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The Telangana Science Journal

Health and Nutrition

TIACS-subscribe@yahoo.com (The Indian American Chemical Society)

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Benefits of True Bilingualism¹

Seniors who have spoken two languages since childhood are faster than single-language speakers at switching from one task to another, according to a study published in the January 9 issue of The Journal of Neuroscience. , which found that compared to their monolingual peers, lifelong bilinguals also show different patterns of brain activity when making the switch. The value of regular stimulating mental activity across the lifetime by using two distinct languages (not the modern Anglicized language containing a mixture of both languages) is evident from this study.

Young adults did not show much difference in their ability of task-switching, indicating that bilingual seniors use their brains more efficiently than monolingual seniors. Speaking multiple languages on a daily basis is a good brain exercise that keeps your mind agile and efficient when you are old.

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Bread Facts²

Bread from the grocery store will stay fresh for 2 to 4 days if you leave it on the counter. Bakery bread, which usually has fewer preservatives, will keep 1 to 3 days. If you want to store bread for a longer, put it in the freezer. It will stay fresh for 2 to 3 months. Putting bread in the fridge will actually make it go stale quicker.

Bagels are the only bread that's boiled before it's baked. Boiling gives traditional bagels their shiny, chewy crusts. Some companies steam their bagels instead of boiling them, however. How can you tell? Steamed bagels are puffier and softer. But you might want to be careful about how many you eat. Bagels can have a lot more calories than a slice of bread.

Green or black fuzzy spots on the piece of bread are mold, and it may have spread to other parts of the loaf; therefore, the bread loaf should be thrown away, not just the piece having the spots of mold. There are a few different kinds of mold that pop up on bread. The blue-gray-green fuzzy mold is the same fungus that can produce penicillin.

Blood sugar levels go up after eating foods that have carbohydrates such as bread. Whole-grain pumpernickel causes the lowest and gentlest change in blood sugar, while its digestion takes longer than other breads, beneficial for diabetics. The fiber in whole-grain breads can make feel full longer and help control weight. To lose weight, eat less, exercise more, and eat healthy foods. When picking bread, look for 16 grams of whole grains in a serving. If you are buying bakery bread that doesn't have a label, pick it up to see how heavy it is. Heavier breads are usually higher in whole grains. In general, look for coarser, denser breads with a lot of grainy bits to avoid a spike in your blood sugar. Choose whole-grain breads with at least 3 grams of fiber a slice. If you buy "double fiber" bread, you'll usually be getting 5 to 6 grams of fiber a slice. Just make sure that your double-fiber bread is whole grain and that it doesn't have artificial sweeteners in it.

"White" whole wheat bread is made with flour from white wheat, not the red wheat most bread is made from. The bran of white wheat is lighter and has a milder flavor, which might make this bread taste better to some people. Experts consider white wheat and red wheat to be the same nutritionally. Gluten is a protein found in wheat, barley, and rye. People who are allergic to gluten should avoid breads and other foods made with those grains. Many gluten-free breads and mixes are made with white or brown rice

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flours and starches such as arrowroot, potato, and tapioca. Avoiding wheat can be hard. It's in most prepared foods and in some vitamins and lip balms.

Secondhand Smoke³

No level of secondhand smoke (SHS) exposure is safe. SHS exposure occurs when nonsmokers breathe in smoke exhaled by smokers or from burning tobacco products. It kills more than 400 infants and 41,000 adult nonsmokers every year. Exposure to SHS among US nonsmokers has declined, but progress has not been the same for everyone.

Adult Vaccinations⁴

In October 2014, the Advisory Committee on Immunization Practices (ACIP) approved the Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States, 2015. This schedule provides a summary of ACIP recommendations for the use of vaccines routinely recommended for adults aged 19 years or older in two figures, footnotes for each vaccine, and a table that describes primary contraindications and precautions for commonly used vaccines for adults. Changes in the 2015 adult immunization schedule from the 2014 schedule included the August 2014 recommendation for routine administration of the 13-valent pneumococcal conjugate vaccine (PCV13) in series with the 23-valent pneumococcal polysaccharide vaccine (PPSV23) for all adults aged 65 years or older⁵, the August 2014 revision on contraindications and precautions for the live attenuated influenza vaccine (LAIV)⁶, and the October 2014 approval by the Food and Drug Administration to expand the approved age for use of recombinant influenza vaccine (RIV)⁷. These revisions were also reviewed and approved by the American College of Physicians, American Academy of Family Physicians, American College of Obstetricians and Gynecologists, and American College of Nurse-Midwives.

