

Evolutionary theories on gender and sexual reproduction

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The origin and maintenance of sex and recombination is not easily explained by natural selection. Evolutionary biology is unable to reveal why animals would abandon asexual reproduction in favor of more costly and inefficient sexual reproduction. Exactly how did we arrive at two separate genders—each with its own physiology? If, as evolutionists have argued, there is a materialistic answer for everything, then the question should be answered: Why sex? Is sex the product of a historical accident or the product of an intelligent creator? The current article reviews some of the current theories for why sexual reproduction exists today. Yet, as these theories valiantly attempt to explain why sex exists now, they do not explain the origin of sex. We suggest that there is no naturalistic explanation that can account for the origin and maintenance of sex.

Biology texts illustrate amebas evolving into intermediate organisms, which then give rise to amphibians, reptiles, mammals, and, eventually, humans. Yet, we never learn exactly when or how independent male and female sexes originated. Somewhere along this evolutionary path, both males and females were required in order to ensure the procreation that was necessary to further the existence of a particular species. But how do evolutionists explain this? When pressed to answer questions such as, ‘Where did males and females actually come from?’, ‘What is the evolutionary origin of sex?’, evolutionists become silent. How could nature evolve a female member of a species that produces eggs and is internally equipped to nourish a growing embryo, while at the same time evolving a male member that produces motile sperm cells? And, further, how is it that these gametes (eggs and sperm) conveniently ‘evolved’ so that they each contain *half* the normal chromosome number of somatic (body) cells? (Somatic cells reproduce via the process of *mitosis*, which maintains the species’ standard chromosome number; gametes are produced via the process of *meiosis*, which halves that number. We will have more to say about both processes later.)

The evolution of sex (and its accompanying reproductive capability) is not a favorite topic of discussion in most evolutionary circles, because no matter how many theories evolutionists conjure up (and there are several), they still must surmount the enormous hurdle of explaining the origin of the first fully functional female and the first fully functional male necessary to begin the process. In his book, *The Masterpiece of Nature: The Evolution of Genetics and Sexuality*, Graham Bell described the dilemma in the following manner:

‘Sex is the queen of problems in evolutionary biology. Perhaps no other natural phenomenon has aroused so much interest; certainly none has sowed as much confusion. The insights of Darwin and Mendel, which have illuminated so many mysteries, have so far failed to shed more than a dim and wavering light on the central mystery of sexuality, emphasizing its obscurity by its very isolation.’¹

The same year that Bell released his book, well-known evolutionist Philip Kitcher noted: ‘Despite some ingenious suggestions by orthodox Darwinians, there is no convincing Darwinian history for the emergence of sexual reproduction’.² Evolutionists since have freely admitted that the origin of gender and sexual reproduction still remains one of the most difficult problems in biology.³ In his 2001 book, *The Cooperative Gene*, evolutionist Mark Ridley wrote (under the chapter title of ‘The Ultimate Existential Absurdity’):

‘Evolutionary biologists are much teased for their obsession with why sex exists. People like to ask, in an amused way, ‘isn’t it obvious?’ Joking apart, *it is far from obvious. ... Sex is a puzzle that has not yet been solved; no one knows why it exists*’ [emphasis added].⁴

In an article in *Bioscience*, Julie Schecter remarked:

‘Sex is ubiquitous Yet sex remains a mystery to researchers, to say nothing of the rest of the population. Why sex? At first blush, its disadvantages seem to outweigh its benefits. After all, a parent that reproduces sexually gives only one-half its genes to its offspring, whereas an organism that reproduces by dividing passes on all its genes. Sex also takes much longer and requires more energy than simple division. Why did a process so blatantly unprofitable to its earliest practitioners become so widespread?’⁵

This ‘mystery’ of sex deserves serious consideration in light of its ‘widespread’ prevalence today.

‘Intellectual mischief and confusion’—or intelligent design?

Evolutionists freely admit that the origin of the sexual process remains one of the most difficult problems in biology.⁶ Lynn Margulis and Dorion Sagan have proposed a simple solution by suggesting that Mendelian inheritance

and sex were a historical accident—i.e. a kind of ‘accidental holdover’ from the era of single-celled organisms. They claim that the maintenance of sex is therefore a ‘nonscientific’ question that ‘leads to intellectual mischief and confusion’.⁶ This implies, however, that sex is useless, and that it has been retained through the years merely by accident. Yet even evolutionists realize the ubiquity and complexity of sexual reproduction. Niles Eldridge, a staunch evolutionist from the American Museum of Natural History, has declared: ‘Sex occurs in all major groups of life’.⁷

