Design at the Microscopic Level

The Signature in the Cell

Rom. 1:20

His invisible attributes … understood by the things that are made

–His Eternal Power

–His Divine Nature (Godhead)

Argument from Design

Search for Extra Terrestrial Intelligence - SETI

SETI INSTITUTE

search

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SETI

- Allen Telescope Array
- Optical SETI
- Interstellar Message Construction
- Project Phoenix (past search)
- Background Science
- History of SETI
- Center for SETI Research Team

The Center for SETI Research

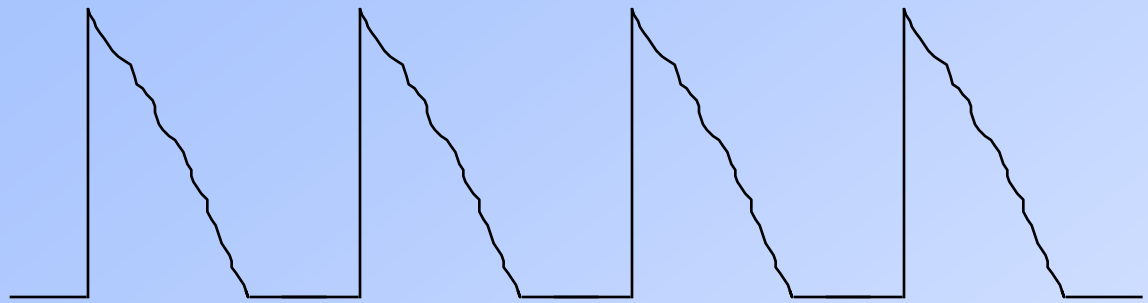
SETI, the Search for Extraterrestrial Intelligence, is an exploratory scienc hat seeks evidence of life in the universe by lo for some signature of its technology. Our e understanding of life's origin on Earth sugge given a suitable environment and sufficient ill develop on other planets. Whether e ve rise to intelligent, technolo is open to speculation. Howe on could be detected across inter d may actually offer our be overing extraterrestrial life

technological civilizations
ant effort. Currently the Center for SETI Research develops signal-

SETI, the Search for Extraterrestrial Intelligence, is an exploratory science that seeks evidence of life in the universe by looking for **some signature** of its technology…

SETI

Search for Extra - Terrestrial Intelligence



Signal Received from Space

What if we received a message from space with a language we could decode and read?

Signs of Intelligent Design Right Here on Earth

- **Every living cell is full of signs of intelligent design.**
- **Including a language which we have learned to decode and read!**

Anthony Flew

Professor of Philosophy

Former atheist, author and debater

2004

“It now seems to me that the findings of more than fifty years of DNA research have provided materials for a new and enormously powerful argument to design.”

Signs of Intelligent Design Right Here on Earth

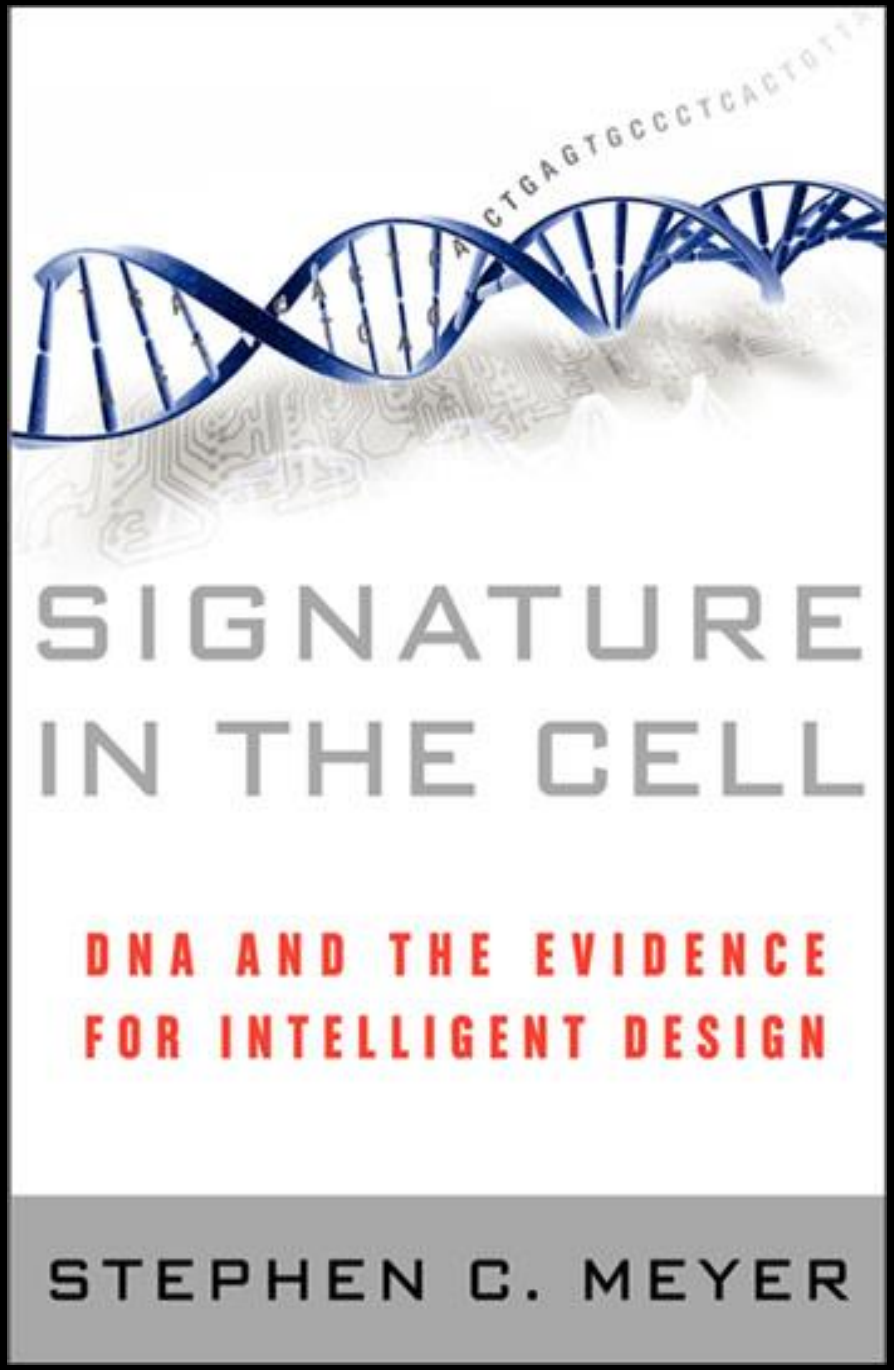
- Every living cell is full of signs of intelligent design.
- Including a language which we have learned to decode and read!
- Research on DNA continues to reveal signs of DESIGN.
- Anthony Flew “had to go where the evidence leads.”