Vaccination coverage levels among adults are low. Improvement in adult vaccination is needed to reduce the health consequences of vaccine-preventable diseases among adults. Successful vaccination programs combine 1) education of potential vaccine recipients and publicity to promote vaccination, 2) increased access to vaccination services in health care settings, and 3) use of practices shown to improve

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vaccination coverage, including reminder-recall systems, efforts to remove administrative and financial barriers to vaccination, use of standing order programs for vaccination, and assessment of practice-level vaccination rates with feedback to staff members (4). Health care provider recommendations for vaccination are associated with patients' receipt of vaccines. Routine assessment of adult patient vaccination needs, recommendation, and offer of needed vaccinations for adults should be incorporated into routine clinical care of adults (4,5). The adult immunization schedule (2), updated annually, provides current recommendations for vaccinating adults and a ready resource for persons who provide health care services for adults in various settings.

Details on these updates and information on other vaccines recommended for adults are available under Adult Immunization Schedule, United States, 2015, schedules and in the Annals of Internal Medicine⁸.

Hypertension

When pressure of blood against the walls of arteries is too high, known as hypertension or high blood pressure, it raises the heart's workload and can cause serious damage to the arteries. Uncontrolled high blood pressure increases the risk of heart disease, stroke, and kidney disease. High blood pressure is sometimes called a silent killer because it may have no outward symptoms for years. In fact, one in five people with the condition don't know they have it. Internally, it can quietly damage the heart, lungs, blood vessels, brain, and kidneys if left untreated. There is a strong correlation between changing lifestyle factors and increase in hypertension. It's a major risk factor for strokes and heart attacks today⁹.

Normal blood pressure readings should be below 120/80, while higher results over time can indicate hypertension. In most cases, the underlying cause of hypertension is unknown. The top number (systolic) shows the pressure when the heart beats. The lower number (diastolic) measures pressure at rest between heartbeats, when the heart refills with blood. Occasionally, kidney or adrenal gland disease can lead to hypertension. A hypertensive crisis can lead to a stroke, heart attack, kidney damage, or loss of consciousness. Symptoms of a hypertensive crisis can include a severe headache, anxiety, nosebleeds, and feeling short of breath.

Cardiovascular diseases account for a large proportion of all deaths and disability worldwide. Global Burden of Disease Study reported that in 1990, there were 5.2 million deaths from cardiovascular diseases in economically developed countries and 9.1 million deaths from the same causes in developing

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countries¹⁰. Cardiovascular diseases caused 2.3 million deaths in India in the year 1990 and this was projected to double by the year 2020. Hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths in India¹¹. The Centers for Disease Control and Prevention (CDC) estimate about one in three Americans have hypertension¹².

Up to the age of 45, more men have high blood pressure than women. It becomes more common for both men and women as they age, and more women have hypertension by the time they reach 65. People, who have diabetes or a close family member with high blood pressure or diabetes, have greater risk. About 60% of people with diabetes have high blood pressure.

African-Americans are more likely to develop hypertension and to develop it at a younger age. Genetic research suggests that African-Americans seem to be more sensitive to salt. Diet and excessive weight can play a role, as well. Sodium, a major component of salt, can raise blood pressure by causing the body to retain fluid, which leads to a greater burden on the heart. The American Heart Association recommends eating less than 1,500 milligrams of sodium per day. Processed foods make up the majority of American sodium intake. Canned soups and lunch meats are prime suspects.

Stress can make one's blood pressure spike, but there's no evidence that it causes high blood pressure as an ongoing condition. However, stress may affect risk factors for heart disease, so it may have an indirect connection to hypertension. Stress may lead to other unhealthy habits, such as a poor diet, alcohol use, or smoking, which can contribute to high blood pressure and heart disease.

Being overweight places a strain on the heart and increases your risk of high blood pressure. That is why diets to lower blood pressure are often also designed to control calories. They typically call for cutting fatty foods and added sugars, while increasing fruits, vegetables, lean protein, and fiber. Even losing 10 pounds can make a difference.

Drinking alcohol can increase blood pressure. Gestational hypertension is a kind of high blood pressure that occurs in the second half of pregnancy. Without treatment, it may lead to a serious condition called preeclampsia that endangers both the mother and baby.

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Four weeks is enough time to achieve some big improvements in your heart health¹³. You may be able to lower your blood pressure by simply switching to a better diet. The Dietary Approaches to Stop Hypertension involves eating more fruits, vegetables, whole-grain foods, low-fat dairy and nuts. You should eat less saturated fats and sweets. Reducing sodium in the diet can also have a significant effect. Regular exercise helps lower blood pressure. Adults should get about 150 minutes of moderate-intensity exercise every week. That could include gardening, walking briskly, bicycling, or other aerobic exercise. Muscle-strengthening activities are recommended at least two days a week and should work all major muscle groups.

Meditation can put the body into a state of deep rest, which can lower blood pressure. Yoga, tai chi, and deep breathing also help. These relaxation techniques should be combined with other lifestyle changes, such as diet and exercise. Be aware that herbal therapies may conflict with other drugs you take, and some herbs actually raise blood pressure. Tell your doctor if you take herbal or other dietary supplements. Hypertension is often a life-long condition. It's important to take your medications and continue to monitor your blood pressure. If you keep it under control, you can reduce the risk of stroke, heart disease, and kidney failure.