But *why* is this the case? Evolutionists have practically been forced to concede that there must be ‘some advantage’ to a system as physiologically and energetically complex as sex—as Mark Ridley admitted when he wrote: ‘... [I]t is highly likely that sex has *some advantage*, and that the advantage is *big*. Sex would not have evolved, and been retained, unless it had *some advantage*’ (emphasis added).⁸ Yet finding and explaining that advantage seems to have eluded our evolutionary colleagues. Sir John Maddox, who served for over twenty-five years as the distinguished editor of *Nature*, the prestigious journal published by the British Association for the Advancement of Science (and who was knighted by Queen Elizabeth II in 1994 for ‘multiple contributions to science’), authored an amazing book titled *What Remains to be Discovered* in which he addressed the topic of the origin of sex, and stated forthrightly:

‘The overriding question is when (and then how) sexual reproduction itself evolved. *Despite decades of speculation, we do not know*. The difficulty is that sexual reproduction creates complexity of the genome and the need for a separate mechanism for producing gametes. The metabolic cost of maintaining this system is huge, as is that of providing the organs specialized for sexual reproduction (the uterus of mammalian females, for example). What are the offsetting benefits? *The advantages of sexual reproduction are not obvious*’ [emphasis added].⁹

The fact that the advantages of sex ‘are not obvious’



Figure 1. *The intricacy, complexity, and informational content associated with sexual reproduction demand an intelligent creator.*

is well known (though perhaps not often discussed) within academia. J.F. Crow lamented:

‘Sexual reproduction seems like a lot of baggage to carry along if it is functionless. Evolutionary conservatism perpetuates relics, but does it do so on such a grand scale as this? ... It is difficult to see how a process as elaborate, ubiquitous, and expensive as sexual reproduction has been maintained without serving some important purpose of its own.’¹⁰

What is that ‘purpose’? And how can evolution (via natural selection) explain it? As it turns out, the common ‘survival of the fittest’ mentality cannot begin to explain the high cost of first evolving, and then maintaining, the sexual apparatus. Sexual reproduction requires organisms first to produce, and then maintain, gametes (reproductive cells—i.e. sperm and eggs).

Additionally, various kinds of incompatibility factors (such as the blood Rh factor between mother and child) pass along more ‘costs’ (some of which can be life threatening) that are automatically inherent in this ‘expensive’ means of reproduction. In sexual organisms, problems also can arise in regard to tissue rejection between the mother and the newly formed embryo. The human immune system is vigilant in identifying foreign tissue (such as an embryo that carries half of the male’s genetic information), yet evolutionists contend that the human reproductive system has ‘selectively evolved’ this ‘elaborate, ubiquitous, and expensive’ method of reproduction.

It is our contention, based on the evidence, that the intricacy, complexity, and informational content associated with sexual reproduction demand the conclusion that sex is neither a ‘historical accident’ resulting in evolutionary baggage, nor a product of organic evolution itself, but rather is the product of an intelligent creator.

From asexual to sexual reproduction—the origin of sex

Many single-celled organisms reproduce asexually. If we all descended from these single-celled creatures, as Margulis and Sagan have suggested, then why was the simple-yet-efficient method of asexual reproduction set aside in favor of sexual reproduction? Dobzhansky and his co-authors commented on this ironic difficulty in their book, *Evolution*:

‘With respect to the origin of sexual reproduction, two challenging questions present themselves. First, in what kinds of organisms did sex first arise? And second, what was the adaptive advantage that caused sexual reproduction to become predominant in higher organisms?’¹¹

Asexual reproduction is the formation of new individuals from cells of only one parent, without gamete formation or fertilization by another member of the species. Asexual reproduction thus does not require one egg-producing parent and one sperm-producing parent. A single parent

is all that is required. Sporulation (the formation of spores) is one method of asexual reproduction among protozoa and certain plants. A spore is a reproductive cell that produces a new organism without fertilization. In certain lower forms of animals (e.g. hydra), and in yeasts, budding is a common form of asexual reproduction as a small protuberance on the surface of the parent cell increases in size until a wall forms to separate the new individual (the bud) from the parent. Regeneration is another form of asexual reproduction that allows organisms (e.g. starfish and salamanders) to replace injured or lost parts.

As they have struggled to explain the existence of sexual reproduction in nature, evolutionists have suggested four different (and sometimes contradictory) theories, known in the literature as: (1) the Lottery Principle; (2) the Tangled Bank Hypothesis; (3) the Red Queen Hypothesis; and (4) the DNA Repair Hypothesis. We would like to discuss each briefly.

