Intelligent Design and Evolution Awareness Center

FAQ:
Wouldn't intelligent design theory be the end of scientific investigation -- a "science stopper"?

The Short Answer: If we seek truth, design is progress for science. Inferring design in no way stops science from achieving its goal to understand nature. Like any new paradigm, design opens up new doors to research. Many evolutionary biologists might not yet see these doors because they have been trained to think under the paradigm of evolution. That does not mean design could not bear fruit for science, once science is willing to "retool" to accept design. Much work could be done trying to learn to discriminate between design and evolution in fields such as biochemistry, paleontology, the origin of life, systematics, and genetics. William Dembski has identified a number of scientific and philosophical fields where design can contribute. Design is not intended to "subsume" all science and will not force science to conclude that everything is designed if we apply the mechanisms of detecting carefully and properly.

The Long Answer:

Some have claimed that intelligent design would mean the end of science because we would just "give up" and say "the designer did it." Like a "deus ex machina" type explanation, it is feared the designer comes in to save us from things we don't understand, when we should keep investigating them to figure out their natural cause. Of course history has taught us to not make this mistake--to not relegate things to intelligent causes (such as lightning bolts) when they really have natural causes (natural electric charges in the clouds).

One thing that should be noted about irreducible complexity is that it is an evolution stopper. Natural causes have completely broken down. What should we do? Is that enough to infer design. We infer design because we have positive predictions that a designer can create the type of complexity found in the cell. As Stephen Meyer says:

> "Experience teaches that information-rich systems … invariable result from intelligent causes, not naturalistic ones. Yet origin-of-life biology has artificially limited its explanatory search to the naturalistic nodes of causation … chance and necessity. Finding the best explanation, however, requires invoking causes that have the power to produce the effect in question. When it comes to information, we know of only one such cause. For this reason, the biology of the information age now requires a new science of design.
> (Stephen C. Meyer, *Mere Creation*, pg. 140).
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> "Indeed, in all cases where we know the causal origin of 'high information content,' experience has shown that intelligent design played a causal role."
> (Stephen C. Meyer, DNA and Other Designs at http://www.arn.org/docs/meyer/sm_dnaotherdesigns.htm)
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> "Intelligent design provides a sufficient causal explanation for the origin of large amounts of information, since we have considerable experience of intelligent agents generating informational configurations of matter."
> (Meyer S. C. et. al., "The Cambrian Explosion: Biology's Big Bang," in *Darwinism, Design, and Public Education*, edited by J. A. Campbell and S. C. Meyer (Michigan State University Press, 2003)

According to the National Academy of Science (see *Teaching about Evolution and the Nature of Science*), a primary goal of science is to "understand nature," where "understanding" means "relating

one natural phenomena to another and recognizing the causes and effects of phenomena." According to the NAS, "[p]rogress in science consists of the development of better explanations for the causes of natural phenomena." A natural phenomena is something which exists in the natural world. Thus if intelligent design was a cause involved in the origin and diversification of life, then it would be scientific progress -- not a "stoppage of science" and aid in our understanding of nature to recognize that fact.

In science, what we are ultimately looking for is a way of understanding the world which bears the closest resemblance to reality--whether it produces practical results or not. In many ways, evolutionary theory is useless when it comes to practical applications, but people accept it because they think it is empirically valid. The same might go for intelligent design. Even if in some cases it has less practical use or produces fewer avenues of research, that point is moot if it better reflects the truth of what actually happened. One should never take a pragmatic approach to scientific truth, nor is there an inherent correlation between materialist explanation and practical application; non-material explanations can have much practical value as well.

Philosophers often use the "correspondence theory of truth" truth to describe the aim of science. According to the "correspondence theory of truth," something is true if it corresponds to an actual fact. Science is supposed to discover things which correspond to facts. If it is true that intelligent design is a cause in the origin and diversification of life on earth, then to not consider intelligent design would be to cause science to not correspond to a fact about the origin and diversification of life on earth. To fail to consider intelligent design as a cause in the origin and diversification of life on earth would be to "stop" science from fulfilling its goal to develop better and truthful explanations for the causes of natural phenomena.

