THE SECRET OF MISCELLANEOUS DNA pdf

1: Do Telomeres Hold the Secret to the Fountain of Youth? â€“ Organic Sulfur For Health

DNA is a long molecule that contains our unique genetic code and thus the instructions an organism needs to develop, live, and reproduce. Just like a recipe book, it holds the directions for making all the proteins in our bodies.

DNA is the genetic material of all cellular organisms. RNA has multiple roles. Introduction At their core, all organisms on the planet have very similar mechanisms by which they handle their genetic information and use it to create the building blocks of a cell. Organisms store information as DNA, release or carry information as RNA, and transform information into the proteins that perform most of the functions of cells for example, some proteins also access and operate the DNA library. Among the core features: Cytosine, a nucleotide Deoxyribonucleic acid DNA is the material substance of inheritance. All cellular organisms use DNA to encode and store their genetic information. DNA is a chemical compound that resembles a long chain, with the links in the chain made up of individual chemical units called nucleotides. The nucleotides themselves have three components: The bases come in four chemical forms known as adenine , cytosine , guanine , and thymine , which are frequently simply abbreviated as A, C, G and T. The two DNA strands are arranged with the bases from one lining up with the bases of the other. The sugar and phosphate components run up the outside like curving rails, with the matched bases forming ladder-like rails in the center. Note â€” some viruses have their genetic material in the form of a single strand of DNA. The bases from one strand of a DNA helix are in essence a mirror image of the bases in the other strand â€” when there is an A in one strand there is a T in the other; when there is a C in one strand there is a G in the other. When organisms copy their genomes, enzymes separate the two strands of the double helix, pulling apart the paired bases. Other enzymes start new DNA strands, using the base pairing rules to make a new mirror image of each of the original strands. Many organisms possess error checking mechanisms that scan through the newly replicated DNA for mistakes and correct them, thus greatly limiting the number of mutations that arise due to replication errors. DNA does not make things. It resembles a long chain, with the links in the chain made up of individual nucleotides. The DNA strands are pulled apart in the location of the gene to be transcribed, and enzymes create the messenger RNA from the sequence of DNA bases using the base pairing rules. RNA molecules made in a cell are used in a variety of ways. For our purposes here, there are three key types of RNA: Like DNA, proteins are polymers: Each possible three letter arrangement of A,C,U,G e. In fact, the extreme similarity of ribosomes across all of life is one of the lines of evidence that all life on the planet is descended from a common ancestor. Biologists do not mean to imply that such molecules are designed. The ribosome reads the instructions found in the messenger RNA molecules in a cell and builds proteins from these mRNAs by chemically linking together amino acids these are the building blocks of proteins in the order defined by the mRNA. Within any particular organism, there can be hundreds to thousands to tens of thousands of distinct mRNAs that lead to distinct proteins. The diversity of form and function in organisms is determined in a large part by the types of proteins made as well as the regulation of where and when these proteins are made. The ribosome that converts mRNA into proteins is large and complex. It has more than fifty proteins the exact number varies by species in two major subunits known generally as the large and small subunit. They do not carry instructions for making a specific protein i. For more information on ribosomal RNA, see here. For information on how we use ribosomal RNA sequences in evolutionary studies, and environmental sampling go here. Each codon is supposed to be converted into either a specific amino acid in a protein or a specific instruction to the ribosome e. At one end, a transfer RNA presents a three-base codon. At the other, it grasps the corresponding amino acid. The ribosome acts like a giant clamp, holding all of the players in position, and facilitating both the pairing of bases between the messenger and transfer RNAs, and the chemical bonding between the amino acids.

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2: Renee's Genealogy Blog: The secret of Erikoussa

Fifty years ago, James Watson and Francis Crick announced to patrons in a Cambridge pub that they had just discovered the secret of life. Their discovery was that the DNA double helix explained.

Jan Summary Rosalind Franklin: In Rosalind Franklin became visible to the world beyond a small circle of scientists when Watson published The Double Helix , his "personal account" of puzzling out DNA. It creates a biography of a complex woman who negotiated biases as a citizen and a scientist. The biography is divided into three parts. Yet early on she showed an aptitude for three-dimensional thinking and for understanding crystalline structures. This balanced account of a controversial episode in the history of science offers evidence that Franklin was close to drawing the same conclusion about the structure of DNA that Watson and Crick rushed into print. This section also accessibly explains the molecular biology of her day and the painstaking physical and intellectual intricacies of making and interpreting x-rays of crystalline molecules. The third section reminds us that Franklin had a very productive, though short career after leaving DNA to others. She directed research programs for the study of plant viruses, and she investigated the polio virus shortly before she died. Respected scientists, including Crick, praised her research. Many, unlike Wilkins, liked working with her. See the note on Photo 51 below. Commentary The relationship between the research lab and the clinic that marks modern medicine should make us curious about the workings of medical science and the way stories are told about that work. The story of DNA research suggests that the particular narrative framing of episodes in science influence both public and scientific perceptions about the value of its products. Watson created an auspicious narrative that represents his work with DNA as an adventurous race to discover the secret of life: Overall, other researchers did not believe that they were participating in a race, no less one to discover the totalizing secret of life. But the scientist who promoted that belief plotted the first memorable story about DNA, influencing our understanding of the meaning of the molecule and those who worked on it. Even though Rosalind Franklin: PBS maintains an informative website that further explains the science and circumstances that led to the elucidation of the DNA molecule: See especially the section "Anatomy of Photo 51," which engagingly explains how to view that famous photo and understand how it offered such valuable information to Watson.

THE SECRET OF MISCELLANEOUS DNA pdf

3: Francis Crick - Wikipedia

Miscellaneous notes from a variety of sources relating to DNA matches and genetic genealogy in general. I may eventually get around to having individual webpages for some of these, but at the moment this is just a place for me to dump useful information!