Our Interesting Hands

1. Fingernails grow about twice as fast as toenails, at 3.47 millimeters per month compared with 1.62 millimeters per month. After death, the corpse's nails become longer than before death. Dehydration causes a corpse's skin and soft tissues to shrink, making the nails look longer; No, they don't grow after we die. Our nails don't have sensation, but the nail bed is packed with nerve endings and blood vessels. That's why a tap on the nail is felt below.
2. If we position our hands correctly on the keyboard, our left hand will do 56% of the work.
3. Broken pinkies make up about one-third of all hand fractures in adults, because the pinky isn't as protected hanging out there on the end, and the bone is about the width of a pencil.
4. Even though most of our body's moving parts have muscles, our fingers don't. They're moved by muscles in the wrist, palm, and forearm that are attached to tendons, or tough bands of connective tissue, in our fingers.
5. A thumb that can be placed opposite the fingers of the same hand is an opposable thumb which allows the digits to grasp and handle objects and is characteristic of primates, not us alone.

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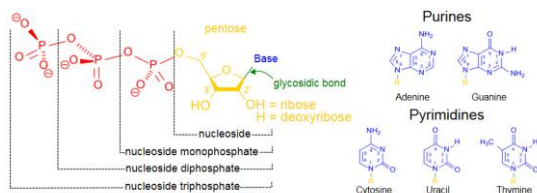
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Opossums have opposable thumbs, too. Most apes and monkeys can touch their thumbs to their other fingers. We can move our thumb farther across hand than a non-human primate can. The opposable thumb allows us to use tools

6. The difference is determined by sex hormone testosterone early on during a baby's growth in the womb. For that reason, most men have longer ring fingers, while the opposite is true for many women.
7. Cracking fingers is annoying to many who are not cracking. So, the myth that cracking causes arthritis, because they couldn't stand the irritating sound of cracking. The popping noise is the bursting of small gas bubbles in the joint and there is no link between the habit and stiff and painful joints or arthritis, say the scientists.
8. The percentage of chance for right-handed parents to have a left-handed child is about 10%, not 25%, because it is a complicated science, beyond genetics of dominant/recessive genes¹⁴. Scientists think hand preference stems from genetics, hormones, and development. Two left-handed parents are about 30% to 40% likely to have a left-handed child, not 100%.

Human Genetics



Genes influence not only human traits and behavior, but also health and disease. Scientists are beginning to use genetic technology to unravel the genomic contributions to these different phenotypes. They are also discovering potential applications for this technology.

Gene is defined as a functional and physical unit of heredity passed from parent to offspring. Genes are pieces of deoxyribonucleic acid (DNA) and make a specific protein that results in a phenotype. The process of making a protein is called protein synthesis which involves a complex translation of the genetic information (aka genetic code) from the DNA through ribonucleic acid (RNA). Both nucleic acids are polymers of four nucleotide monomers. A nucleotide is composed of a nucleoside, a five-carbon sugar

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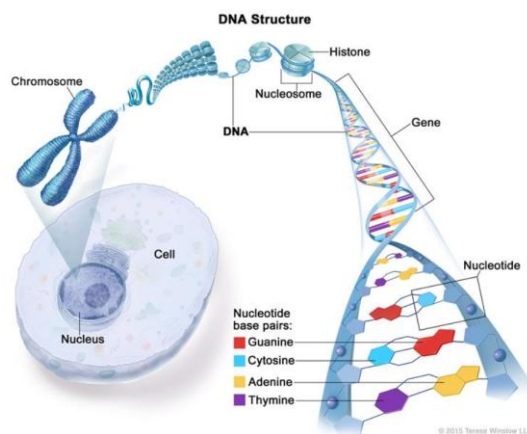
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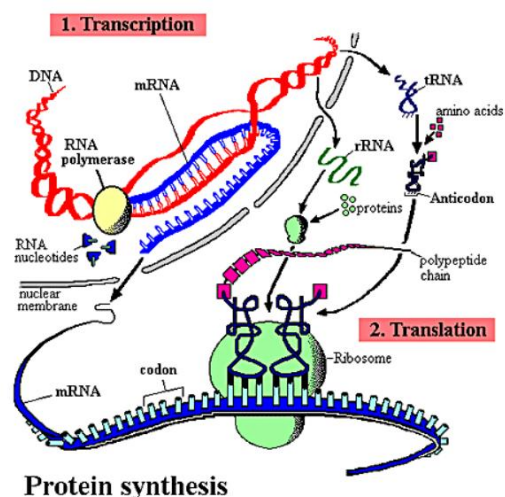
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(ribose for RNA or deoxyribose for DNA), and at least one phosphate group. In DNA, the nucleosides are adenine (A), guanine (G), thymine (T) and cytosine (C); while in RNA, they are A, G, uracil (U) and C. DNA is a double helix with two complementary nucleic acid chains, while RNA is a single chain. One strand of the DNA double helix is used as a template by the RNA polymerase to synthesize a messenger RNA (mRNA), which migrates from the nucleus to the cytoplasm and binds to a ribosome, where the protein encoded by the DNA is produced. Thus produced protein or enzyme performs its metabolic duty producing a physical or physiological result, called phenotype.