Like any good research program, intelligent design theory does provide answers which raise many new questions and open up new avenues of investigation. How, or why the Design was inserted the way it was encompasses a set of questions which have potentially high practical and theoretical value. For example, take the field of psychology. If one assumes that the human mind is nothing more than the product, or by-product of selection pressures upon our ancestors who survived in the African Savanna, then this "evolutionary psychology" could lead people trying to understand how the human mind works and can be helped down the wrong path. If one takes an ID approach, and looks for causes of the mind based upon an assumption that the mind was designed for some purpose--an research-stimulating avenue of investigation--then the intelligent design paradigm could lead one to many valid and practical conclusions about how to help both people and the world we live in as a whole.

One area that design could bear much fruit is the area of "junk-DNA." Evolutionary assumptions that "junk DNA" is functionless junk, the result of millions of years of duplicated, mutated, and discarded DNA sequences, has slowed research into the function of many types of "junk-DNA" Under evolution, many forms of junk-DNA have been seen as meaningless evolutionary genetic baggage DNA. That such DNA might serve a purpose (and the following research that validated the claim) were sparked in the researchers because of notions of design. In November 2003, Scientific American discussed that "junk-DNA" is not so junky (see "The Gems of "Junk" DNA") which state that types of DNA--"the introns within genes and the long stretches of intergenic DNA between genes ... 'were immediately assumed to be evolutionary junk" and "long ago written off as irrelevant because they yield no proteins." The article admits that the "[evolutionary] assumption [that the DNA was junk] was too hasty" and that "[t]he failure to recognize the importance of introns 'may well go down as one of the biggest mistakes in the history of molecular biology.'" This mistake was apparently caused by evolutionary assumptions--could evolutionary assumptions cause the "one of the biggest mistakes in the history of molecular biology?" Perhaps intelligent design could have changed the assumptions

and led the researchers to seek function earlier on. Perhaps discovery of the function of "junk-DNA" leads to advances in medical technology.
Intelligent design theory could also have contributed much to what today amounts to many popularly false notions about vestigial organs. For example, the appendix and the thymus were for long thought to be a completely functionless vestigial organ. Imagine the progress that would have been made if the thymus had not been assumed for some time to be a useless relic of our evolutionary history! There may be many such examples of evolutionary assumptions hindering scientific (and medical) progress, and the *lack* of intelligent design hindering science.

Design could also lead to advances in paleontology as we learn to recognize where a designer designed things in earth's history, and in systematics as we compare parts in different species to see where a designer re-used parts.

William Dembski, in *Design as a Research Program: 14 Questions to Ask About Design* (http://www.discovery.org/viewDB/index.php3?program=CRSC%20Responses&command=view&id=259), offers the following philosophical and/or scientific avenues of investigation that could follow from research into intelligent design theory:

- **1. Detectability Problem** --- How is design detected?
- **2. Functionality Problem** --- What is a designed object's function?
- **3. Transmission Problem** --- How does an object's design trace back historically? (search for narrative)
- **4. Construction Problem** --- How was a designed object constructed?
- **5. Reverse-Engineering Problem** --- How could a designed object have been constructed?
- **6. Perturbation Problem** --- How has the original design been modified and what factors have been modified?
- **7. Variability Problem** --- What degree of perturbation allows continued functioning?
- **8. Restoration Problem** --- Once perturbed, how can original design be recovered?
- **9. Constraints Problem** --- What are the constraints within which a designed object functions well and outside of which it breaks?
- **10. Optimality Problem** --- In what way is the design optimal?
- **11. Ethical Problem** --- Is the design morally right?
- **12. Aesthetic Problem** --- Is the design beautiful?
- **13. Intentionality Problem** --- What was the intention of the designer?
- **14. Identity Problem** --- Who is the designer?