Signature in the Cell

by

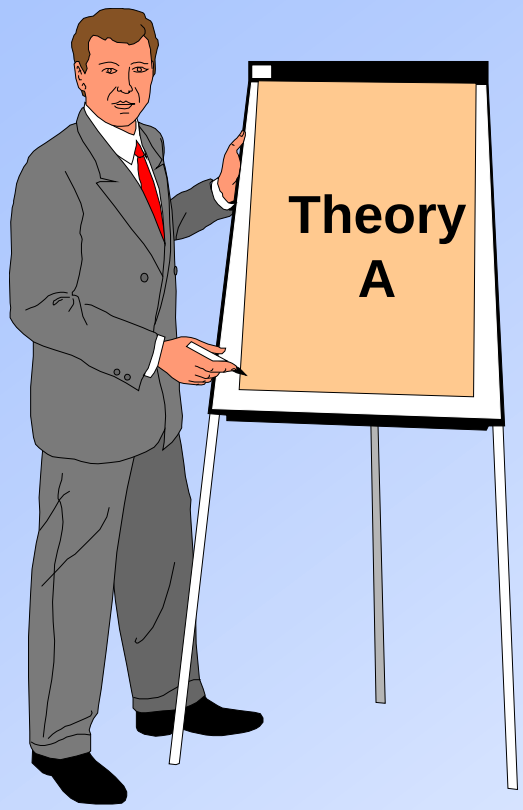
Dr. Stephen C. Meyer

2009

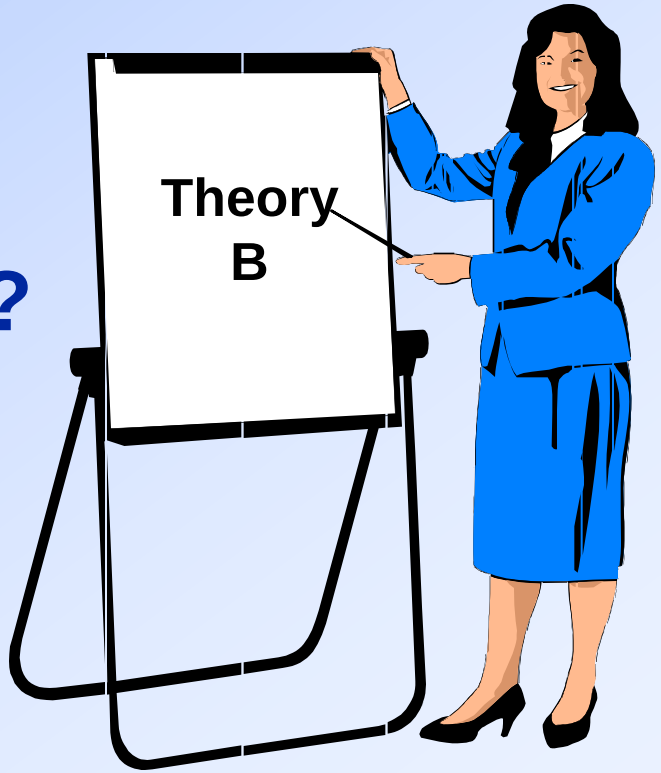


Judge

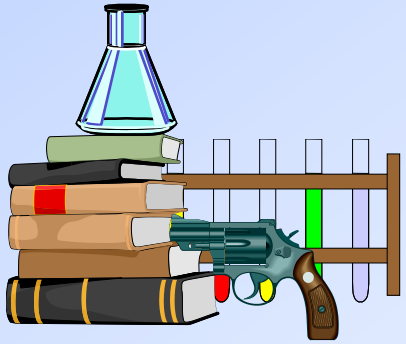
Natural Causes



Intelligent Design



Which is more reasonable?



EVIDENCE

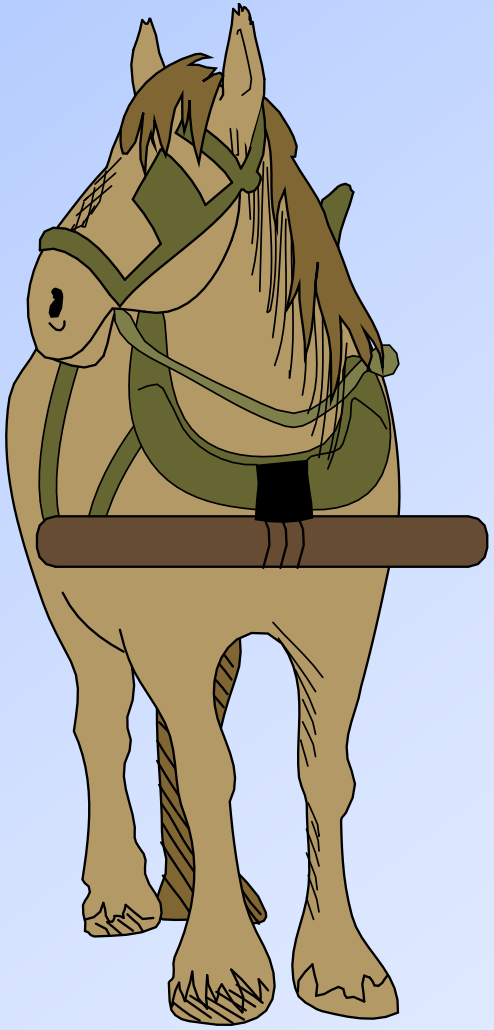
<u>Facts</u> of nature

Critical Components of Life

Components	*Assembled Organic Compounds*	*Function*
Structural Materials	**Proteins (assembled from amino acids)**	***Construction* (shape and mobility)**
Tools and Machinery	**Enzymes (special forms of proteins)**	***Metabolism* (growth and maintenance)**
Blueprints	**Genes - Nucleic Acid (DNA and RNA)**	***Reproduction* (information and directive function)**