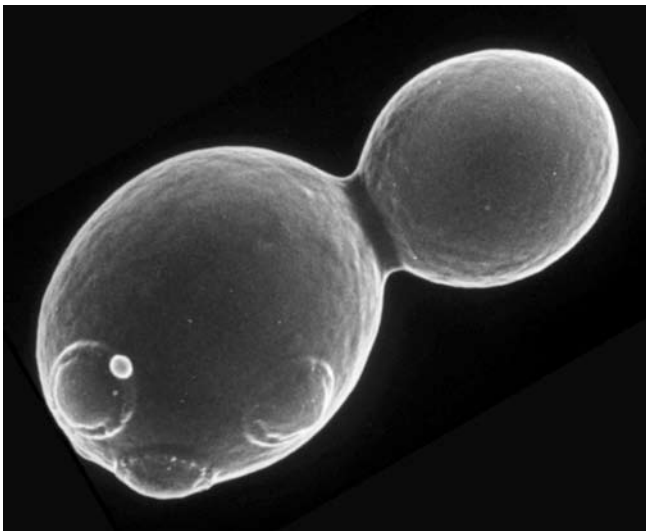


Figure 2. Budding is a common form of asexual reproduction.

The Lottery Principle

The Lottery Principle was first suggested by American biologist George C. Williams in his monograph, *Sex and Evolution*.¹² Williams' idea was that sexual reproduction introduced genetic variety in order to enable genes to survive in changing or novel environments. He used the lottery analogy to get across the concept that breeding asexually would be like buying a large number of tickets for a national lottery but giving them all the same number. Sexual reproduction, on the other hand, would be like purchasing a small number of tickets, but giving each of them a different number.

The essential idea behind the Lottery Principle is that since sex introduces variability, organisms would have a better chance of producing offspring that will survive if they reproduce a range of types rather than merely more of the same. The point being made by those who advocate the

Lottery Principle is that, in their view, asexual reproduction is poorly equipped to adapt to rapidly changing environmental conditions due to the fact that the offspring are exact duplicates (i.e. clones) of their parents, and thus inherently possess less genetic variation—variation that ultimately could lead to radically improved adaptability and a much greater likelihood of survival). As Carl Zimmer wrote under the title of 'Evolution from Within' in his volume, *Parasite Rex*: 'A line of clones might do well enough in a forest, but what if that forest changed over a few centuries to a prairie? Sex brought the variations that could allow organisms to survive change.'¹³ Matt Ridley added:

'... [A] sexual form of life will reproduce at only half the rate of an equivalent clonal form. The halved reproductive rate of sexual forms is probably made up for by a *difference in quality: the average sexual offspring is probably twice as good as an equivalent cloned offspring*' [emphasis added].¹⁴

It would be 'twice as good' or 'twice as fit' of course, because it had twice the genetic endowment (having received half from each of the two parents). As Reichenbach and Anderson summarized the issue:

'For example, why do most animals reproduce sexually rather than asexually, when asexual reproduction seems to conform best to the current theory that in natural selection the fittest are those that preserve their genes by passing them on to their progeny? One theory is that sexual reproduction provides the best defense against the rapidly reproducing, infectious species that threaten the existence of organisms. The *diversity in the species* that results from combining different gene pools favors the survival of those that are sexually reproduced over those that by cloning inherit repetitive genetic similarity' [emphasis added].¹⁵

It is that 'diversity in the species', according to the principle, which helps an organism maintain its competitive edge in nature's struggle of 'survival of the fittest'. But the Lottery Principle has fallen on hard times of late. It suggests that sex would be favored by a *variable* environment, yet a close inspection of the global distribution of sex reveals that where environments are *stable* (such as in the tropics), sexual reproduction is most common. In contrast, in areas where the environment is unstable (such as at high altitudes or in small bodies of water), asexual reproduction is rife.

The Tangled Bank Hypothesis

The Tangled Bank Hypothesis suggests that sex evolved in order to prepare offspring for the complicated world around them. The 'tangled bank' phraseology comes from the last paragraph of Darwin's *Origin of Species*, in which he referred to a wide assortment of creatures all competing for light and food on a 'tangled bank'. According to this

concept, in any environment where there exists intense competition for space, food, and other resources, a premium is placed on diversification. As Zimmer described it:

‘In any environment—a tidal flat, a forest canopy, a deep-sea hydrothermal vent—the space is divided into different niches where different skills are needed for survival. A clone specialized for one niche can give birth only to offspring that can also handle the same niche. But sex shuffles the genetic deck and deals the offspring different hands. It’s basically spreading out progeny so that they’re using different resources.’¹⁶

The Tangled Bank Hypothesis, however, also has fallen on hard times. In his book, *Evolution and Human Behavior*, John Cartwright concluded:

‘Although once popular, the tangled bank hypothesis now seems to face many problems, and former adherents are falling away. The theory would predict a greater interest in sex among animals that produce lots of small offspring that compete with each other. In fact, sex is invariably associated with organisms that produce a few large offspring, whereas organisms producing small offspring frequently engage in parthenogenesis [asexual reproduction—BT/BH]. In addition, *the evidence from fossils suggests that species go for vast periods of [geologic] time without changing much*’ [emphasis added].¹⁷

Indeed, the evidence *does* suggest ‘that species go for vast periods of time without changing much’. Consider the following admission in light of that point. According to Margulis and Sagan, bacteria ‘evolved’ in such a fashion as to ultimately be responsible for sexual reproduction. Yet if that is the case, why, then, have the bacteria themselves remained virtually unchanged—from an evolutionary viewpoint—for billions of years of Earth history? In his book, *Evolution of Living Organisms*, the eminent French zoologist, Pierre-Paul Grassé, raised this very point.

