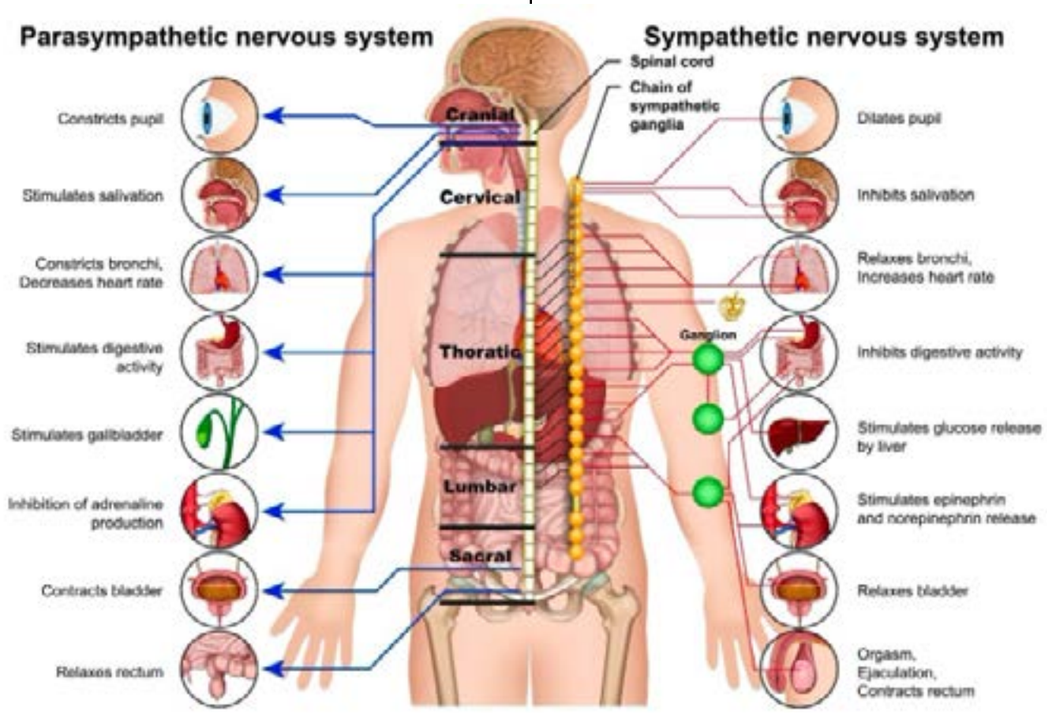
Sincerely, author and Researcher of Epigenology Medical, G. Picard



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Autonomic Nervous System