Published in the United States by Alfred A. Knopf, a division of Random House, Inc. Knopf Canada, Limited, Toronto. Distributed by Random House, Inc. Watson, with Andrew Berry. Includes bibliographical references and index. The Secret of Life was conceived over dinner in Under discussion was how best to mark the fiftieth anniversary of the discovery the double helix. Publisher Neil Patterson joined one of us, James D. Watson, in dreaming up a multifaceted venture including this book, a television series, and additional more avowedly educational projects. Doron Weber at the Alfred P. Sloan Foundation then secured seed money to ensure that the idea would turn into something more concrete. From the start, our goal was to go beyond merely recounting the events of the past fifty years. DNA has moved from being an esoteric molecule only of interest to a handful of specialists to being the heart of a technology that is transforming many aspects of the way we all live. With that transformation has come a host of difficult questions about its impactâ€”practical, social, and ethical. Taking the fiftieth anniversary as an opportunity to pause and take stock of where we are, we give an unabashedly personal view both of the history and of the issues. Every technical term is explained when first introduced. Should you need to refresh your memory about a term when you come across one of its later appearances, you can refer to the index, where such words are printed in bold to make locating them easy; a number also in bold will take you to the page on which the term is defined. We have inevitably skimped on many of the technical details and recommend that readers interested in learning more go to DNAi. Here you will find animations explaining basic processes and an extensive archive of interviews with the scientists involved. In addition, the Further Reading section lists books relevant to each chapter. Where possible we have avoided the technical literature, but the titles listed nevertheless provide a more in-depth exploration of particular topics than we supply We thank the many people who contributed generously to this project in one way or another in the acknowledgments at the back of the book. Four individuals, however, deserve special mention. George Andreou, our preternaturally patient editor at Knopf, wrote much more of this bookâ€”the good bitsâ€”than either of us would ever let on. Kiryn Hasfinger, our superbly efficient assistant at Cold Spring Harbor Lab, cajoled, bullied, edited, researched, nit-picked, mediated, wroteâ€”all in approximately equal measure. The book simply would not have happened without her. Jan Witkowski, also of Cold Spring Harbor Lab, did a marvelous job of pulling together chapters 10, 11, and 12 in record time and provided indispensable guidance throughout the project. Maureen Berejka, J D W s assistant, rendered sterling service as usual in her capacity as the sole inhabitant of Planet Earth capable of interpreting J D W s handwriting. I had good reason for being up early. I knew that we were closeâ€”though I had no idea just how closeâ€”to figuring out the structure of a then little-known molecule called deoxyribonucleic acid: This was not any old molecule: DNA, as Crick and I appreciated, holds the very key to the nature of living things. It stores the hereditary information that is passed on from one generation to the next, and it orchestrates the incredibly complex world of the cell. I had spent the previous afternoon making cardboard cutouts of these various components, and now, undisturbed on a quiet Saturday morning, I could shuffle around the pieces of the 3-D jigsaw puzzle. How did they all fit together? Soon I realized that a simple pairing scheme worked exquisitely well: A fitted neatly with T, and G with C. Did the molecule consist of two chains linked together by A-T and G-C pairs? It was so simple, so elegant, that it almost had to be right. It was an anxious wait. Crick realized straightaway that my pairing idea implied a double-helix structure with the two molecular chains running in opposite directions. Everything known about DNA and its propertiesâ€”the facts we had been wrestling with as we tried to solve the problemâ€”made sense in light of those gentle complementary twists. Crick, however, was right. Our discovery put an end to a debate as old as the human species: Does life have some magical, mystical essence, or is it, like any chemical reaction carried out in a science class, the product of normal physical and chemical processes? Is there something divine at the heart of a cell that brings

it to life? The double helix answered that question with a definitive No. The breakthroughs of biologists Theodor Schwann and Louis Pasteur during the second half of the nineteenth century were also an important step forward. Rotting meat did not spontaneously yield maggots; rather, familiar biological agents and processes were responsibleâ€”in this case egg-laying flies. The idea of spontaneous generation had been discredited. Despite these advances, various forms of vitalismâ€”the belief that physicochemical processes cannot explain life and its processesâ€”lingered on. Many biologists, reluctant to accept natural selection as the sole determinant of the fate of evolutionary lineages, invoked a poorly defined overseeing spiritual force to account for adaptation. Physicists, accustomed to dealing with a simple, pared-down worldâ€”a few particles, a few forcesâ€”found the messy complexity of biology bewildering. Maybe, they suggested, the processes at the heart of the cell, the ones governing the basics of life, go beyond the familiar laws of physics and chemistry. That is why the double helix was so important. And there was nothing special about it. The double helix is an elegant structure, but its message is downright prosaic: Crick and I were quick to grasp the intellectual significance of our discovery, but there was no way we could have foreseen the explosive impact of the double helix on science and society. Not only has it yielded a stunning array of insights into fundamental biological processes, but it is now having an ever more profound impact on medicine, on agriculture, and on the law. DNA is no longer a matter of interest only to white-coated scientists in obscure university laboratories; it affects us all. By the mid-sixties, we had worked out the basic mechanics of the cell, and we knew how, via the "genetic code," the four-letter alphabet of DNA sequence is translated into the twenty-letter alphabet of the proteins. Extraordinary new scientific vistas opened up: But the climax of the first fifty years of the DNA revolution came on Monday, June 26, , with the announcement by U. With this profound new knowledge, humankind is on the verge of gaining immense, new power to heal. Not only was it an extraordinary xiii Introduction technological achievementâ€”the amount of information mined from the human complement of twenty-three pairs of chromosomes is staggeringâ€”but it was also a landmark in terms of our idea of what it is to be human. It is our DNA that distinguishes us from all other species, and that makes us the creative, conscious, dominant, destructive creatures that we arc. And here, in its entirety, was that set of DNAâ€”the human instruction book. DNA has come a long way from that Saturday morning in Cambridge. However, it is also clear that the science of molecular biologyâ€”what DNA can do for usâ€”still has a long way to go. Cancer still has to be cured; effective gene therapies for genetic diseases still have to be developed; genetic engineering still has to realize its phenomenal potential for improving our food. But all these things will come. The first fifty years of the DNA revolution witnessed a great deal of remarkable scientific progress as well as the initial application of that progress to human problems. She, too, possessed these qualities and felt that they must have been passed down to her from him. Growing up, I had endless arguments with Mother about the relative roles played by nature and nurture in shaping us. By choosing nurture over nature, I was effectively subscribing to the belief that I could make myself into whatever I wanted to be. If her shape was the product of her genes, then I too might have a hefty future. However, even as a teenager, I would not have disputed the evident basics of inheritance, that like begets like. My arguments with my mother concerned complex characteristics like aspects of personality, not the simple attributes that, even as an obstinate adolescent, I could see were passed down over the generations, resulting in "family likeness. Sometimes characteristics come and go within a few generations, but sometimes they persist over many. One of the most famous examples of a long-lived trait is known as the "Hapsburg Lip. The Hapsburgs added to their genetic woes by intermarrying. Arranging marriages between different branches of the Hapsburg clan and often among close relatives may have made political sense as a way of building alliances and ensuring dynastic succession, but it was anything but astute in genetic terms. Inbreeding of this kind can result in genetic disease, as the Hapsburgs found out to their cost. Charles II, the last of the Hapsburg monarchs in Spain, not only boasted a prize-worthy example of the family lipâ€”he could not even chew his own foodâ€”but was also a complete invalid, and incapable, despite two marriages, of producing children. Genetic disease has long stalked humanity. Retrospective diagnosis has suggested that George III, the English king whose principal claim to fame is to have lost the American colonies in the Revolutionary War, suffered from an inherited disease, porphyria, which causes periodic bouts of madness. While 4 Beginnings of Genetics most hereditary