Some of the basic mechanisms of evolutionary change operate through genetic variation. Sex, gene flow and mutations are three sources of genetic variation. Sex can introduce new gene combinations into a population through shuffling of genes from male and female organisms. Gene flow is any movement of genes from one population to another and is an important source of genetic variation.



A single mutation can have a large effect, but in many cases, evolutionary change is based on the accumulation of many mutations. Genetic alterations that occur in more than 1 percent of the population are called polymorphisms. They are common enough to be considered a normal variation in the DNA. Polymorphisms are responsible for many of the normal differences between people such as eye color, hair color, and blood type. Although many polymorphisms have no negative effects on a person's health, some of these variations may influence the risk of developing certain disorders. A gene mutation¹⁵ is a permanent alteration in the DNA sequence that makes up a gene, such that the sequence differs from what is found in most people. Mutations range in size; they can affect anywhere from a single DNA building block (base pair) to a large segment of a chromosome that includes

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multiple genes. Most disease-causing gene mutations are uncommon in the general population. However, other genetic changes occur more frequently.

Gene mutations¹⁶ can be classified in two major ways: Hereditary mutations are inherited from a parent and are present throughout a person's life in virtually every cell in the body. These mutations are also called germline mutations because they are present in the parent's egg or sperm cells, which are also called germ cells. When an egg and a sperm cell unite, the resulting fertilized egg cell receives DNA from both parents. If this DNA has a mutation, the child that grows from the fertilized egg will have the mutation in each of his or her cells. Acquired (or somatic) mutations occur at some time during a person's life and are present only in certain cells, not in every cell in the body. These changes can be caused by environmental factors such as ultraviolet radiation from the sun, or can occur if a mistake is made as DNA copies itself during cell division. Acquired mutations in somatic cells (cells other than sperm and egg cells) cannot be passed on to the next generation.

Genetic changes that are described as de novo (new) mutations can be either hereditary or somatic. In some cases, the mutation occurs in a person's egg or sperm cell but is not present in any of the person's other cells. In other cases, the mutation occurs in the fertilized egg shortly after the egg and sperm cells unite.

It is often impossible to tell exactly when a de novo mutation happened. As the fertilized egg divides, each resulting cell in the growing embryo will have the mutation. De novo mutations may explain genetic disorders in which an affected child has a mutation in every cell in the body but the parents do not, and there is no family history of the disorder.

Once disease genes were identified, it became much easier to make a molecular or cytogenetic diagnosis for many genetic conditions. Diagnostic testing supplies the technical ability to test presymptomatic, at-risk individuals and/or carriers to determine whether they will develop a specific condition. This sort of testing is a particularly attractive choice for individuals who are at risk for diseases that have available preventative measures or treatments, as well as people who might carry genes that have significant

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reproductive recurrence risks. Indeed, thanks to advances in single-cell diagnostics and fertilization technology, embryos can now be created in vitro; then, only those embryos that are not affected by a specific genetic illness can be selected and implanted in a woman's uterus. This process is referred to as pre-implantation genetic diagnosis.

In the 1990s, a team of researchers at the St. Barnabus Institute in New Jersey developed an infertility treatment called cytoplasmic transfer, which involved inserting donor cytoplasm, the substance within a cell that contains the mitochondria and other organelles, into a woman's egg. The USFDA banned the procedure in 2002. While in the UK, children may be born with the DNA of three different people, by an approved fertility procedure, pioneered by the U.K.'s Newcastle University. The procedure can be done a couple different ways. In the first, maternal spindle transfer, the nucleus is taken from a mother's egg and inserted into the donor egg, which has been cleared of everything but its mitochondria. The resulting egg—which contains nuclear DNA from one woman, mitochondrial DNA from another, is then fertilized with the father's sperm. In the second method, called pro-nuclear transfer, both the mother's egg and the donor's egg are fertilized; the mother's nuclear DNA is then taken out of her egg and inserted into the donor's, which has had its own nucleus removed. American ban did not stop the rest of the world from practicing genetic engineering¹⁷ (not to be confused with the so-called Eugenics¹⁸), inspired by the pioneering work done in the US.