Two Types of Proteins

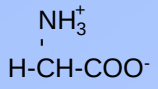
- **Structural**
- **Enzymes**



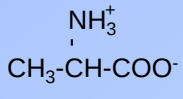
Workhorses

The Twenty Common Amino Acids Occurring in Proteins

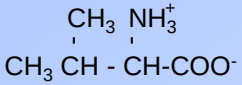
Glycine (Gly)



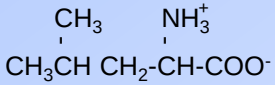
Alanine (Ala)



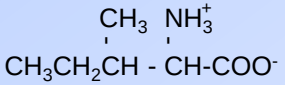
Valine (Val)



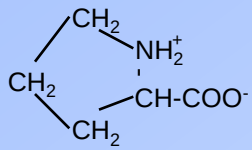
Leucine (Leu)



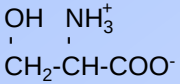
Isoleucine (Ileu)



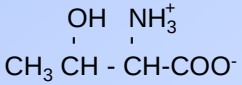
Proline (Pro)



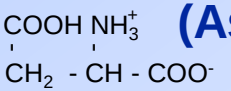
Serine (Ser)



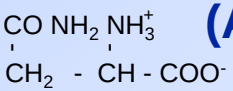
Threonine (Thr)



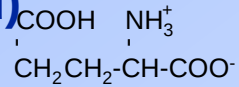
Aspartic acid (Asp)



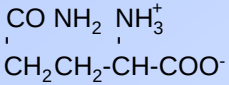
Asparagine (Asp N)



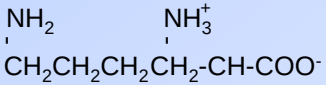
Glutamic acid (Glu)



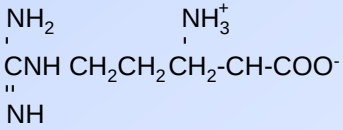
Glutamine (Glu N)



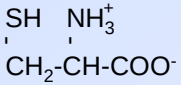
Lysine (Lys)



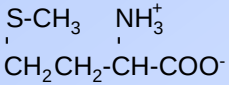
Arginine (Arg)



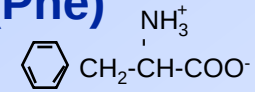
Cysteine (CySH)



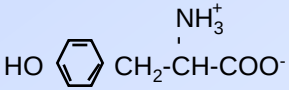
Methionine (Met)



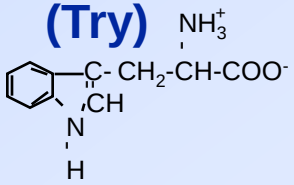
Phenylalanine (Phe)



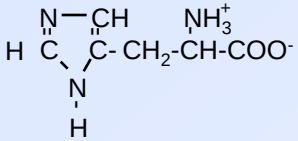
Tyrosine (Tyr)



Tryptophan (Try)

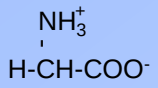


Histidine (His)

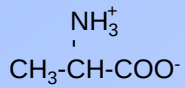


The Twenty Common Amino Acids Occurring in Proteins

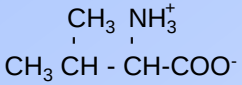
Glycine (Gly)



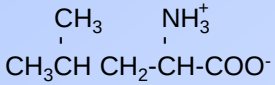
Alanine (Ala)



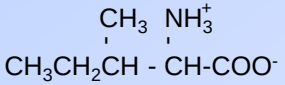
Valine (Val)



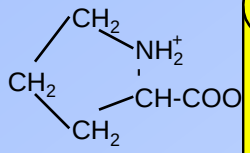
Leucine (Leu)



Isoleucine (Ileu)



Proline (Pro)

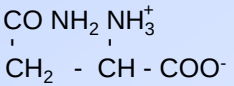


Serine (Ser)

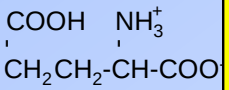
Threonine (Thr)

Aspartic acid (Asp

Asparagine (Asp N)

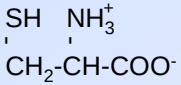


Glutamic acid (Gl

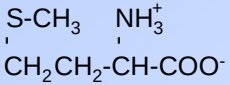


Every protein is a combination of these 20.

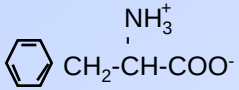
Cysteine (CySH)



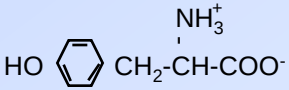
Methionine (Met)



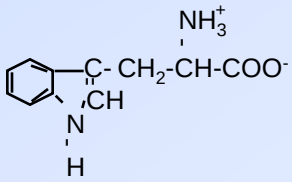
Phenylalanine (Phe)



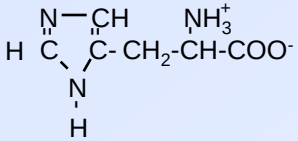
Tyrosine (Tyr)



Tryptophan (Try)

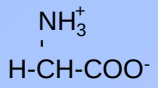


Histidine (His)

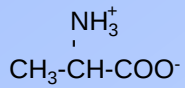


The Twenty Common Amino Acids Occurring in Proteins

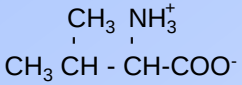
Glycine (Gly)



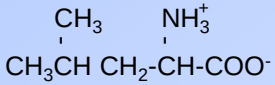
Alanine (Ala)



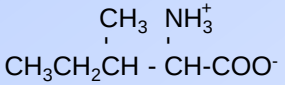
Valine (Val)



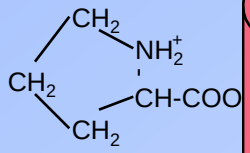
Leucine (Leu)



Isoleucine (Ileu)



Proline (Pro)

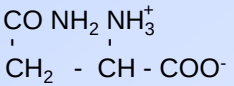


Serine (Ser)