diseases have no such geopolitical impact, they nevertheless have brutal and often tragic consequences for the afflicted families, sometimes for many generations. Understanding genetics is not just about understanding why we look like our parents. Our ancestors must have wondered about the workings of heredity as soon as evolution endowed them with brains capable of formulating the right kind of question. And the readily observable principle that close relatives tend to be similar can carry you a long way if, like our ancestors, your concern with the application of genetics is limited to practical matters like improving domesticated animals for, say, milk yield in cattle and plants for, say, the size of fruit. Generations of careful selectionâ€”breeding initially to domesticate appropriate species, and then breeding only from the most productive cows and from the trees with the largest fruitâ€”resulted in animals and plants tailor-made for human purposes. Underlying this enormous unrecorded effort is that simple rule of thumb: Thus, despite the extraordinary advances of the past hundred years or so, the twentieth and twenty-first centuries by no means have a monopoly on genetic insight. Almost everything we eatâ€”cereals, fruit, meat, dairy productsâ€”is the legacy of that earliest and most far-reaching application of genetic manipulations to human problems. An understanding of the actual mechanics of genetics proved a tougher nut to crack. Gregor Mendel â€” published his famous paper on the subject in and it was ignored by the scientific community for another thirtyfour years. Why did it take so long? After all, heredity is a major aspect of the natural world, and, more important, it is readily, and universally, observable: One simple reason is that genetic mechanisms turn out to be complicated.

4: Jordan Peterson Believes Ancient Chinese Had Knowledge of DNA Double Helix - Jason Colavito

This, says Dr. Louis Aronne, director of the Comprehensive Weight Control Center at Weill Cornell Medicine/New York-Presbyterian, is the DNA diet's biggest advantage. "One thing we find [at.

Share27 Shares In high school biology class, we learn about recessive and dominant genesâ€”and more than we ever cared to know about pea plants and moths. But those lessons only scratch the surface of what can be revealed about the body through the study of genetics. Recent research into the genetics of mankind has revealed some new ideas about ourselves and our history that should make us look at ourselves in a new light. A prolific conqueror whose armies swept across Asia, the emperor was also reported to be a prolific conqueror of another sort. In , geneticists took another look at the research and theories, and what they found was pretty shocking. A 16th-century Qing Dynasty ruler named Giocangga has somewhere around 1. Another came from Ireland, a member of the Ui Neill family who started spreading his genetic material sometime in the medieval era. The study dates at least some of those founding fathers to between and BC and places them in the Middle East, through India, and into southeast and central Asia. A series of recent studies looked at how much our genetics influence our relationship with alcohol, and they found that about 55 percent of how we feel the morning after a party has to do with our genetics. The rest is down to factors like how much and what we drank. The first batch of data came from A total of 13, male twins, all World War II veterans, were asked about their hangover experiences. Later, sets of male and female twins were quizzed on how they felt after a night of drinking. Even with the change in gender demographic, the results were similar. A study from the University of North Carolina found something even more intriguingâ€”a gene that might help certain people stay out of the dark, dismal trap of alcoholism. The gene, CYP2EI, is coded to instruct the body to break down some alcohol in the brain as well as in the liver. Some people with a particular version of the gene were more likely to have more alcohol broken down in the brain. But in the early 20th-century Soviet Union, it was outlawed. Belyaev followed in the footsteps of his older brother, Nikolai, who was arrested by the secret police in and executed for his work in genetics. After serving in World War II, Belyaev began looking for the genetic key that made our domestic dogs into pets instead of wild animals. He wanted to recreate domestication with silver foxes in part because he could hide his experiments under the guise of the fur trade. In the remote reaches of Siberia, he set about domesticating his animals. He started with 30 males and females and began a selective breeding process by focusing on behavior rather than traits fur farms typically looked for like color and quality of coat. If a fox bit him or exhibited other unfriendly behavior, it was excluded from breeding. Within 45 generations, Belyaev had successfully bred a group of foxes that reacted to the presence of humans in a way very similar to that of domesticated dogs. The domestication process had some unanticipated physical impact on the foxes, too. Their fur started to become irregularly colored and their skin pigmented. In essence, they were getting cuter. As a commercial operation, they were worthless. Belyaev died in , but his experiments continued with his protege, who continues to selectively breed foxes. The foxes need to be trained like dogs can be trained, and more work needs to be done to explore the link between a domestication gene and physical traits associated with it, like floppy ears and spotty fur. For now, though, the project is ailing from a lack of money and volunteers, and the newest generations of foxes languish in their cages. With less oxygen in the blood, most people start to feel tired, develop headaches, and, in some cases, become more susceptible to heart attacks and strokes. With more than million people living at altitudes high enough to present some serious physical challenges, there were plenty of subjects. The three groups were chosen for the study not only because of their distinctly different reactions to living at high altitudes , but also because many of them have been in those locations for generations upon generationsâ€”long enough to present a clear picture of how altitude has impacted the evolution and adaptation of their genes. They found that those people who have adapted to life at high altitudes did so because they carry several genetic mutations that help them deal with the low oxygen levels. But what about how we feel about our own physical traits? While there are a number of outside influences that encourage both men and women to idealize narrowly defined body types, it turns out that the desire to be thin or muscular has a much deeper root than television and magazines.