‘[B]acteria, despite their great production of intraspecific varieties, exhibit a great fidelity to their species. The bacillus *Escherichia coli*, whose mutants have been studied very carefully, is the best example. *The reader will agree that it is surprising, to say the least, to want to prove evolution and to discover its mechanisms and then to choose as a material for this study a being which practically stabilized a billion years ago*’ [emphasis added].¹⁸

Additionally, it should be noted that today we still see organisms that reproduce asexually, as well as organisms that reproduce sexually—which raises the obvious question: Why do some organisms continue to reproduce asexually, while others have ‘evolved’ the ability to reproduce sexually? Don’t the asexual organisms ever ‘need’ genetic variety in order to enable genes to survive in changing or novel environments (the Lottery Principle)? Don’t they ever ‘need’ to prepare their offspring for the complicated world around them (the Tangled Bank Hypothesis)?

The Red Queen Hypothesis

The Red Queen Hypothesis was first suggested by Leigh Van Valen in an article titled ‘A New Evolutionary Law’.¹⁹ His research suggested that the probability of organisms becoming extinct bears no relationship to how long they already may have survived. In other words, as Cartwright put it: ‘It is a sobering thought that the struggle for existence never gets any easier; however well adapted an animal may become, it still has the same chance of extinction as a newly formed species.’²⁰ Biologists came to refer to the concept as the Red Queen Hypothesis, named after the character in Lewis Carroll’s *Through the Looking Glass* who took Alice on a lengthy run that actually went nowhere. As the queen said to poor Alice, ‘Now, here, you see, it takes all the running you can do, to keep in the same place’. Think of it as a ‘genetics arms race’ in which an animal constantly must run the genetic gauntlet of being able to chase its prey, elude predators, and resist infection from disease-causing organisms. In the world of the Red Queen, organisms have to run fast—just to stay still! That is to say, they constantly have to ‘run to try to improve’ (and the development of sex would be one way of accomplishing that). Yet doing so provides no automatic guarantee of winning the struggle known as ‘survival of the fittest’. ‘Nature’, said the eminent British poet Lord Tennyson, is ‘red in tooth and claw’. Currently, the Red Queen Hypothesis seems to be the favorite of evolutionists worldwide in attempting to explain the reason as to the ‘why’ of sex.

The DNA Repair Hypothesis

Think about this. Why are babies born young? Stupid question—with a self-evident answer, right? Evolutionists suggest otherwise. The point of the question is this. Our somatic (body) cells age. Yet cells of a newborn have had their clocks ‘set back’. Somatic cells die, but the germ line seems to be practically immortal. Why is this the case? How can ‘old’ people produce ‘young’ babies? In a landmark article published in 1989, Bernstein, Hopf and Michod suggested that they had discovered the answer:

‘We argue that the lack of ageing of the germ line results mainly from repair of the genetic material by meiotic recombination during the formation of germ cells. Thus our basic hypothesis is that the primary function of sex is to repair the genetic material of the germ line.’²¹

DNA can be damaged in at least two ways. First, ionizing radiation or mutagenic chemicals can alter the genetic code. Or, second, a mutation can occur via errors during the replication process itself. Most mutations are deleterious.²² In an asexual organism, by definition, any mutation that occurs in one generation will be passed on automatically to the next. In his book, *The Red Queen*,²³ Matt Ridley compared it to what occurs when you photo-

copy a document, then photocopy the photocopy, and then photocopy that photocopy, etc. Eventually, the quality deteriorates severely. Asexual organisms, as they continue to accumulate mutations, face the unpleasant prospect of eventually becoming both unable to reproduce and unviable—neither of which would be at all helpful to evolution. (Commonly known as Müller’s Ratchet hypothesis, the mechanism operates like a downward ratchet on asexual populations with any deleterious mutation that occurs in a vertically transmitted organism.)