Threonine (Thr)

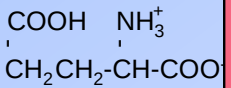
Aspartic acid (Asp)

Asparagine (Asp N)

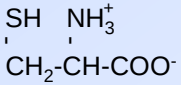


Like the 26 letters of the alphabet which make up our words

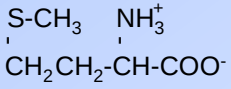
Glutamic acid (Gl



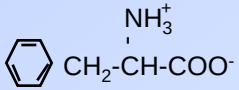
Cysteine (CySH)



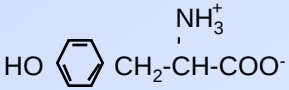
Methionine (Met)



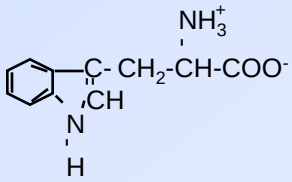
Phenylalanine (Phe)



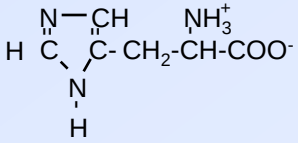
Tyrosine (Tyr)



Tryptophan (Try)



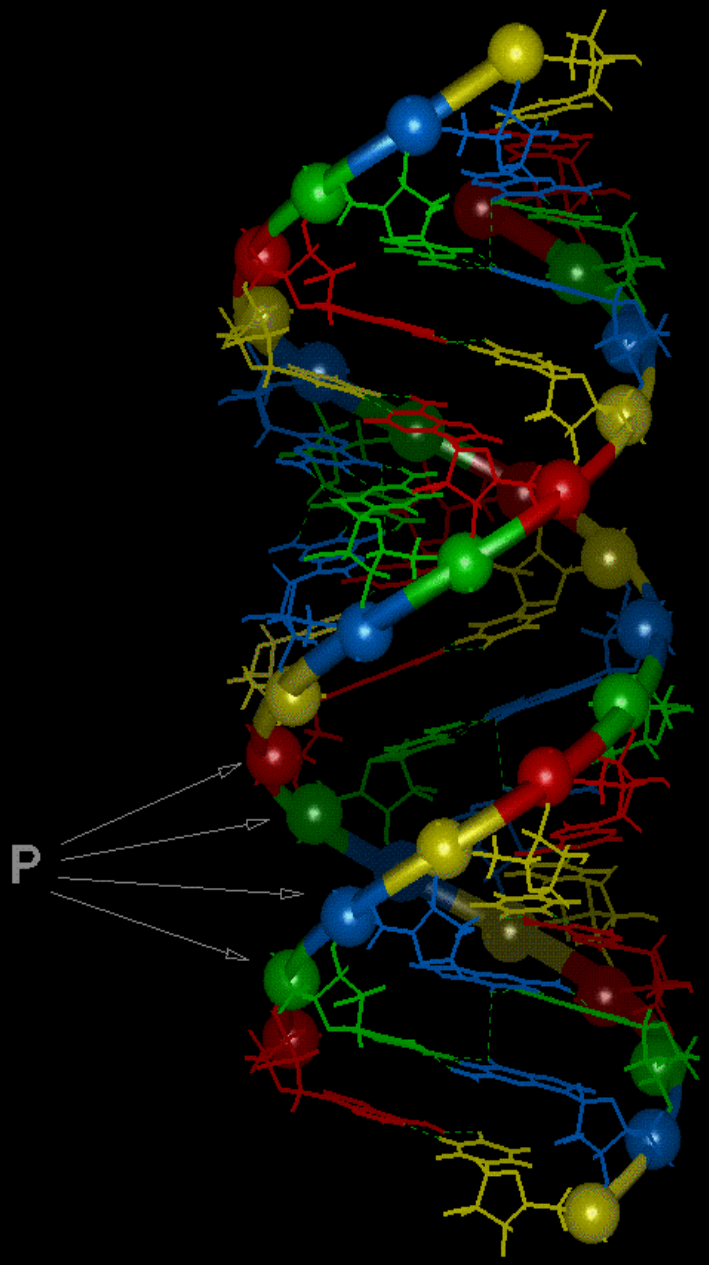
Histidine (His)