Researchers at Michigan State University looked at sets of fraternal and identical twins and asked them how they felt about beauty standards. The study, which looked at twins because of their tendency to be raised in the same environment, found that identical twins were much more likely to share the same ideas that a slim build equates to beauty. The more similar the genes, the more similar the answers. Geneticists agree with this. The people deemed Adam and Eve by geneticists are the two people whose DNA has survived even into today. This Eve, they said, continues to prosper through her mitochondrial DNA and lived in the flesh about , years ago somewhere in Africa. At first, attempts to trace the lineage of this Adam found that he lived only about , years ago, generations after Eve. And the University of Arizona has found something even stranger: This information has, not surprisingly, been seized by many Christians as scientific proof that the Bible is literally accurate. Hamer conducted a study that was part interviews and part genetic research. He looked at pairs of gay brothers and their family members, and ultimately found that the gay brothers shared the same genetic marker on the Xq28 patch of their DNA. Follow-up work has been frustratingly sparse. In contrast, after publishing a similar study that linked a gene to anxiety, more than follow-up studies were performed. There was no such interest in finding a gay gene, aside from some other researchers claiming that his work was invalid. Several other studies have been done, including one that looked at the lives of children who were born male and were surgically altered to female as babies. As late as , CNN found that most Americans believed that being gay was a choice. Finding a gay gene could add a boost to the changing perception. There have already been clear genetic links found between certain physical traits and being gay. If one identical twin is gay, the other has a higher chance of being gay as well, when compared to fraternal twins. Gay men are also much more likely to be left-handed and to have hair that lies in a counterclockwise pattern. Later studies divided these early arrivals into two groupsâ€”the Paleo-Eskimos and Neo-Eskimos , separated by about 4, years. But even more recent advancements in genetics have turned our perception of the first people to inhabit the continent on its head. Early Paleo-Eskimos hunted reindeer and musk ox to survive, while later Paleo-Eskimo cultures took to the sea to hunt small whales and seals. The Neo-Eskimos crossed the Bering Strait much better prepared with more advanced weapons, tools, and means of transportation. Their ability to hunt larger whales and use dog sleds to traverse larger domains allowed the Neo-Eskimos to flourish. DNA from Neo-Eskimos is present in contemporary populations, but the genes of the Paleo-Eskimos simply disappear along the genetic record. In , geneticists took the results of a study on the monogamous prairie vole and applied it to people. It was found that the voles had a particular alleleâ€”allele , to be exactâ€”that controlled a brain chemical that was in turn responsible for regulating emotions. They found that when they looked at whether or not men had inherited this allele, they could tell what their relationships were like. Men with the allele were more likely to have had marital difficulties or to dodge getting married in the first place. If a man had inherited two copies of the allele, the chances of marital or relationship troubles skyrocketed. Those with one or two long versions of the gene were much more content in their relationships, but those with two short alleles experienced more roller coaster relationships. Other studies found a genetic link to divorce , too, with studies of fraternal and identical twins both suggesting that people are genetically predisposedâ€”or notâ€”to remain in a single, stable marriage, to divorce, or even to divorce and remarry. In a study that looked at 1, married couples, a comparison of their genetics and DNA showed that married couples had more genetic similarities than random pairings from within the study. A study from the Max Planck Institute for Evolutionary Anthropology found that while men are the ones who might have the reputation for sowing their wild oats, there have been more mothers in the world than there have been fathers. A major explanation for this is polygyny, the relatively common practice of one man having many wives or partners, as it were. The study looked at the genetic codes of people from all over the world, examining their mitochondrial DNA as well as the Y chromosome. The picture created was so clear that geneticists were able to look into the reproductive history for different areas of the world. In East Asia and Europe, there were bigger differences in the male-inherited genetic material, suggesting that it was the women were leaving their hometowns, settling in other areas, and raising their children far away from where they were born. In other areas, like Africa and the Americas, the reverse was true. Further studies yielded startling revelations that paint a very different picture of world history than we generally accept. Tracing the genetics of early Americans indicates that there

were most likely more women than men colonizing the New World. They also found a population bottleneck in Africa, with some groups migrating out of the area and settling new lands with perhaps no more than 25 women and 15 men. The idea that it was the women of history who were moving around, migrating, and contributing a wider range of genetic material to the human race is very contradictory to what we might expect.

5: Pub Facts - 29 Interesting Facts About Pubs | www.enganchecubano.com

At the heart of every cell lies a collection of molecules that hold the key to biology's incredible diversity: DNA. In his book "DNA: The Secret of Life" molecular biologist James D Watson gives the reader an in depth tour of genetics, it's history, where it stands today and where it's going tomorrow.

Also see next section. Links to external sites will open in a new window. Bottom of page; return links and contact information Introduction A major news story over recent years has been the announcement of the genome sequence for humans. In fact, this project reached a symbolic completion point in April But this human genome work is just part of a much bigger story -- which includes a list of many completed genomes, for microbes, plants and animals. And all this genome work is just the beginning This overview section summarizes the class presentation. The original web materials were designed as a supplement to that class presentation. Two major news stories of set the background for this discussion. One is the 50th anniversary of the announcement of the double helical structure of DNA. The other is the announcement of the completed DNA sequence for the human genome. We discussed the development of the DNA structure. A key idea that emerged from this is the complementarity of the two DNA strands. This complementarity immediately suggests how DNA replicates -- by the two strands separating and each serving as a template for a new strand. The resulting "daughter" DNA molecules have one "old" strand and one "new" strand. There is much chemical complexity to DNA and much biochemical complexity to how DNA really replicates, but the basic logic of a double stranded structure held together by complementarity still holds. We then discussed DNA sequencing. We started by looking at some simple DNA sequencing results -- and showed how easy it is to actually read the sequence. Of course, what we looked at is the end step of a lengthy series of steps. We discussed an example of how one might generate the pattern we saw on the sequencing film; our example was not what is actually done, but was a simpler variation to illustrate the logic. The main problem with this basic sequencing procedure is that it works for only about bases. Thus sequencing larger genomes requires some additional work, but it is still based on the same classical procedure that we started with. For large genomes, the process is highly automated, including the use of lasers to read dye-coded bases. Further, tremendous computer capability is needed to keep track of the data from the millions of pieces of DNA that are individually sequenced. We discussed the gene count for humans. It is rather low -- and also uncertain. It is uncertain because we actually have considerable difficulty recognizing genes simply from DNA sequences, especially for complex organisms. The low gene count is forcing us to emphasize complexities in gene function, such as splicing and editing, that allow more than one protein to be made from a gene. We then discussed applications of genome information, especially of genome differences between individuals. These include applications such as forensic testing and paternity testing, which were developed some time ago. We discussed some drugs which are chosen based on specific genetic characteristics -- either of the individual, or even of the particular cancer. We then discussed more recent work, using gene chips microarrays , where analysis of many genes allows leukemia or leprosy sub-types to be recognized. The specific figure that I showed was from a recent supplement to The Scientist: New Frontiers in Cancer Research, Sept 22, One topic that came up during general discussion was prions; I now have a page on prions. A major milestone in the history of DNA is being celebrated in the year this page was started The Fig at the left is a diagram of the general structure of DNA. It shows the famous overall double helix. And it shows the four bases A, T, G and C -- which are the "information". At each rung along the DNA ladder is a base pair. Each pair is either A with T or G with C; that is, one strand precisely determines the other strand -- and that indeed is the key to how DNA replicates. Choose deoxyribonucleic acid DNA. Also see next Fig. The figures I have used from that site may no longer be there; some have been replaced by newer figures. The Fig at the left is a diagram of DNA replicating. The top of the Fig shows a "parental" DNA molecule; the bottom shows two "daughters". During DNA replication, the two parental strands separate, and each serves as the template for a new strand, which is made by those simple base pairing rules A-T and G-C , which were mentioned with the Fig above. In this Fig, the "replication fork" the site and apparatus for making new DNA is moving upward. For more, see http: The January 23, ,