Another American intervention was holding federal funding and banning certain forms of stem cell¹⁹ research. Stem cells are unspecialized cells capable of renewing themselves through cell division, sometimes after long periods of inactivity. Under certain conditions, they can be induced to become tissue specific cells with special functions. In some organs, such as the gut and bone marrow, stem cells regularly divide to repair and replace worn out or damaged tissues. In other organs, however, such as the pancreas and the heart, stem cells only divide under special conditions. Scientists discovered ways to derive embryonic stem cells from early mouse embryos in 1981. The embryos used in these studies were created for reproductive purposes through in vitro fertilization procedures. When they were no longer needed for that purpose, they were donated for research with the informed consent of the donor.

On August 9, 2001, former President George Walker Bush announced²⁰ that laid down barriers for by requiring federal funds be awarded for research limited to stem cells not derived from embryos. As a result, in 2006, researchers made another breakthrough by identifying conditions that would allow some

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specialized adult cells to be "reprogrammed" genetically to assume a stem cell-like state. This new type of stem cell is called induced pluripotent stem cells (iPSCs)²¹.

On March 9, 2009, President Barack Hussein Obama issued an executive order removing barriers to responsible scientific research involving human stem cells. The Executive Order²² states that the Secretary of Health and Human Services, through the Director of NIH, may support and conduct responsible, scientifically worthy human stem cell research, including human embryonic stem cell (hESC) research, to the extent permitted by law. Accordingly, NIH issued guidelines for human stem cell research (Guidelines)²³.

Another barrier, this time by the Supreme Court, not of India in Novartis's patent case²⁴, but of the US in the Myriad patent case, is the story of BRCA1 and BRCA2, which are human genes that produce tumor suppressor proteins. These tumor suppressor proteins prevent cancer by helping in repair of damaged DNA and, therefore, play a role in ensuring the stability of the cell's genetic material. When either of these genes is mutated, or altered, such that its protein product is not made or does not function correctly, DNA damage may not be repaired properly. As a result, cells are more likely to develop additional genetic alterations that can lead to cancer. Thus the mutated genes are abnormal and unnatural, because these mutations can be due to environmental factors, which may occur in a person's life time resulting in cancer and may be transmitted to offspring as defective genes, e.g., a woman's risk of developing breast and/or ovarian cancer is greatly increased if she inherits mutation in the BRCA1 or BRCA2 gene. Together, BRCA1 and BRCA2 mutations account for about 20 to 25 percent of hereditary breast cancers²⁵ and about 5 to 10 percent of all breast cancers²⁶. In addition, mutations in BRCA1 and BRCA2 account for around 15 percent of ovarian cancers overall²⁷. Breast cancers associated with BRCA1 and BRCA2 mutations tend to develop at younger ages than sporadic breast cancers.

A harmful BRCA1 or BRCA2 mutation can be inherited from a person's mother or father. Each child of a parent who carries a mutation in one of these genes has a 50 percent chance of inheriting the mutation. The effects of mutations in BRCA1 and BRCA2 are seen even when a person's second copy of the gene is normal.

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In Australia, an invention “is a manner of manufacture within the meaning of section 6 of the Statute of Monopolies.” The Federal Court of Australia concluded that an isolated gene sequence is different to the gene as it exists in nature, with specific reference to the functional differences that arise as a result of isolation. The Court further rejected the view of the U.S. Supreme Court that Myriad’s claims are concerned ‘primarily with the information contained in the genetic sequence.’ The Full Court emphasized that the claim in question ‘is to a compound; a nucleic acid. It is not a claim to information.’ The Full Court’s decision that the isolated nucleic acid in question has ‘resulted in an artificially created state of affairs for economic benefit’ and is therefore capable of defining patentable subject matter, has maintained the status quo in Australia in relation to the patentability of isolated gene sequences. The presiding judge, Justice Nicholas, identified the issue of whether a valid patent may be granted for “a claim that covers naturally occurring nucleic acid that has been isolated” is “of considerable importance.” Cancer Voices Australia that isolated genetic material (DNA or RNA) that is naturally occurring in nature is not patentable subject matter. Citing the High Court’s decision in *National Research Development Corporation v Commissioner of Patents* (1959) (NRDC), Justice Nicholas found “a product that consists of an artificially created state of affairs which has economic significance will constitute a manner of manufacture.”

In “the Myriad litigation” in the United States, which also concerned Myriad Genetics’ patent claiming isolated nucleic acid fragments coding for the BRCA1 gene, the Court of Appeals upheld the validity of the claims (by majority). However, in June 2013, the US Supreme Court held that mutant BRCA 1 human DNA, isolated from the human body, is not a patentable subject matter under US patent law. In the UK and other parts of Europe, isolated genetic material may be patentable even if it is identical to the form in which it is found in a cell. The patents at issue were: US 5,747,282; US 5,837,492; US 5,693,473; US 5,709,999; US 5,710,001; US 5,753,441; US 6,033,857. The Supreme Court discussed claims 1, 2, 5 and 6 of the ’282 patent as representative of the Myriad claims at issue.