Dumb Blondes of the Biochemical World

Dr. Francis Crick in *Life Itself*

- **DNA**
- **RNA**



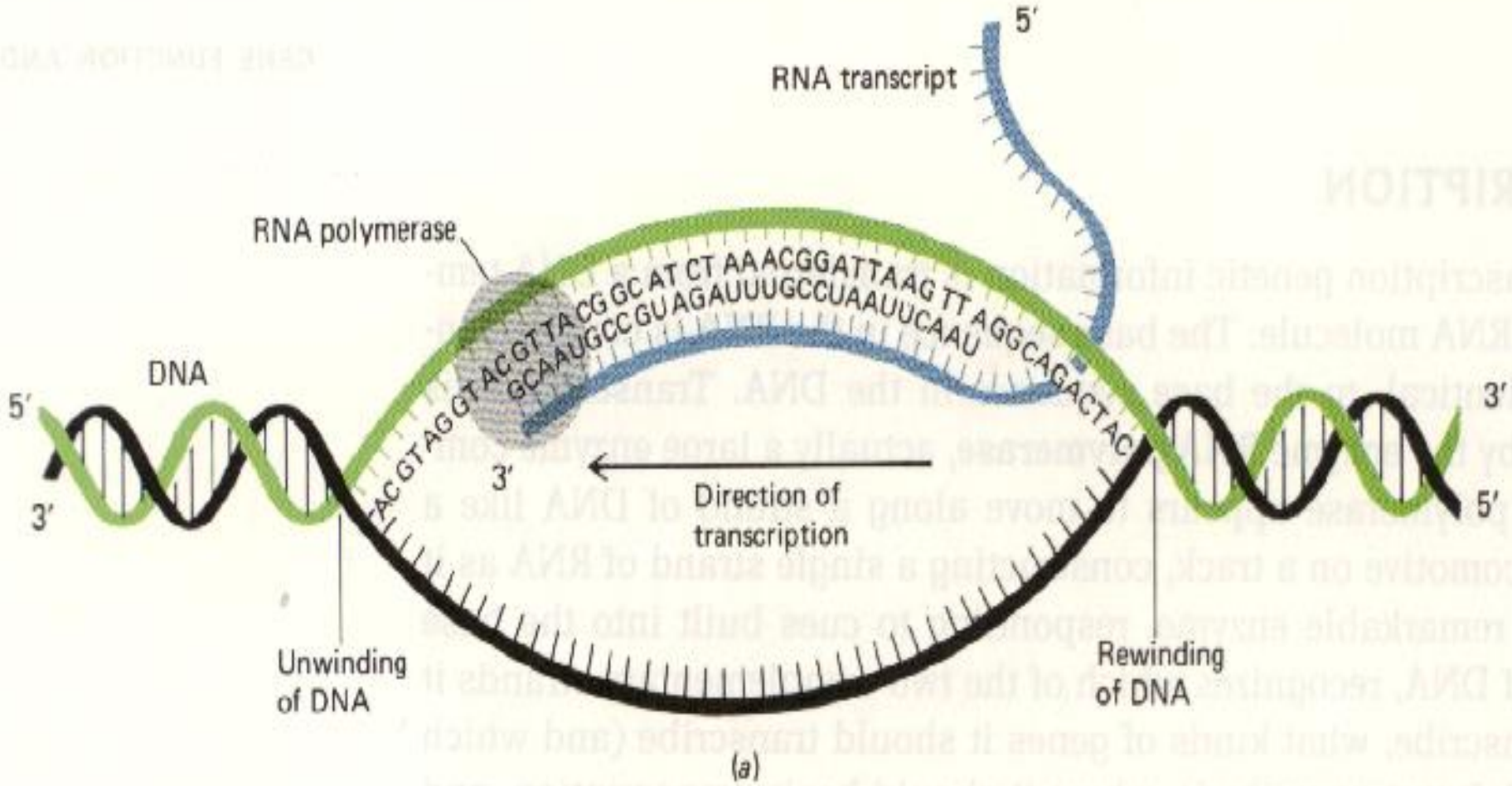
DNA

Certain characteristic structure

Double helix with cross bars

Capacity to reproduce itself

A DNA double helix is unwound by RNA polymerase, giving the enzyme access to the nucleotide sequence.



Genetic Code

First Base	Second Base				Third Base
	U	C	A	G	
U	phenylalanine	serine	tyrosine	cysteine	U
	phenylalanine	serine	tyrosine	cysteine	C
	leucine	serine	stop	stop	A
	leucine	serine	stop	tryptophan	G
C	leucine	proline	histidine	arginine	U
	leucine	proline	histidine	arginine	C
	leucine	proline	glutamine	arginine	A
	leucine	proline	glutamine	arginine	G
A	isoleucine	threonine	asparagine	serine	U
	isoleucine	threonine	asparagine	serine	C
	isoleucine	threonine	lysine	arginine	A
	(start) methionine	threonine	lysine	arginine	G
G	valine	alanine	aspartate	glycine	U
	valine	alanine	aspartate	glycine	C
	valine	alanine	glutamate	glycine	A
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C	leucine	proline	histidine	arginine	U
	leu			ginine	C
	leu			ginine	A
	leu			ginine	G
A	isole			erine	U
	isole			erine	C
	isoleucine	threonine	lysine	arginine	A
	(start) methionine	threonine	lysine	arginine	G
G	valine	alanine	aspartate	glycine	U
	valine	alanine	aspartate	glycine	C
	valine	alanine	glutamate	glycine	A
	valine	alanine	glutamate	glycine	G

All 20 Amino Acids are Coded Here

Genetic Code

AUG = Start Reading

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U	phenylalanine	serine	tyrosine	cysteine	U
	phenylalanine	serine	tyrosine	cysteine	C
	leucine	serine	stop	stop	A
	leucine	serine	stop	tryptophan	G
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	leucine	proline	glutamine	arginine	A
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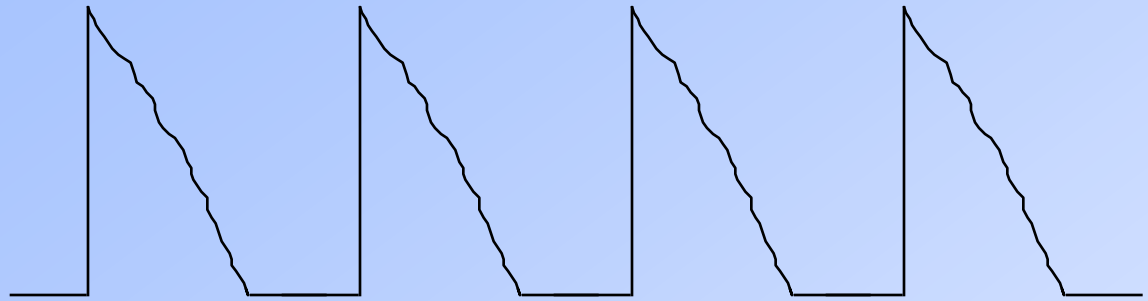
G	valine	alanine	aspartate	glycine	U
	valine	alanine	aspartate	glycine	C
	valine	alanine	glutamate	glycine	A
	valine	alanine	glutamate	glycine	G

UAG = Stop Reading

SETI

Search for Extra - Terrestrial Intelligence



Signal Received from Space

What if we received a message from space containing the genetic code?

SETI

Search for Extra - Terrestrial Intelligence

The Genetic Code

The SETI organization and other reasonable people would certainly conclude this came from an intelligent source!!