But sexual reproduction allows most plants and animals to create offspring with good copies of two genes via crossover and would thus, help eliminate this downward ratchet since mutations, although they might still be passed on from one generation to the next, would not necessarily be *expressed* in the next generation (a mutation must appear in the genes of *both* parents before it is expressed in the offspring). As Cartwright put it:

‘In sexually reproducing species on the other hand, some individuals will be “unlucky” and have a greater share than average of deleterious mutations in their genome, and some will be “lucky”, with a smaller share. The unlucky ones will be selected out. This in the long term has the effect of constantly weeding out harmful mutations through the death of those that bear them Deleterious mutations ... would have devastating consequences if it were not for sexual reproduction.’²⁴

But, as Cartwright went on to admit: ‘This theory is not without its problems and critics’.²⁴ One of those problems, expressed by Mark Ridley (no kin to Matt), is: ‘We do not know for sure that sex exists to purge bad genes’.¹³ No, we certainly do not! And, in fact, evidence is beginning to mount that perhaps the DNA Repair Hypothesis is itself in need of ‘repair’. As Maddox noted:

‘One view is that sexual reproduction makes it easier for an evolving organism to get rid of deleterious changes. That should certainly be the case if there is more than one genetic change and if their combined effect on the fitness of the evolving organisms is greater than the sum of their individual changes acting separately. *But there is no direct evidence to show that this rule is generally applicable*’ [emphasis added].⁹

We must not overlook an important fact throughout all of this: These theories valiantly attempt to explain *why sex exists now*, but they do not explain *the origin* of sex. How, exactly, did nature accomplish the ‘invention’ of the marvelous process we know as sex? In addressing this very issue, Maddox asked quizzically:

‘How did this process (and its complexities) evolve? ... The dilemma is that *natural selection cannot anticipate changes in the environment*, and so arrange for the development of specialized sexual organs as a safeguard against environmental change’

[emphasis added; parenthetical item in orig.].²⁵

Exactly our point! It is one thing to develop a theory or hypothesis to explain something that *already exists*, but it is entirely another to develop a theory or hypothesis to explain *why* that something (in this case, sex) *does exist*. As Mark Ridley begrudgingly admitted: ‘Sex is not used simply for want of an alternative. Nothing, in an evolutionary sense, *forces* organisms to reproduce sexually’ [emphasis added].²⁶

Perhaps Cartwright summarized the issue well when he said: ‘There is perhaps no single explanation for the maintenance of sex in the face of severe cost’.²⁴ Since he is speaking of a strictly naturalistic explanation, we would agree wholeheartedly. But we would suggest that there is no naturalistic explanation at all for the origin or maintenance of sex.

Why sex?

Why, then, does sex exist? In his 2001 book, *Evolution: The Triumph of an Idea*, Carl Zimmer admitted:

‘Sex is not only unnecessary, but *it ought to be a recipe for evolutionary disaster*. For one thing, it is an inefficient way to reproduce And sex carries other costs as well By all rights, any group of animals that evolves sexual reproduction should be promptly outcompeted by nonsexual ones. *And yet sex reigns Why is sex a success, despite all its disadvantages?*’ [emphasis added].²⁷

From an evolutionary viewpoint, sex definitely is ‘an inefficient way to reproduce’. Think about all the sexual process entails, including the complexity involved in reproducing the information carried within the DNA. It is the complexity of this process, and the manner in which it is copied from generation to generation, which practically drove Mark Ridley to distraction in *The Cooperative Gene*.

‘No one in human culture would try the trick of first making two copies of a message, then breaking each into short bits at random, combining equal amounts from the two to form the version to be transmitted, and throwing the unused half away. *You only have to think of sex to see how absurd it is*. The ‘sexual’ method of reading a book would be to buy two copies, rip the pages out, and make a new copy by combining half the pages from one and half from the other, tossing a coin at each page to decide which original to take the page from and which to throw away’ [emphasis added].²⁸

Again, from an evolutionary viewpoint, sex would be considered ‘absurd.’ But from a design viewpoint, it is nothing short of incredible!

Yet there is an even more important question than *why* sex exists. *How* did sex come to exist? Evolution is dependent on change (the English word ‘evolution’ derives from

the Latin *evolvere*, meaning ‘to unroll, to change’). Quite obviously, if everything remained the same, there would be no evolution. Evolutionists believe that the driving forces behind evolution are natural selection and genetic mutations occurring over lengthy spans of geologic time.²⁹ Mutations are primarily the result of *mistakes* that occur during DNA replication. There are three different types of mutations: beneficial, deleterious, and neutral.³⁰ Neutral mutations (which admittedly do occur) are, as their name implies, ‘neutral’. They do not ‘propel’ evolution forward in any significant fashion. Deleterious mutations ‘will be selected against and will be eliminated in due time’.³⁰ That, then, leaves beneficial mutations, which, according to evolutionists, are incorporated into the species by natural selection, eventually resulting in new and different organisms.

But what does all of this have to do with the origin of sex? Evolutionists adhere to the view that the first organisms on Earth were asexual, and thus they believe that, during billions of years of Earth history, asexual organisms experienced numerous beneficial mutations that caused them to evolve into sexual organisms. But the change of a single-celled, asexual prokaryote (like a bacterium) into a multi-celled, sexual eukaryote would not be a ‘magical’ process carried out by just a few, well-chosen beneficial mutations (as if nature had the power to ‘choose’ anything!).