Elsewhere, Dembski outlined a research program for design in detail in "Three Frequently Asked Questions about Intelligent Design"
(at "http://www.designinference.com/documents/2003.09.ID_FAQ.pdf"):

> What research topics does a design-theoretic research program explore?
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> • Methods of Design Detection. Methods of design detection are widely employed in various special sciences (e.g., archeology, cryptography, and the Search for Extraterrestrial Intelligence or SETI). Design theorists investigate the scope and validity of such methods.
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> • Biological Information. What is the nature of biological information? How do function and fitness relate to it? What are the obstacles that face material mechanisms in attempting to generate biological information? What are the theoretical and empirical grounds for thinking that intelligence is indispensable to the origin of biological information?

• Evolvability. Evolutionary biology's preferred research strategy consists in taking distinct biological systems and finding similarities that might be the result of a common evolutionary ancestor. Intelligent design, by contrast, focuses on a different strategy, namely, taking individual biological systems and perturbing them (both intelligently and randomly) to see how much the systems can evolve. Within this latter research strategy, limitations on evolvability by material mechanisms constitute indirect confirmation of design.

• Evolutionary Computation. Organisms employ evolutionary computation to solve many of the tasks of living (cf. the immune system in vertebrates). But does this show that organisms originate through some form of evolutionary computation (as through a Darwinian evolutionary process)? Are GPGAs (General Purpose Genetic Algorithms) like the immune system designed or the result of evolutionary computation? Need these be mutually exclusive? Evolutionary computation occurs in the behavioral repertoire of organisms but is also used to account for the origination of certain features of organisms. Design theorists explore the relationship between these two types of evolutionary computation as well as any design intrinsic to them. One aspect of this research is writing and running computer simulations that investigate the scope and limits of evolutionary computation. See the work of William Dembski and Robert Marks's Evolutionary Informatics Lab (www.evoinfo.org).

• Technological Evolution (TRIZ). The only well-documented example we have of the evolution of complex multipart integrated functional systems (as we see in biology) is the technological evolution of human inventions. In the second half of the twentieth century, Russian scientists and engineers studied hundreds of thousands of patents to determine how technologies evolve. They codified their findings in a theory to which they gave the acronym TRIZ, which in English translates to Theory of Inventive Problem Solving (see Semyon 3 Savransky, Engineering of Creativity: Introduction to TRIZ Methodology of Inventive Problem Solving, CRC Publishers, 2000). The picture of technological evolution that emerges out of TRIZ parallels remarkably the history of life as we see it in the fossil record and includes the following: (1) New technologies (cf. major groups like phyla and classes) emerge suddenly as solutions to inventive problems. Such solutions require major conceptual leaps (i.e., design). As soon as a useful new technology is developed, it is applied immediately and as widely as possible (cf. convergent evolution). (2) Existing technologies (cf. species and genera) can, by contrast, be modified by trial-anderror tinkering (cf. Darwinian evolution), which amounts to solving routine problems rather than inventive problems. (The distinction between routine and inventive problems is central to TRIZ. In biology, irreducible complexity suggests one way of making the analytic cut between these types of problems. Are there other ways?) (3) Technologies approach ideality (cf. local optimization by means of natural selection) and thereafter tend not change (cf. stasis). (4) New technologies, by supplanting old technologies, can upset the ideality and stasis of the old technologies, thus forcing them to evolve in new directions (requiring the solution of new inventive problems, as in an arms race) or by driving them to extinction. Mapping TRIZ onto biological evolution provides a especially promising avenue of design theoretic research.

• Strong Irreducible Complexity of Molecular Machines and Metabolic Pathways. For certain enzymes (which are themselves highly complicated molecular structures) and metabolic pathways (i.e., systems of enzymes where one enzyme passes off its product to the next, as in a production line), simplification leads not to different functions but to the complete absence of all function. Systems with this feature exhibit a strengthened

form of irreducible complexity. Strong irreducible complexity, as it may be called, entails that no Darwinian account can in principle be given for the emergence of such systems. Theodosius Dobzhansky, one of the founders of the neo-Darwinian synthesis, once remarked that to talk about prebiotic natural selection is a contradiction in terms—the idea being that selection could only select for things that are already functional. Research on strong irreducible complexity finds and analyzes biological systems that cannot in principle be grist for natural selection's mill. For this research, which is only now beginning, to be completely successful would imply the unraveling of molecular Darwinism.