1. An isolated DNA coding for a BRCA1 polypeptide, said polypeptide having the amino acid sequence set forth in SEQ ID NO:2. (This claim encompasses isolated naturally occurring DNA, and so is invalid in view of the Supreme Court decision.)
2. The isolated DNA of claim 1, wherein said DNA has the nucleotide sequence set forth in SEQ ID NO: 1. (This claim recites an isolated full-length cDNA sequence, and so is not invalid in view of the Supreme Court decision.)

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Health and Nutrition

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5. An isolated DNA having at least 15 nucleotides of the DNA of claim 1. (This claim encompasses isolated naturally occurring DNA, and so is invalid in view of the Supreme Court decision.)
6. An isolated DNA having at least 15 nucleotides of the DNA of claim 2. (This claim likely encompasses isolated fragments of naturally occurring DNA, and so is likely invalid in view of the Supreme Court decision, and its discussion of short strands of cDNA that “may be indistinguishable from natural DNA”).

In January 2015, Myriad Genetics has essentially given up²⁸ trying to stop other companies from offering tests for increased risk of breast cancer, ending a dispute that was the subject of a landmark Supreme Court ruling that human genes cannot be patented. The company has settled or is in the process of settling patent-infringement lawsuits it filed against other companies that now offer such testing. Myriad’s monopoly on testing for mutations in two genes linked to an increased risk of breast and ovarian cancer ended in 2013, cutting short the monopoly of a short term of 20-years from the filing date. The irony is that BRCA1 and 2 genes have been in existence²⁹ more than 20-million years ago; and the US Supreme Court and American Civil Liberties could not tolerate a 20-year monopoly over a test kit; Myriad did not create anything, which is not a groundbreaking, innovative, or even brilliant discovery does not by itself satisfy the §101 inquiry.

Pubococcygeus (PC)

Pubococcygeus (PC)³⁰ muscles of the pelvic floor are taut and strong, which helps to hold the pelvic organs in place, and assists in bladder control and sexual function. However, as both men and women age, they can become weakened and stretched. Strengthening these muscles is as simple as strengthening your arm muscles or leg muscles. California gynecologist Dr. Arnold Kegel created Kegel exercises in the late 1940s to help women control incontinence following childbirth. Later research discovered that the exercises could also be helpful in preventing prolapse and alleviating pelvic pain during intercourse.

A 2006 study published in the journal Urology found men who suffered from chronic pelvic pain syndrome experienced significant improvement in pelvic pain, urinary symptoms, erectile dysfunction, and libido after performing pelvic floor muscle training (PFMT) exercises. PC muscles enable stopping

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urination midstream, and while contracting, they raise the testicles. Once they're located, the next step is to practice flexing them, either while peeing or imagining it, by stopping the urine stream, holding for five to 20 seconds and releasing; doing up to 50 reps. One rep equals five seconds of clenching the PC muscles for three to five seconds, and then releasing. Start by doing 10 to 20 reps and work your way up. It's best to increase your reps when you feel your muscles adapt. Then begin to increase the time from five to seven seconds for further strengthening.

Source: The primary sources cited above, New York Times (NYT), Washington Post (WP), Mercury News, Bayarea.com, Chicago Tribune, USA Today, Intellihealthnews, Deccan Chronicle (DC), the Hindu, Hindustan Times, Times of India, AP, Reuters, AFP, womenfitness.net, about.com etc.

Om! Asatoma Sadgamaya, Tamasoma Jyotirgamaya, Mrityorma Amritamgamaya, Om Shantih, Shantih, Shantih!

(Aum! Lead the world from wrong path to the right path, from ignorance to knowledge, from mortality to immortality, and peace!)

¹Lifelong Bilingualism: <http://chicagosfn.org/news/article/77>

²Bread: http://www.webmd.com/food-recipes/rm-quiz-bread-facts?ecd=wnl_day_020715&ctr=wnl-day-020715_nsl-ld-stry_1&mb=s10u26bW4bX4A6f2oTmCQ%40HnVev1imbCifxQ3xyXZ4k%3d

³Secondhand Smoke: http://www.cdc.gov/tobacco/basic_information/secondhand_smoke/index.htm ;
http://www.cdc.gov/tobacco/data_statistics/fact_sheets/secondhand_smoke/health_effects/index.htm;

⁴Adult Vaccinations: <http://www.cdc.gov/mmwr/pdf/wk/mm6404.pdf>

⁵Tomczyk S, Bennett NM, Stoecker C, et al. Use of 13-valent pneumococcal conjugate vaccine and 23-valent pneumococcal polysaccharide vaccine among adults aged ≥65 years: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Morb Mortal Wkly Rep 2014;63: 822–5.