Genetic Code

First Base	Second Base				Third Base
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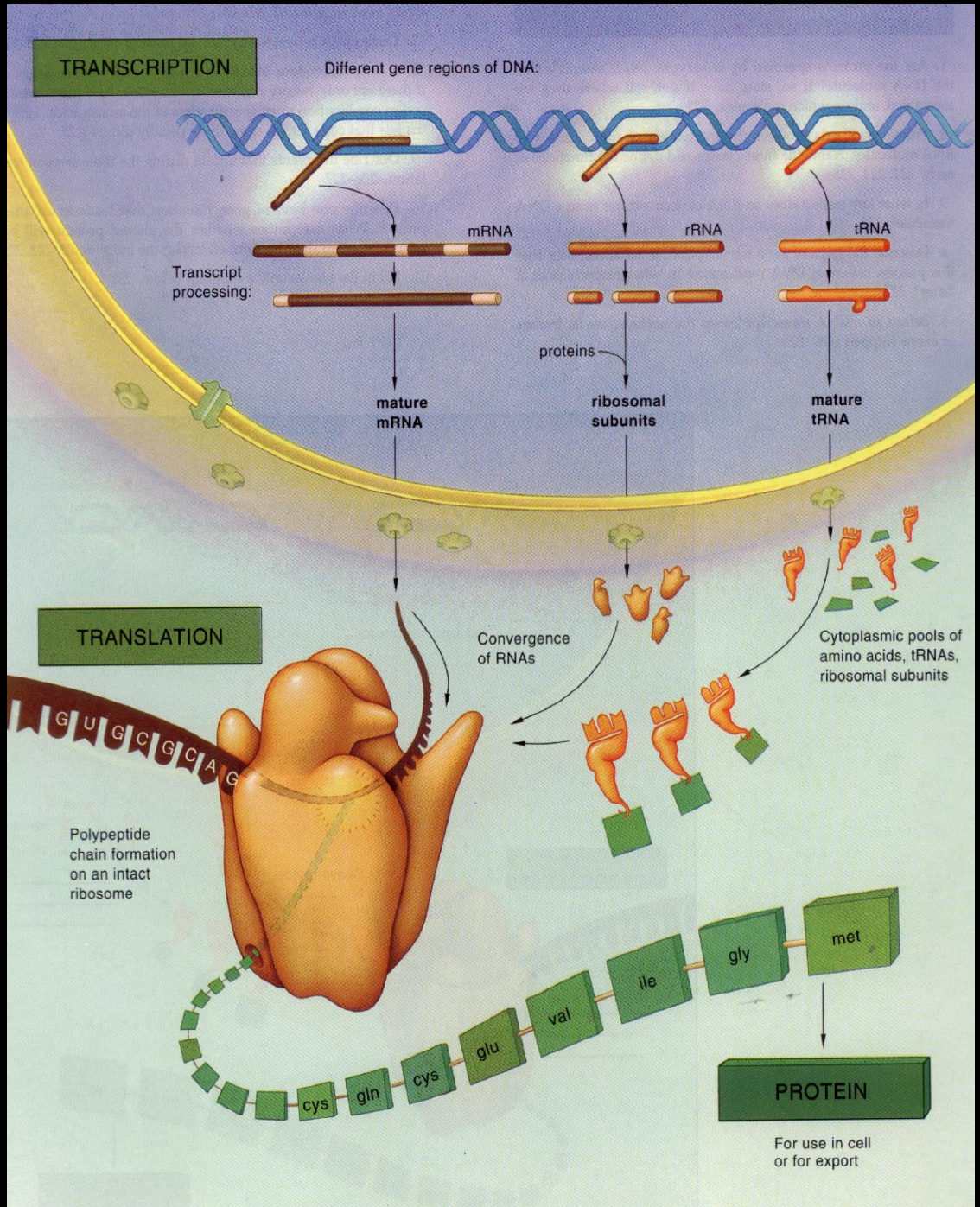
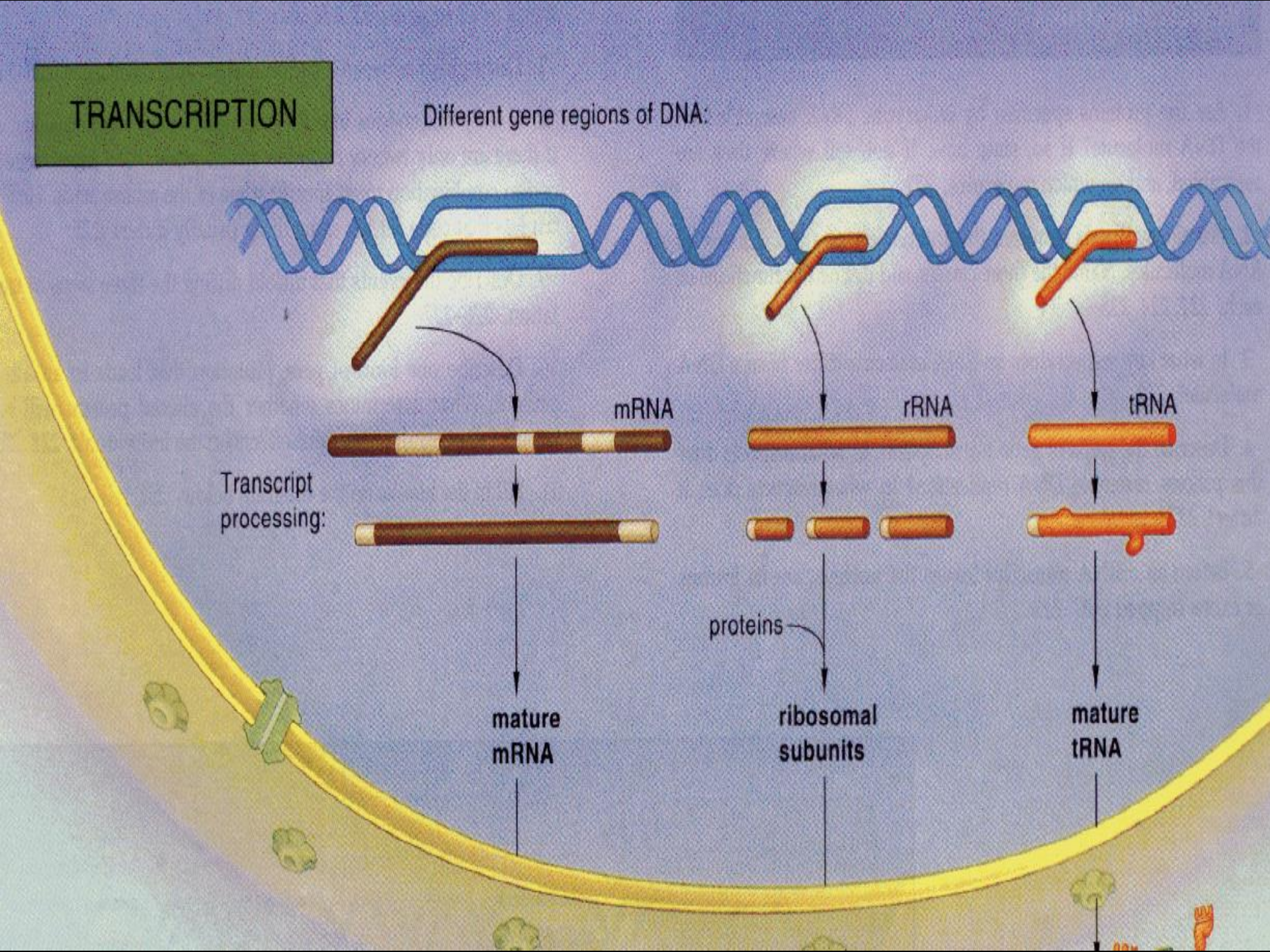
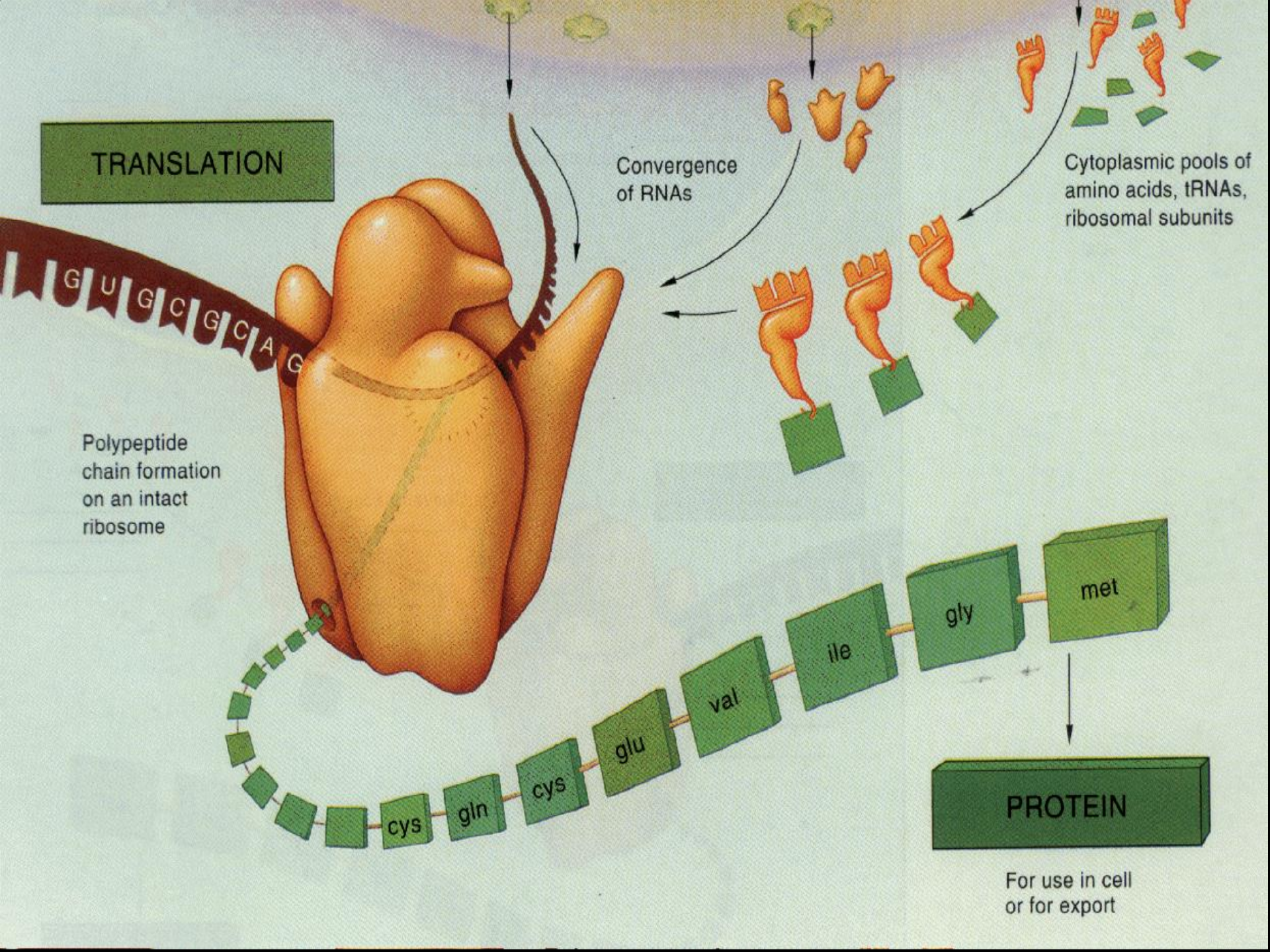
	(start) methionine	threonine	lysine	arginine	G
G	valine	alanine	aspartate	glycine	U
	valine	alanine	aspartate	glycine	C
	valine	alanine	gluamate	glycine	A
	valine	alanine	gluamate	glycine	G