• Natural and Artificial Biological Design (Bioterrorist Genetic Engineering). We are on the cusp of a bioengineering revolution whose fallout is likely to include bioterrorism. Thus we can expect to see bioterror forensics emerge as a practical scientific discipline. How will such forensic experts distinguish the terrorists' biological designs from naturally occurring biological designs?

• Design of the Environment and Ecological Fine-Tuning. The idea that ecosystems are fine-tuned to support a harmonious balance of plant and animal life is old. How does this balance come about. Is it the result of blind Darwinian forces competing with one another and leading to a stable equilibrium? Or is there design built into such ecosystems? Can such ecosystems be improved through conscious design or is "monkeying" with such systems invariably counterproductive? Design-theoretic research promises to become a significant factor in scientific debates over the environment.

• Steganographic Layering of Biological Information. Steganography belongs to the field of digital data embedding technologies (DDET), which also include information hiding, steganalysis, watermarking, embedded data extraction, and digital data forensics. 4 Steganography seeks efficient (high data rate) and robust (insensitive to common distortions) algorithms that can embed a high volume of hidden message bits within a cover message (typically imagery, video, or audio) without their presence being detected. Conversely, steganalysis seeks statistical tests that will detect the presence of steganography in a cover message. Key research question: To what degree do biological systems incorporate steganography, and if so, is biosteganography demonstrably designed?

• Cosmological Fine-Tuning and Anthropic Coincidences. Although this is a well worn area of study, there are some new developments here. Guillermo Gonzalez, assistant professor of physics and astronomy at Iowa State University, and Jay Richards, a senior fellow with Seattle's Discovery Institute, have a forthcoming book titled The Privileged Planet (along with a video based on the book) in which they make a case for planet earth as intelligently designed not only for life but also for scientific discovery. In other words, they argue that our world is designed to facilitate the scientific discovery of its own design. Aspects of Gonzalez's work in this area have been featured on the cover story of the October 2001 Scientific American.

• Astrobiology, SETI, and the Search for a General Biology. What might life on other planets look like? Is it realistic to think that there is life, and even conscious life, on other planets? What are the defining features that any material system must possess to be alive? How simple can a material system be and still be alive (John von Neumann posed this question over half a century ago in the context of cellular automata)? Insofar as such systemsdisplay intelligent behavior, must that intelligence be derived entirely from its material constitution or can it transcend yet nevertheless guide its behavior (cf. the

mechanism vs. vitalism debate)? Is there a testable way to decide this last question? How, if at all, does quantum mechanics challenge a purely mechanistic conception of life? Design theorists are starting to investigate these questions.

• Consciousness, Free Will, and Mind-Brain Studies. Is conscious will an illusion—we think that we have acted freely and deliberately toward some end, but in fact our brain acted on its own and then deceived us into thinking that we acted deliberately. This is the majority position in the cognitive neuroscience community, and a recent book makes just that claim in its title: The Illusion of Conscious Will by Harvard psychologist Daniel Wegner. But there is now growing evidence that consciousness is not reducible to material processes of the brain and that free will is in fact real. Jeffrey Schwartz at UCLA along with quantum physicist Henry Stapp at the Lawrence Berkeley National Laboratory are two of the key researchers presently providing experimental and theoretical support for the irreducibility of mind to brain (see Schwartz's book The Mind and the Brain: Neuroplasticity and the Power of Mental Force).

• Autonomy vs. Guidance. Many scientists worry that intelligent design attempts to usurp nature's autonomy. But that is not the case. Intelligent design is attempting to restore a proper balance between nature's autonomy and teleologic guidance. Prior to the rise of modern science all the emphasis was on teleologic guidance (typically in the form of divine design). Now the pendulum has swung to the opposite extreme, and all the emphasis is on nature's autonomy (an absolute autonomy that excludes design). Where is the point of balance that properly respects both, and in which design becomes empirically evident? The search for that balance-point underlies all design-theoretic research. It's not all design or all nature but a synergy of the two. Unpacking that synergy is the intelligent design research program in a nutshell.