⁶Grohskopf LA, Olsen SJ, Sokolow LZ, et al. Prevention and control of seasonal influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices (ACIP)—United States, 2014–15 influenza season. MMWR Morb Mortal Wkly Rep 2014; 63:691–7.

⁷Food and Drug Administration. October 29, 2014 approval letter—Flublok. Silver Spring, MD: US Department of Health and Human Services, Food and Drug Administration; 2014. Available at <http://www.fda.gov/biologicsbloodvaccines/vaccines/approvedproducts/ucm421396.htm>.

⁸Kim DK, Bridges CB, Harriman KH. Advisory Committee on Immunization Practices recommended immunization schedule for adults aged 19 years or older: United States, 2015. Ann Intern Med 2015; 162:214–23.

The full ACIP recommendations are available at: <http://www.cdc.gov/vaccines/hcp/acip-recs/index.html>.

⁹High BP: <http://link.springer.com/article/10.1007%2Fs11906-013-0340-9#page-1>

¹⁰Murray CJL, Lopez AD. Mortality by cause for eight regions of the world: Global Burden of Disease Study. Lancet 1997; 349: 1269–1276.

¹¹India: <http://www.nature.com/jhh/journal/v18/n2/full/1001633a.html>

¹²High blood Pressure: <http://www.cdc.gov/bloodpressure/>

¹³Healthier Heart: http://www.cdc.gov/salt/healthy_heart_tips.htm

¹⁴**Dominant/Recessive Genes:** All life forms, including but not limited to sexually reproducing animals like us, have genes, two copies of each gene in diploid state (http://www.diffen.com/difference/Diploid_vs_Haploid). We have 46 (23 pairs of) chromosomes carrying genes. One should not confuse genes with chromosomes or with DNA in the chromosome. Gene is a fragment of a huge DNA molecule (a polymer of four nucleotides, <http://www.lifetechnologies.com/us/en/home/references/ambion-tech-support/rna-tools-and-calculators/dna-and-rna-molecular-weights-and-conversions.html>; in a double helix form: http://geneed.nlm.nih.gov/topic_subtopic.php?tid=15&sid=16) and is the fundamental unit of inheritance that encodes a complete peptide that is vital to the organism, through the processes of transcription and translation. Contrary to earlier outlandish estimates, human genome may have less than 20,000 genes, while a water flea has 31,000 genes (<https://medium.com/the-physics-arxiv-blog/human-genome-shrinks-to-only-19-000-genes-21e2d4d5017e>); each gene having two alleles. The differences in alleles can cause variations in the protein that's produced, change protein production or no

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production at all. Proteins are the basis for all traits and metabolism, so variations in protein activity or expression can produce different phenotypes. However, a gene may encode several proteins and as result impact as many phenotypes. In general, a dominant allele produces a dominant phenotype in individuals who have one copy of the allele, which can come from just one parent, and for a recessive allele to produce a recessive phenotype, the individual must have two copies, one from each parent. Thus, individuals showing dominant phenotype may have one dominant and one recessive allele for a gene, they are generally considered "carriers" of the recessive allele, not visible without genetic testing; the recessive allele is there, but the recessive phenotype is not. This is what Mendel hypothesized based on his experiments on peas - in a cross between two pure-bred parents with different traits like seed color, the hybrid offspring would have both the gene alternates for green and yellow seed color - and reasoned that the dominant trait is seen whenever a single copy of its gene is inherited. When he crossed the hybrid offspring, green seeds reappeared in the next generation. Mendel reasoned that the "recessive" green trait is shown only when a copy of the recessive gene form is inherited from each parent, i.e., two copies of the same allele should be there for it to show up as a phenotype. However, that does not mean that there is no impact of the so-called recessive gene single allele with its so-called dominant counter-part present. For example, sickle-cell disease is an inherited condition that causes pain and damage to organs and muscles. Instead of having flattened, round red blood cells, people with the disease have stiff, sickle-shaped cells that get caught in capillaries, where they block blood flow to vital organs, and organ cells don't get enough oxygen and nutrients, and they begin to die. Only individuals with two copies of the sickle-cell allele have the disease due to a lot of such sickle cells, while people with just one copy are healthy due to lesser number of deformed cells – not enough to cause the disease. In addition to causing the disease, the sickle-cell allele makes people who carry it resistant to malaria, a serious illness carried by mosquitoes. Malaria resistance has a dominant inheritance pattern: just one copy of the sickle cell allele is enough to protect against infection. Therefore, people with one allele of sickle cells are healthy and immune to malaria, while people with two sickle cell alleles get sick, but they are immune to malaria. <http://ghr.nlm.nih.gov/handbook/inheritance/inheritancepatterns>; <http://learn.genetics.utah.edu/content/inheritance/patterns/>; <http://www.nature.com/scitable/topicpage/genetic-dominance-genotype-phenotype-relationships-489>.