issue of Nature has a big feature on this. It includes an introductory article Nature And then there is more in the April 24, , issue. This includes an article Nature Fig 1 of that article is a fold-out timeline "Landmarks in Genetics and Genomics"; this is available as a pdf file from the Nature web site. At least some of this material could be usefully read or browsed by those with little background in the field. Links to items mentioned above: This article is not freely available. You can click on "Table of Contents" for the issue listings; there is no way to tell what is freely available except to try it. This article is freely available. Again, there is no way to tell what is freely available except to try it. More at the Nature site: Among other web sites that resulted from the commemoration of the DNA anniversary They no longer maintain the anniversary celebration page, but they have much about DNA They are listed below in the section Posts in my Musings newsletter. The human genome was officially announced in February by two groups. That entire issue is available online, with free access, at http: The main genome articles are probably too technical for most, but the issues contain many news stories dealing with various aspects of the project. Links to all human genome work from Nature journals. Much consists of the technical articles, but there are also news stories and discussions. February brings the announcement of a genome sequence from a 38, year old Neandertal. It is actually fairly rough at this point, but it is a remarkable achievement to get this far. There is little to conclude for now, except that the genome evidence so far provides no evidence for interbreeding between Neandertals and modern man Homo sapiens. First draft of Neanderthal genome is unveiled; February 12, It includes basic background information on Neandertals, and on the genome project. Tales of a Prehistoric Human Genome. It is online at:. Genome results are so important and fascinating that rodents have been seen scrutinizing their genome data. My main purpose in giving this link is for the Figure, for fun. But the work described there is an example of moving a gene from one organism to another, and using that as a tool to learn about the characteristics of an organism. It is not the magic solution to anything in particular. Because the genome data is fairly new, in fact few practical advances can be directly attributed to it. So, much of what I do here is to show how genome info might be used. Traditional recommendations about proper nutrition and medicine assume that the population is uniform. Data is collected about population averages and this is used to guide medical treatments and nutritional advice. But we are not all the same. In fact, some examples of genetic differences in how we respond to drugs or nutrients have been found, more or less accidentally, in the past. The availability of complete genome information will allow such knowledge to come more rapidly. Here is a major nutrigenomics site: That site is also listed on my page Further reading: Medical topics, under Web Sites. A brochure for the general public, from the Institute for the Future. Two articles on work to classify cancers by gene expression patterns. This work has implications for customizing treatment. A Gianella-Borradori et al, Reducing risks, maximizing impact with cancer biomarkers and B A Maher, The makings of a microarray prognosis. Both are freely available online: Is "race" a useful criterion for guiding medical treatment? The important point for us here is that genomics is offering new insight into this socially-charged question. At this point, genetic analysis suggests that there are some genes that reflect "geographical origin", but that the variability of human genomes within any "race" is far more than the genetic differences between "races". Of course, this information will be of more practical use as details emerge.

6: Wellcome Library | DNA: The Secret of Life

Buy a cheap copy of DNA: The Secret of Life book by James D. Watson. What makes DNA different from hordes of competitors purporting to help readers understand genetics is that it is written by none other than James Watson, of Watson.

It only remained as an exercise of experimental biology to discover exactly which molecule was the genetic molecule. However, some people such as fellow researcher and colleague Esther Lederberg thought that Crick was unduly optimistic [24] It was clear that some macromolecule such as a protein was likely to be the genetic molecule. In the Avery-MacLeod-McCarty experiment , Oswald Avery and his collaborators showed that a heritable phenotypic difference could be caused in bacteria by providing them with a particular DNA molecule. Linus Pauling was the first to identify [29] the 3. Crick was witness to the kinds of errors that his co-workers made in their failed attempts to make a correct molecular model of the alpha helix; these turned out to be important lessons that could be applied, in the future, to the helical structure of DNA. For example, he learned [30] the importance of the structural rigidity that double bonds confer on molecular structures which is relevant both to peptide bonds in proteins and the structure of nucleotides in DNA. DNA structure[edit] In and , together with William Cochran and Vladimir Vand, Crick assisted in the development of a mathematical theory of X-ray diffraction by a helical molecule. They shared an interest in the fundamental problem of learning how genetic information might be stored in molecular form. Stimulated by their discussions with Wilkins and what Watson learned by attending a talk given by Franklin about her work on DNA, Crick and Watson produced and showed off an erroneous first model of DNA. Their hurry to produce a model of DNA structure was driven in part by the knowledge that they were competing against Linus Pauling. At any rate he was preoccupied with proteins at the time, not DNA. Crick was writing his Ph. In , Watson performed X-ray diffraction on tobacco mosaic virus and found results indicating that it had helical structure. Having failed once, Watson and Crick were now somewhat reluctant to try again and for a while they were forbidden to make further efforts to find a molecular model of DNA. Diagram that emphasizes the phosphate backbone of DNA. Watson and Crick first made helical models with the phosphates at the centre of the helices. Franklin shared this chemical knowledge with Watson and Crick when she pointed out to them that their first model from , with the phosphates inside was obviously wrong. Crick described what he saw as the failure of Wilkins and Franklin to cooperate and work towards finding a molecular model of DNA as a major reason why he and Watson eventually made a second attempt to do so. They asked for, and received, permission to do so from both William Lawrence Bragg and Wilkins. However, Watson and Crick found fault in her steadfast assertion that, according to her data, a helical structure was not the only possible shape for DNAâ€”so they had a dilemma. In an effort to clarify this issue, Max Ferdinand Perutz later published what had been in the progress report, [41] and suggested that nothing was in the report that Franklin herself had not said in her talk attended by Watson in late Further, Perutz explained that the report was to a Medical Research Council MRC committee that had been created in order to "establish contact between the different groups of people working for the Council". After the first crude X-ray diffraction images of DNA were collected in the s, William Astbury had talked about stacks of nucleotides spaced at 3. Thus, the Watson and Crick model was not the first "bases in" model to be proposed. During their model building, Crick and Watson learned that an antiparallel orientation of the two nucleotide chain backbones worked best to orient the base pairs in the centre of a double helix. Diagrammatic representation of some key structural features of DNA. The similar structures of guanine: The base pairs are held together by hydrogen bonds. The phosphate backbones are anti-parallel. Another key to finding the correct structure of DNA was the so-called Chargaff ratios , experimentally determined ratios of the nucleotide subunits of DNA: A visit by Erwin Chargaff to England, in , reinforced the salience of this important fact for Watson and Crick. G pairs are structurally similar. In particular, the length of each base pair is the same. Chargaff had also pointed out to Watson that, in the aqueous, saline environment of the cell, the predominant tautomers of the pyrimidine C and T bases would be the amine and keto configurations of cytosine and thymine, rather than the imino and enol forms that Crick and Watson had