In fact, quite the opposite would be true. Why so? Ernst Mayr, who undeniably ranks as the most eminent evolutionary taxonomist in the world, remarked in his book, *What Evolution Is*: ‘Any mutation that induces changes in the phenotype [the outward, physical make-up of an organism—BT/BH] will either be favored or discriminated against by natural selection ... [T]he occurrence of new beneficial mutations is rather rare’ [emphasis added].³⁰ Beneficial mutations (viz., those that help the organism) are indeed ‘rather rare’. Furthermore, as evolutionists have been known to admit quite candidly, mutations that affect the phenotype almost always are *harmful*.^{22,31} The famous Stanford University geneticist, Luigi Cavalli-Sforza (who is the head of the International Human Genome Project), addressed this fact when he wrote:

‘Evolution also results from the accumulation of new information. In the case of a biological mutation, new information is provided by an error of genetic transmission (i.e., a change in the DNA during its transmission from parent to child). *Genetic mutations are spontaneous, chance changes, which are rarely beneficial, and more often have no effect, or a deleterious one*’ [emphasis added; parenthetical item in original].³²

In addressing the complete ineffectiveness of mutations as an alleged evolutionary mechanism, Dr Grassé observed:

‘No matter how numerous they may be, mutations do not produce any kind of evolution The opportune appearance of mutations permitting animals and plants to meet their needs seems hard to believe. Yet the Darwinian theory is even more demanding: a single plant, a single animal would require thousands and thousands of lucky, appropriate events. Thus, miracles would become the rule: events with an infinitesimal probability could not fail to occur There is no law against daydreaming, but science must not indulge in it’ [emphasis added].³³

Grassé is not the only prominent evolutionist to take such a view in regard to mutations as an ineffectual driving force for evolution. In a speech presented at Hobart College several years ago, the late Harvard paleontologist Stephen Jay Gould spoke out in a somewhat militant fashion about the subject when he said:

‘A mutation doesn’t produce major new raw material. You don’t make a new species by mutating the species That’s a common idea people have; that evolution is due to random mutations. A mutation is not the cause of evolutionary change.’³⁴

All of this raises the question: If mutations are *not* the cause of evolutionary change, then what is?

There is more to the problem of the origin of sex, however, than ‘just’ the fact of rare, beneficial mutations

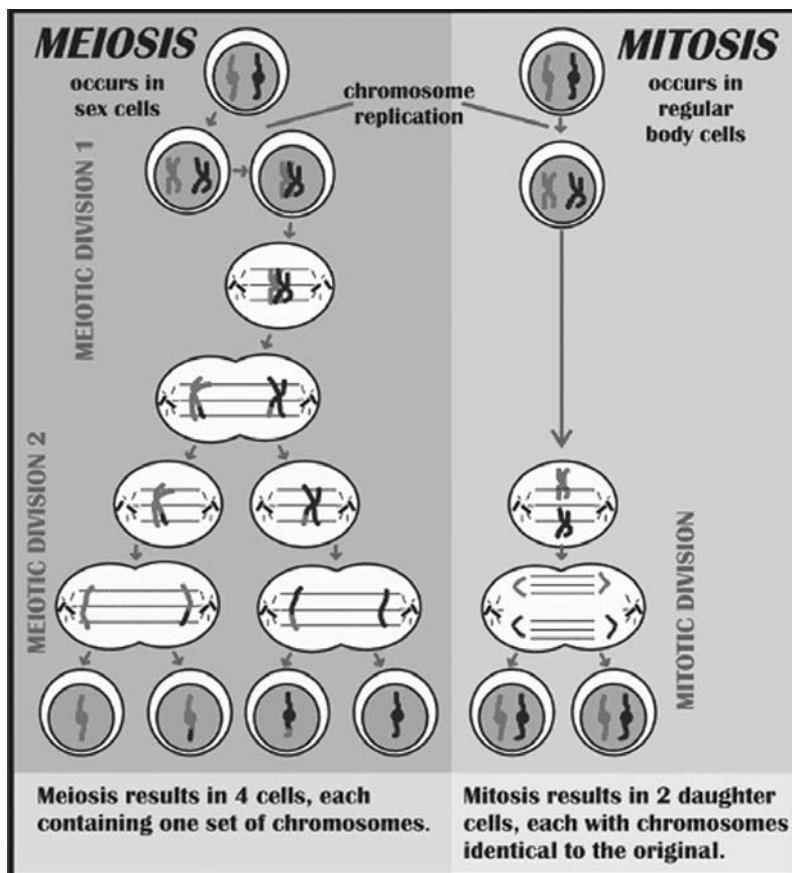


Figure 3. Graphic depiction of meiosis and mitosis.