¹⁵ Gene Mutations: <http://ghr.nlm.nih.gov/handbook/mutationsanddisorders/genemutation>. The Centre for Genetics Education provides [a fact sheet discussing variations in the genetic code](#) . More basic information about genetic mutations

¹⁶Id.

¹⁷ <http://www.nature.com/scitable/topicpage/genetic-inequality-human-genetic-engineering-768>

¹⁸ American eugenics practitioners coercively sterilized some 60,000 Americans, barred the marriage of thousands, forcibly segregated thousands in "colonies," and persecuted untold numbers in ways we are just learning <http://historynewsnetwork.org/article/1796>

¹⁹ Stem Cell Basics: <http://stemcells.nih.gov/info/basics/Pages/Default.aspx>; Information Center: <http://stemcells.nih.gov/info/Pages/Default.aspx>

²⁰ Human Embryonic Stem Cell Policy: <http://stemcells.nih.gov/policy/pages/2001policy.aspx>

²¹ Induced Pluripotent Stem Cells: <http://stemcells.nih.gov/info/basics/pages/basics10.aspx>

²² Executive Order 13435 of June 20, 2007: <http://www.gpo.gov/fdsys/pkg/FR-2007-06-22/pdf/07-3112.pdf>; Executive Order 13505 of March 9, 2009: <http://www.gpo.gov/fdsys/pkg/FR-2009-03-11/pdf/E9-5441.pdf>

²³ National Institutes of Health Guidelines: <http://stemcells.nih.gov/policy/pages/2009guidelines.aspx>

²⁴ The Supreme Court in India ruled that Novartis, the pharmaceutical company, should not be given a patent for a cancer drug because it was too similar to Novartis's earlier version: <http://www.nytimes.com/2013/04/05/opinion/the-supreme-court-in-india-clarifies-law-in-novartis-decision.html#>; <http://www.wsj.com/articles/SB10001424127887323296504578395672582230106>;

Myriad did not create anything, which is not a groundbreaking, innovative, or even brilliant discovery does not by itself satisfy the §101 inquiry; Decided June 13, 2013; http://www.supremecourt.gov/opinions/12pdf/12-398_1b7d.pdf;

²⁵ Easton, How many more breast cancer predisposition genes are there? Breast Cancer Research 1999; 1(1):14–17

²⁶ Campeau et al., Hereditary breast cancer: New genetic developments, new therapeutic avenues. Human Genetics 2008; 124(1):31–42

²⁷ Pal et al., BRCA1 and BRCA2 mutations account for a large proportion of ovarian carcinoma cases. Cancer 2005; 104(12):2807–16

²⁸ Myriad Genetics Ending Patent Dispute on Breast Cancer Risk Testing: http://www.nytimes.com/2015/01/28/business/myriad-genetics-ending-patent-dispute-on-breast-cancer-risk-testing.html?_r=0#

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²⁹ BRCA1 and BRCA2 in humans and other primates: <http://www.biomedcentral.com/1471-2148/14/155>; Adaptive evolution of the tumor suppressor BRCA1 in humans and chimpanzees: <http://www.ncbi.nlm.nih.gov/pubmed/10932184>; The tumor suppressor BRCA1 locus in primates: <http://hmg.oxfordjournals.org/content/13/22/2737.full>; Positive selection on the human genome: http://hmg.oxfordjournals.org/content/13/suppl_2/R245.full; Evolutionary dynamics of BRCA1: <http://michorlab.dfci.harvard.edu/publications/JTheorBio2010.pdf>; Human Evolutionary History and Disease: <http://www.annualreviews.org/doi/abs/10.1146/annurev.genom.4.070802.110226>; Understanding the recent evolution of the human genome: <http://onlinelibrary.wiley.com/doi/10.1002/humu.20420/abstract;jsessionid=551820B785F1D41B033A6CCEC2184332.f03t04>; Genome of the apes: <http://www.sciencedirect.com/science/article/pii/S0168952501024945>; More than 20-million years ago: <http://humanorigins.si.edu/resources/intro-human-evolution>;

³⁰ Pubococcygeus (PC): Kegel Exercises for Men: <http://www.healthline.com/health-slideshow/kegel-exercises-for-men>; Kegel Exercises for Women: <http://www.livestrong.com/article/331590-how-to-exercise-your-pc-muscle-for-women/>; Role of pubococcygeus muscle: <http://www.ncbi.nlm.nih.gov/pubmed/468760>; Women's orgasm: <http://www.ncbi.nlm.nih.gov/pubmed/17044219>; <http://www.ncbi.nlm.nih.gov/pubmed/16913280>; <http://www.medicaldaily.com/pulse/kegel-exercises-men-how-bladder-control-may-help-you-last-longer-bed-319726>;

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