assumed. They consulted Jerry Donohue who confirmed the most likely structures of the nucleotide bases. The correct structures were essential for the positioning of the hydrogen bonds. These insights led Watson to deduce the true biological relationships of the A: After the discovery of the hydrogen bonded A: G pairs, Watson and Crick soon had their anti-parallel, double helical model of DNA, with the hydrogen bonds at the core of the helix providing a way to "unzip" the two complementary strands for easy replication: There was another near-discovery of the base pairing rules in early Crick had started to think about interactions between the bases. He asked John Griffith to try to calculate attractive interactions between the DNA bases from chemical principles and quantum mechanics. C were attractive pairs. Identification of the correct base-pairing rules A-T, G-C was achieved by Watson "playing" with cardboard cut-out models of the nucleotide bases, much in the manner that Linus Pauling had discovered the protein alpha helix a few years earlier. The Watson and Crick discovery of the DNA double helix structure was made possible by their willingness to combine theory, modelling and experimental results albeit mostly done by others to achieve their goal. However, later research showed that triple-stranded, quadruple-stranded and other more complex DNA molecular structures required Hoogsteen base pairing. The entire field of synthetic biology began with work by researchers such as Erik T. In addition to synthetic DNA there are also attempts to construct synthetic codons , synthetic endonucleases , synthetic proteins and synthetic zinc fingers. Using synthetic DNA, instead of there being 43 codons, if there are n new bases there could be as many as n3 codons. Research is currently being done to see if codons can be expanded to more than 3 bases. These new codons can code for new amino acids. These synthetic molecules can be used not only in medicine, but in creation of new materials. Nearer Secret of Life. The New York Times subsequently ran a longer article on 12 June In a seven-page, handwritten letter [48] to his son at a British boarding school on 19 March Crick explained his discovery, beginning the letter "My Dear Michael, Jim Watson and I have probably made a most important discovery According to the late Dr. Beryl Oughton, later Rimmer, they all travelled together in two cars once Dorothy Hodgkin announced to them that they were off to Cambridge to see the model of the structure of DNA. Crick and Watson DNA model built in , was reconstructed largely from its original pieces in and donated to the National Science Museum in London. Polypeptides and Proteins" and received his degree. Crick then worked in the laboratory of David Harker at Brooklyn Polytechnic Institute , where he continued to develop his skills in the analysis of X-ray diffraction data for proteins, working primarily on ribonuclease and the mechanisms of protein synthesis. In , Watson and Crick published another article in Nature which stated: They suggested that spherical viruses such as Tomato bushy stunt virus had icosahedral symmetry and were made from 60 identical subunits. Crick engaged in several X-ray diffraction collaborations such as one with Alexander Rich on the structure of collagen. George Gamow established a group of scientists interested in the role of RNA as an intermediary between DNA as the genetic storage molecule in the nucleus of cells and the synthesis of proteins in the cytoplasm the RNA Tie Club. It was clear to Crick that there had to be a code by which a short sequence of nucleotides would specify a particular amino acid in a newly synthesized protein. Crick proposed that there was a corresponding set of small "adaptor molecules" that would hydrogen bond to short sequences of a nucleic acid, and also link to one of the amino acids. He also explored the many theoretical possibilities by which short nucleic acid sequences might code for the 20 amino acids. Molecular model of a tRNA molecule. During the mid-to-late s Crick was very much intellectually engaged in sorting out the mystery of how proteins are synthesized. None of this, however, answered the fundamental theoretical question of the exact nature of the genetic code. In his article, Crick speculated, as had others, that a triplet of nucleotides could code for an amino acid. Some amino acids might have multiple triplet codes. Crick also explored other codes in which, for various reasons, only some of the triplets were used, "magically" producing just the 20 needed combinations. Crick also used the term " central dogma " to summarize an idea that implies that genetic information flow between macromolecules would be essentially one-way: In his thinking about the biological processes linking DNA genes to proteins, Crick made explicit the distinction between the materials involved, the energy required, and the information flow. Crick was focused on this third component information and it became the organizing principle of what became known as molecular biology. Crick had by this time become a highly influential theoretical molecular biologist. Proof that the genetic code is a degenerate triplet code finally came from genetics experiments, some