and their much-more-frequent cousins, the harmful, deleterious mutations. There is the added problem related to the two different types of cell division we mentioned earlier—mitosis and meiosis. During mitosis, *all* of the chromosomes are copied and passed on from the parent cell to the daughter cells. Meiosis (from the Greek meaning to split), on the other hand, occurs only in sex cells (i.e. eggs and sperm); during this type of replication, *only half* of the chromosomal material is copied and passed on. (Mayr has an excellent, up-to-date description of the complicated, two-part process by which meiosis occurs.³⁵) Once meiosis has taken place,

[t]he result is the production of completely new combinations of the parental genes, all of them uniquely different genotypes [the genetic identity of an individual that does not show as outward characteristics—BT/BH]. These, in turn, produce unique phenotypes, *providing unlimited new material* for the process of natural selection' [emphasis added].³⁶

It is those very facts—that meiosis allegedly has 'evolved' the ability to halve the chromosome number (but only for gametes), *and* that it actually can provide 'unlimited new material'—which make the meiotic process so incredible. And the critical nature of meiosis to life as we know it has been acknowledged (albeit perhaps begrudgingly) even by evolutionists. Margulis and Sagan, for example, wrote:

'We think that meiosis became tied to two-parent sex and that meiosis as a cell process, rather than two-parent sex, was a prerequisite for evolution of many aspects of animals [M]eiosis seems intimately connected with complex cell and tissue differentiation. After all, animals and plants return every generation to a single nucleated cell' [emphasis added].³⁷

These two evolutionists have admitted that meiosis is critical for sexual reproduction. Yet in their volume, *Slanted Truths*, they stated unequivocally that meiotic sex evolved '520 million years ago'.³⁸ How, pray tell, could the bacteria that are supposed to be responsible for the evolution of sex have 'stabilized a billion years ago' (as Grassé observed that they did), and then 500 million years *after* that stabilization, mutate enough to 'evolve' the painstaking process of meiosis? *At some point authors must be questioned as to the rationale in their thinking?* Read carefully the following scenario, as set forth in Jennifer Ackerman's 2001 book, *Chance in the House of Fate*, and as you do, concentrate on the items we have placed in bold print that are intended to draw the reader's attention to the 'just-so' nature of the account being proffered.

'The first sex cells *may* have been interchangeable and of roughly the same size. *By chance*, some *may have been* slightly bigger than others and stuffed with nutrients, an advantage in getting progeny off to a good start. *Perhaps* some were smaller, faster, good at finding mates. As organisms continued to meld and join their genetic material, the pairs of a larger cell with a smaller one proved an efficient system. *Over*

time, the little rift between the sexes widened, as did the strategies of male and female for propagating their own genes' [emphasis added].³⁹

The first sex cells *may* have been *By chance*, some *may have been* *Perhaps* some were *Over time*, the It is little wonder that, in their more candid moments, evolutionists admit, as Ackerman eventually did, that 'when it comes to sex, we inhabit a mystery'.⁴⁰

Notice, however, the admission by Margulis and Sagan that 'meiosis seems connected with complex cell and tissue differentiation'. Indeed it does—*now!* But how did a process as incredibly complex as meiosis ever get started in the first place? What (or, better yet, *Who*) 'intricately connected it with complex cell and tissue differentiation'? With all due respect, there is not an evolutionist on the planet who has been able to come up with an adequate (much less believable) explanation as to how somatic cells reproduce by mitosis (thereby maintaining the species' standard chromosome number in each cell), while gametes are produced by meiosis—wherein that chromosome number is halved so that, at the union of the male and female gametes during reproduction, the standard number is reinstated.

Conclusion

Lewis Thomas, the highly regarded medical doctor who served for many years as the president and chancellor of the prestigious Sloan-Kettering Cancer Center in Manhattan, was unable to contain either his enthusiasm or his praise for the system we know as 'sexual reproduction'. In his book, *The Medusa and the Snail*, he wrote about the 'miracle' of how one sperm cell forms with one egg cell to produce the cell we know as a zygote, which, nine months later, will become a newborn human being. He concluded:

'The mere existence of that cell should be one of the greatest astonishments of the earth. People ought to be walking around all day, all through their waking hours, calling to each other in endless wonderment, talking of nothing except that cell If anyone does succeed in explaining it, within my lifetime, I will charter a skywriting airplane, maybe a whole fleet of them, and send them aloft to write one great exclamation point after another around the whole sky, until all my money runs out.'⁴¹

Dr Thomas' money is perfectly safe. No one has been able to explain—from an evolutionary viewpoint—the origin of sex, the origin of the incredibly complex meiotic process that makes sex possible, or the intricate development of the embryo (which is itself a marvel of design). At conception, the chromosomes inherited from the sperm are paired with the chromosomes inherited from the egg to give the new organism its full chromosomal complement. Evolutionary theorists ask us to believe that random, chance occurrences brought about this marvelously interdependent process of, first, splitting the genetic information into equal halves, and, second, recombining it through sexual reproduction. Not only is an intricate process required to produce a sperm or

egg cell in the first place via meiosis, but another equally intricate mechanism also is required to rejoin the genetic information during fertilization in order to produce the zygote, which will become the embryo, which will become the fetus, which eventually will become the newborn. The idea that all of this ‘just evolved’ is unworthy of consideration or acceptance, especially in light of the evidence now at hand.