Fears over intelligent design often come from the claim that intelligent design would mean "giving up" on evolution, or the end of scientific investigation. These objections may be less visible to the public eye, but are at least equally important in the mind of the scientist. Biologist Rudolph Raff objects to design theory saying, "as the influence of the intelligent designer grows … the relationships between the phenomena and explanations becomes increasingly arbitrary … [until] one reaches a point where all biological features are 'special creations' and other explanations become unnecessary." (Raff, Rudolf A., "The creationist abuse of evo-devo." Evol Dev, 3(6): 373-374 (2001)). In this case, Raff is not necessarily afraid that we are mixing science with religion, but that design is a sort of "science stopper." In fact, design theorist William Dembski sees Raff's arguments as typifying the reasons for the exclusion of design from science:

> "What has kept design outside the scientific mainstream these last 130 years is the absence of precise methods for distinguishing intelligently caused objects from unintelligently caused ones. For design to be a fruitful scientific theory, scientists have to be sure they can reliably determine whether something is designed. Johannes Kepler, for instance, thought the craters on the moon were intelligently designed by moon dwellers. We now know the craters were formed naturally. This fear of falsely attributing something to design only to have it overturned later has prevented design from entering science proper." (Dembski, W. A., "Introduction: Mere Creation", *Mere Creation Science Faith & Intelligent Design*, (InterVarsity Press, 1998) pg. 16)

Dembski understands Raff's sort of concerns. What would solve Raff's problem, however, would be a rigorous criteria which allows scientists to know when to detect and infer design, and when not to. If such a method could be found, then what is best explained naturally remains explained naturally, while what is best explained through design, becomes explained through design. As Dembski subsequently says, "[w]ith precise methods for discriminating intelligently from unintelligently caused

objects, scientists are now able to avoid Kepler's mistake." (Dembsk in *Mere Creation)* In calling what Kepler did a "mistake," Dembski shows that he doesn't want intelligent design theory to take over biology or science. Intelligent design theorists want design to be inferred where the evidence warrants--no more, and no less. The explanatory filter helps to ensure this--we exclusively infer design only if it appears to be what is produced by an intelligent agent, and we know that other causal mechanisms are incapable of producing the data. If the evidence points to evolution, and that has non-scientific religious implications away from theism, so be it. If the empirical evidence points to design so be it. The important thing is to follow the evidence wherever it leads! That's the glory of science!

Some claim that intelligent design is a "science stopper." But we should only infer design where the evidence warrants. Nothing more, nothing less.

Indeed, evolution may make predictions which lead us to "bark up certain trees." Evolution may lead us up trees--but if they are the wrong trees, then we don't want to be barking up them, even if there are a lot of them. If intelligent design is the right tree, then we want to bark up it regardless of what we may or may not find. You don't measure a theory by how many trees it leads you to, but by if those are the right trees period. After all, alchemy and astrology made many predictions. We should be thankful that we abandoned those ideas despite their "predictive power."

Intelligent design is a viable scientific paradigm that relates to the fundamental question of where we came from and what the mechanistic limitations there are for Darwinian theory. If Darwinism has unnecessarily placed constraints scientific research as a result, intelligent design could be freeing, not restrictive, for science.

Intelligent design is thus a cause sufficient to produce the high levels of information, i.e. irreducible complexity, found in biology. This is a reliable indicator of design, and we are justified in inferring design because it meets positive predictions of design. This doesn't "stop science" because even when we infer design, we can still investigate natural causes to see if those bear more fruit in the future. The short history of the ID movement has shown that when ID theorists have postulated design (for example, of the flagellum), many Darwinist scientists (such as Dr. Kenneth Miller, and others) have immediately stepped up research to demonstrate a naturalistic account of origins and weaken the design inference. Practically speaking, inferring a false positive of design would probably pose little risk to science.

Even so, today all scientists assume that all causes of natural--if some things are actually designed, then if we worry about "stopping science," how much design-oriented science has naturalism already stopped? Yet in reality design theorists are not stopped from doing work. Inferring one answer never stops others from seeking and presenting other answers to problems. The remedy to something being a "science stopper" is not to refrain from posing new controversial theories, but that all scientists uphold the scientific value of tentativeness, and remain open minded to new theories and data, and the falsification of old theories.