of which were performed by Crick. Discussion of this nomination can be found on the talk page. Prior to publication of the double helix structure, Watson and Crick had little direct interaction with Franklin herself. They were, however, aware of her work, more aware than she herself realized. Watson was present at a lecture, given in November , where Franklin presented the two forms of the molecule, type A and type B, and discussed the position of the phosphate units on the external part of the molecule. She also specified the amount of water to be found in the molecule in accordance with other parts of it, data that have considerable importance in terms of the stability of the molecule. She was the first to discover and formulate these facts, which in fact constituted the basis for all later attempts to build a model of the molecule. Before this, both Linus Pauling and Watson and Crick had generated erroneous models with the chains inside and the bases pointing outwards. She wrote a series of three draft manuscripts, two of which included a double helical DNA backbone. Her two A form manuscripts reached Acta Crystallographica in Copenhagen on 6 March , [74] one day before Crick and Watson had completed their model. Her experimental results provided estimates of the water content of DNA crystals, and these results were most consistent with the three sugar-phosphate backbones being on the outside of the molecule. Although she at first insisted vehemently that her data did not force one to conclude that DNA has a helical structure, in the drafts she submitted in she argues for a double helical DNA backbone. Her identification of the space group for DNA crystals revealed to Crick that the DNA strands were antiparallel , which helped Watson and Crick decide to look for DNA models with two antiparallel polynucleotide strands. Crick and Watson felt that they had benefited from collaborating with Wilkins. They offered him a co-authorship on the article that first described the double helix structure of DNA. One colleague from the Salk Institute described him as "a brainstorming intellectual powerhouse with a mischievous smile Francis was never mean-spirited, just incisive. He detected microscopic flaws in logic. In a room full of smart scientists, Francis continually reearned his position as the heavyweight champ. For example, Crick advocated a form of positive eugenics in which wealthy parents would be encouraged to have more children. It is not a subject at the moment which we can tackle easily because people have so many religious beliefs and until we have a more uniform view of ourselves I think it would be risky to try and do anything in the way of eugenics The human dilemma is hardly new.

THE SECRET OF MISCELLANEOUS DNA pdf

7: Rosalind Franklin: The Dark Lady of DNA

Scientists have discovered a secret second code hiding within DNA which instructs cells on how genes are controlled. The amazing discovery is expected to open new doors to the diagnosis and treatment of diseases, according to a new study. Ever since the genetic code was deciphered over 40 years ago.

I may eventually get around to having individual webpages for some of these, but at the moment this is just a place for me to dump useful information! HVR1 includes positions to So therefore you need to ignore HVR3. FTDNA gives you a choice between these two options. The folks I know about who have been Chromosome Mapping for a while, set a threshold of 7 cM maybe 5 cM for known close relatives for the segments we use. We do this for several reasons: Every Match has at least one 7 cM segment. So they are all still in the mix Most Matches are true cousins on the 7 cM segment. This keeps our spreadsheet to a manageable size. Smaller segments are far more likely to be IBS [Identical by State â€" that is, by coincidence] and then introduce wild goose chases into our mapping. The Triangulation process should be based on the same rules, for these same reasons. Overlap 7 cM or more. There is no guarantee that all 7 cM segments are IBD [Identical by Descent â€" that is, inherited] either, just a larger share of them. Some people set their minimum thresholds at 10, 12 or 15 cM for these reasons. In short, IMO, you should focus on building a chromosome map with larger segments. After that map is, say, 50 percent done, or so, you can go back and add in the next smaller size segments and see if Triangulation among several Matches validates the smaller segments. Build a backbone first. My extraction and interpretation from this: When using 23andMe data divide the total cMs by 75 to get the percentage of the genome that two people share; there are An interesting message string on DNA-Newbies board: Obtaining "exact" segment boundaries on 23andMe: Log onto your 23andMe account using Firefox as your browser. Right click anywhere in the console. Click on "Log request and response bodies". Click on this line. This brings up a box that says "Inspect Network Request". Why generation estimates based on segment length cannot be accurate, Source: You do get exactly half of your atDNA from each parent. And each parent does this by giving you exactly half of their own atDNA. Each parent has two sets of chromosomes ; they each give a child one set of chromosomes ; and then the child has two sets of - just like every human. The issue is that each chromosome is made up of random segments from their ancestors - at many levels. And each chromosome that is passed to a child is made up of big parts from the two chromosomes the parent got from their parents. This process is recombination and at each generation a few segments from the preceding generation are subdivided usually from 0 to 3 subdivisions for each chromosome for each generation Since there are relatively few subdivisions crossover points in each generation, most of the smaller segments but still over 7cM are not subdivided. I used to call these sticky segments, but I now realize they are the result of a natural process and are actually to be expected. Hope this helps in understanding why generation estimates based on segment length cannot be accurate. String of Messages on Rootsweb Autosomal-DNA Mailing List, April , from Jim Barlett and Tim Janzen For triangulated groups, overlapping segments, and chromosome mapping, their advice is to make separate files for each relative but I think this could be a separate worksheet within the same workbook file , making yourself the priority file. And if multiple siblings, designate a 2nd priority, then a 3rd priority sibling and continue in this same manner. Which DNA strand is reported? Only surnames are shown sometimes with Ms.

8: What is Genetics? (with pictures)

Genetic researchers have proposed an intriguing hypothesis that the aging process and human susceptibility to major illnesses such as heart disease may be related to a noticeable size reduction of the telomeres - the protective 'caps' on the ends of our DNA.

Share Shares Ever since recorded time, secret societies have fascinated and frightened us. These secret societies, however, did indeed influence the world around them, and the reverberations of their teachings and actions are with us to this very day. Federal Bureau of Investigation Because it was one of the most glamorous moments in the history of American law enforcement, a lot of people wanted to take credit for bringing down Al Capone. From the Iowan attorney George E. One group, however, kept their war against Capone quiet. Dubbed the Secret Six, they were a collection of Chicago businessmen who wanted to clean up the city for purely economic reasons. After all, the more Americans felt like Chicago belonged to the gangsters, the less likely they were to vacation in the Windy City. Collection Franz Toth Interwar Germany was an unstable place. Tied down by a sluggish economy and shackled to a punitive Versailles Treaty which blamed Germany for starting World War I, Weimar-era Germans were furious and took to politics in order to vent their anger. While communist, nationalist, and even centrist militias fought each other on the streets, other political groups met in pubs and saloons to discuss their philosophies. One such group was known loosely as Secret Germany , and their poet-messiah was Stefan George. Before it became a political movement, fascism was a fragmented idea argued over by various right-wing intellectuals. One such man was Julius Evola, a Sicilian nobleman, occultist, and student of esotericism. To Evola, fascism had the potential to be a reactionary movement against the modern world, which he considered to be a part of the Kali Yuga, or the Hindu Dark Age. Massachusetts Court System Terrorism is nothing new, and the United States was an experienced hand when it came to battling terrorists even before September During the early 20th century, the US and Europe fought what came to be known as the First War on Terrorâ€”an effort to quell the communists, socialists, and anarchists who had begun to take on the forces of capitalism in the late 19th century. One of their members is also suspected of perpetrating the still-unsolved Wall Street bombing of Alphonse Bertillon Unlike the other organizations on this list, the Bonnot Gang, which terrorized France between and , straddle the line between a secret society and a fairly straightforward criminal enterprise. The Bonnot Gang utilized such high-tech weapons as semi-automatic pistols and repeating rifles during their daring robberies. While other gangs committed crimes for pure profit, the Bonnot Gang, like the later Galleanists, were driven by the philosophy of Illegalism. By the spring of , after numerous gun battles that often involved the French Army, most of the members of the Bonnot Gang were either dead or in jail. Although their brand of Illegalist anarchism found few adherents after their downfall, the gang is rumored to have inspired Les Vampires, an early silent film series that featured a shadowy criminal society known simply as The Vampires. Mlada Bosna Long before the wars of the s, the Balkans were a fractious, ethnically diverse region primed to erupt into war at any moment. Bosnia was particularly volatile due to its mixture of nationalities and religions. One such group was Young Bosnia , a heterogeneous collection of Bosnian Serb, Croat, and Muslim revolutionaries dedicated to an assortment of causes ranging from South Slav unification to Serb nationalism. One such practitioner of this demonic trifecta was Guido von List, a Vienna-born journalist, poet, and occultist who specifically focused on the study of runes, or the alphabet used by the Germanic peoples of pre-Christian Europe. As society membership continued to increase, the group began to look more like a political movement and came complete with their own symbols which included the swastika and gestures the Guido von List Society greeted each other with the Heil salute. With their avowed interests in ancient German mysticism and the supposed superiority of the Aryan race, the Guido von List Society sowed the seeds of National Socialism and gave the later movement many of its theatrics and symbols. For their part, the Thuggees were far worse than any common street criminal or antisocial pest. Often posing as traveling pilgrims, packs of Thuggees would prey on fellow travelers all throughout the Indian subcontinent. After years of hearing fearful reports about missing villagers, family members, and friends, British administrators in the early 19th century began to finally realize that there