The highly complex and intricate manner in which the human body reproduces offspring is not a matter of mere chance or a ‘lucky role of the dice’. Rather, it is the product of an intelligent Creator. Albert Einstein said it well when he stated: ‘God does not play dice with the universe’.⁴²

References

- Bell, G., *The Masterpiece of Nature: The Evolution and Genetics of Sexuality*, University of California Press, Berkeley, p. 19, 1982.
- Bell, ref. 1, p. 54.
- See, for example, Maynard-Smith, 1986, p. 35.
- Ridley, M., *The Cooperative Gene*, The Free Press, New York, pp. 108, 111, 2001.
- Schechter, J., How Did Sex Come About? *Bioscience* **34**:680, 1984.
- Crow, J.F., *The Importance of Recombination, The Evolution of Sex: An Examination of Current Ideas*, Michod and Levin, Sinauer Associates, Sunderland, p. 35, 1988.
- Eldredge N. and Cracraft, J., *Phylogenetic Patterns and the Evolutionary Process: Method and Theory in Comparative Biology*, Columbia University Press, New York, p. 102, 1980.
- Ridley, ref. 4, p. 254.
- Maddox, J., *What Remains to be Discovered*, The Free Press, New York, p. 252, 1998.
- Crow, ref. 6, p. 60.
- Dobzhansky, T., Ayala, F.J., Stebbins, G.L. and Valentine, J.W., *Evolution*, W.H. Freeman, San Francisco, p. 391, 1977.
- Williams, G.C., *Sex and Evolution: in the Monographs in Population Biology* series, Princeton University Press, Princeton, 1975.
- Zimmer, C., *Parasite Rex*, The Free Press, New York, p. 163, 2000.
- Ridley, M., *The Red Queen*, Viking, London, p. 254, 1993.
- Reichenbach, B. and Anderson, V.E., *On Behalf of God*, Eerdmans, Grand Rapids, p. 18.
- Zimmer, ref. 13, p. 163.
- Cartwright, J., *Evolution and Human Behavior*, Macmillan, London, p. 96, 2000.
- Grassé, P.-P., *Evolution of Living Organisms*, Academic Press, New York, p. 87, 1977.
- Van Valen, L., A new evolutionary law, *Evolutionary Theory* **1**:1–30, 1973.
- Cartwright, ref. 17, p. 97.
- Bernstein, H., Hopf, F.A. and Michod, R.E., *The Evolution of Sex: DNA Repair Hypothesis, The Sociobiology of Sexual and Reproductive Strategies*, Rasa, C. and Voland, E. (Eds), Chapman and Hall, London, p. 4, 1989.
- Cartwright, ref. 17, p. 98.
- Ridley, M., *The Red Queen*, Viking, London, 1993.
- Cartwright, ref. 17, p. 99.
- Maddox, ref. 9, p. 253.
- Ridley, ref. 4, p. 109.
- Zimmer, C., *Evolution: The Triumph of an Idea*, HarperCollins, New York, pp. 230, 231, 2001.
- Ridley, ref. 4, pp. 108–109.
- See, Ward, P., *Future Evolution*, Henry Holt, New York, p. 153, 2001.
- See, Mayr, E., *What Evolution Is*, Basic Books, New York, p. 98, 2001.
- Crow, J.F., The high spontaneous mutation rate: is it a health risk? *Proc. Nat. Acad. Sci. U.S.A.* **94**:8380–8386, 1997.
- Cavalli-Sforza, L.L., *Genes, Peoples, and Languages*, North Point Press, New York, p. 176, 2000.
- Grassé, ref. 18, pp. 88, 103, 107.
- Gould, S.J., Is a New and General Theory of Evolution Emerging? speech presented at Hobart College, 14 February 1980; as quoted in: Sunderland, L.D., *Darwin's Enigma*, Master Books, San Diego, 1984.
- Mayr, ref. 30, p. 103.
- Mayr, ref. 30, p. 104.
- Margulis, L. and Sagan, D., *Slanted Truths: Essays on Gaia, Symbiosis, and Evolution*, Springer-Verlag, New York, p. 291, 1997.
- Margulis and Sagan, ref. 37, p. 293.
- Ackerman, J., *Chance in the House of Fate*, Houghton Mifflin, Boston, pp. 48–49, 2001.
- Ackerman, ref. 39, p. 115.
- Thomas, L., *The Medusa and the Snail*, Viking, New York, pp. 155–157, 1979.
- Hoffman, B., *Albert Einstein*, New American Library, p. 73.

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