was a murderous cult at work throughout the centerpiece of the British Empire. It was at this time that they began finding mass graves all across the county. Worse still, each mass grave mirrored the other, with the bodies prepared and buried all in the same manner. Unlike the highwaymen of Europe, who killed for monetary gain, the Thuggees were religious zealots who ritualistically slaughtered their victims as sacrifices for Kali, the Hindu goddess of destruction. Because they did not want to spill blood, the Thuggees used a yellow sash known as a rumal to strangle their victims. The Thuggees were only stopped by a concerted effort led by Lord William Bentinck , the governor-general of India, who helped to put thousands of these cult killers in jail. These heretics were the Cathars, who were Gnostic adherents to the notion of Dualism, or the idea that there is both a good god and an evil god. Inspired by other heretical movements such as Bogomilism and Manichaeism, the Cathars rejected the bureaucracy of the Roman Catholic Church and refused to worship in temples or cathedrals. The Cathars also believed that men and women were equalâ€”in Cathar communities, women often held important religious positions. The Albigensian Crusade, however, successfully expunged the Cathars and their beliefs from Christendom. By , the remaining Cathars had either been converted by the Inquisition or had been driven underground by a crusading army who fought with the same zeal against other Christians as they did against Muslims. Many centuries later, the Cathars became a favorite topic among conspiracy theorists who believed that they had possessed the Holy Grail. Carole Raddato According to ancient historians, the Sacred Wayâ€”which ran from Athens to the holy city of Eleusisâ€”was the best maintained road in all of Greece. The Sacred Way was the route taken annually by the participants in the Eleusinian Mysteries, a religious celebration and initiation ceremony that symbolically retold the story of Demeter and the abduction of her daughter Persephone by the god Hades. Very little is known about the actual celebrations, for those participants who spoke about the secretive ceremonies were frequently killed by fellow initiates. Although commonly perceived today as an ancient orgy fueled by psychotropics such as the concoction known as kykeon , the Eleusinian Mysteries lasted almost 2, years in the Greco-Roman world and may have represented the greatest expression of Ancient Greek religion. Benjamin Welton is a freelance journalist based in New England. He currently blogs at literarytrebuchet.

THE SECRET OF MISCELLANEOUS DNA pdf

9: Scientists discover secret code hidden within human DNA â€" RT World News

DNA: The Master Molecule Video Now that we have learned about the structure of DNA and how it makes copies (replicates), we will now learn why DNA is called the "blueprint of life". We learn how DNA makes up genes that hold the codes for making proteins.

Attorney General to pay rewards pursuant of advertisements for assistance to the Department of Justice to combat terrorism and prevent terrorist acts. These funds can be provided by any U. Executive agency , [1] the U. Navy or the U. Section 3 of the Act mandates the collection of DNA samples of Federal prisoners who were convicted of murder , sexual abuse , child sexual abuse , involvement in sex trafficking , peonage and slavery , kidnapping , robbery or burglary ; [7] or for any military offense against the Uniform Code of Military Justice for which a sentence of confinement for more than one year may be imposed. Coordination with law enforcement[edit] Section of the Foreign Intelligence Surveillance Act of FISA specifies how foreign intelligence information acquired by Federal officers using electronic surveillance may be used. National security authorities[edit] Three national security authorities were modified under title V of the Patriot Act. The requests for counterintelligence access to telephone toll and transactional records made under FISA can ask for the name, address, length of service, and local and long distance toll billing records of a subscriber, [16] or the name, address, and length of service of an employee of the provider. Ashcroft [18] , contending that the NSLs used under 18 U. The court also found that the prohibitions of disclosure in 18 U. Code specifies punishments for various computer crimes. This includes unauthorized access via a computer to: It also includes knowingly committing fraudulent acts using a computer under a number of circumstances. Section of the Patriot Act gave the U. Secret Service jurisdiction to investigate offenses, though the FBI is given primary authority to investigate offenses relating to the unauthorized access to restricted data relating to atomic energy [19] unless it affects the U. President , Vice President , President-elect, Vice President-elect, or their families or other related people. This paragraph allows the U. Attorney General or Assistant Attorney General to collect and retain educational records relevant to an authorized investigation or prosecution of an offense that is defined as a Federal crime of terrorism [23] which are in the possession of an educational agency or institution. The Attorney General or Assistant Attorney General must "certify that there are specific and articulable facts giving reason to believe that the education records are likely to contain information [that a Federal crime of terrorism may be being committed]. Attorney General or Assistant Attorney General to submit a written application to a court of competent jurisdiction for an ex parte order to collect reports, records, and information from the National Center for Education Statistics NCES relating to investigations and prosecutions of a Federal crime of terrorism [23] or an act of domestic or international terrorism.

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