However, there is MUCH MORE to the description of life as we know it than just the genetic code!!!

Transcription, Migration, & Translation for Protein Building




TRANSCRIPTION
Different gene regions of DNA:
mRNA
rRNA
tRNA
Transcript processing:
proteins
mature mRNA
ribosomal subunits
mature tRNA


TRANSLATION
Convergence of RNAs
Cytoplasmic pools of amino acids, tRNAs, ribosomal subunits
Polypeptide chain formation on an intact ribosome
met
gly
ile
val
glu
cys
gln
cys
PROTEIN
For use in cell or for export

Evolution of Genetic Code

"Did the code and the means of translating it appear simultaneously in evolution? It seems almost incredible that any such coincidences could have occurred, given the extraordinary complexities of both sides and the requirement that they be coordinated accurately for survival. By a pre-Darwinian (or a skeptic of evolution after Darwin), this puzzle surely would have been interpreted as the most powerful sort of evidence for special creation." Caryl P. Haskins, *American Scientist* 298, 305 (1971)

A Disturbing Riddle

"What makes the origin of life and of the genetic code a disturbing riddle is this: the genetic code is without any biological function unless it is translated; that is, unless it leads to the synthesis of the proteins whose structure is laid down by the code. But, as Monod points out, the machinery by which the cell...translated the code 'consists of at least fifty macromolecular components which are themselves coded in DNA.' Thus the code cannot be translated except by using certain products of its translation. This constitutes a really baffling circle: a vicious circle, it seems, for any attempt to form a model, or theory, of the genesis of the genetic code." Popper in *Studies in the Philosophy of Biology* 259, 270 (1974)

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The old chicken and egg problem

Summary of The Puzzle

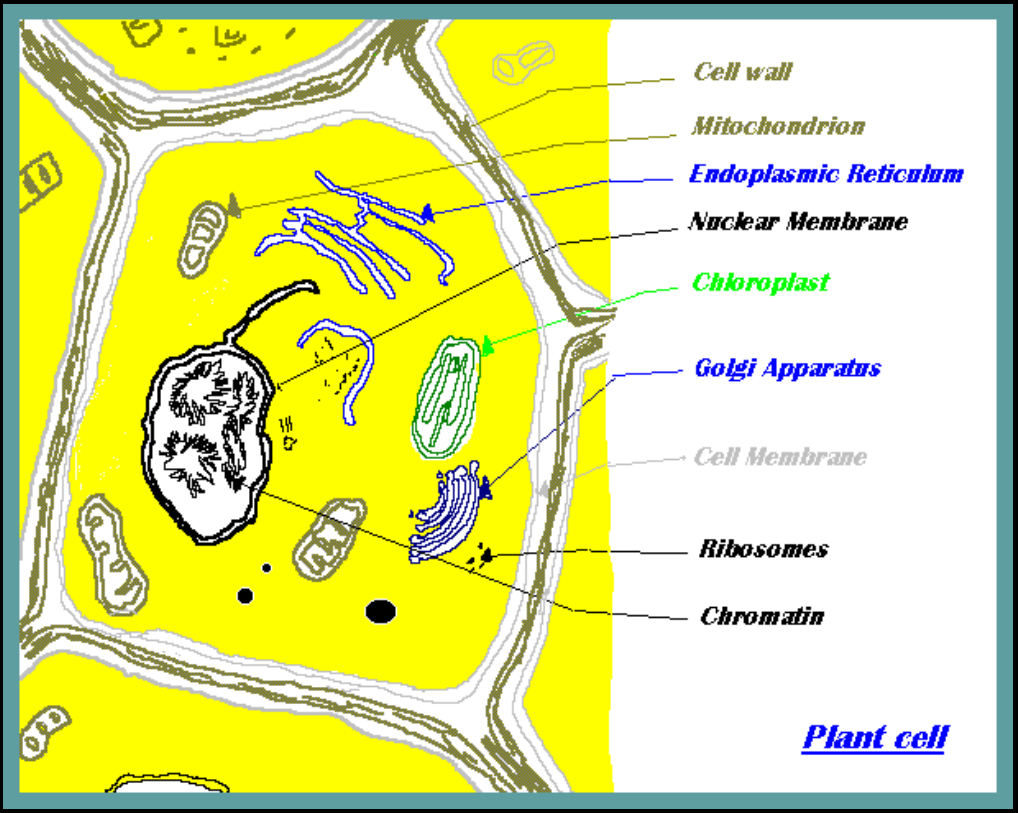
- DNA contains the code
- It takes many proteins to transcribe and translate the code to build proteins
- These proteins are themselves coded in the DNA
- To produce these proteins from the code requires the proteins themselves
- WHICH CAME FIRST?

The Marvelous Living Cell

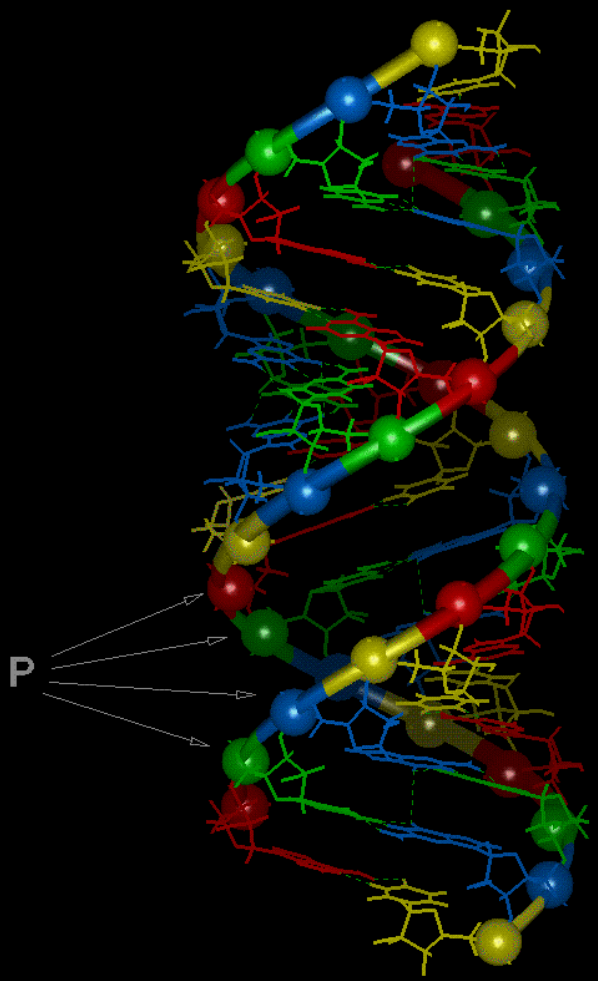
"A living cell is a marvel of detailed and complex architecture. Seen through a microscope there is an appearance of almost frenetic activity. On a deeper level it is known that molecules are being synthesized at an enormous rate. Almost any enzyme catalyzes the synthesis of more than 100 other molecules per second. In ten minutes, a sizable fraction of the total mass of a metabolizing bacterial cell has been synthesized. The information content of a simple cell has been estimated as around 10^{12} bits, comparable to about a hundred million pages of the Encyclopedia Britannica." Sagan, "Life," *Encyclopedia Britannica: Macropaedia* 894 (15 ed. 1974)

The Marvelous Living Cell

Over 200,000 molecules are being built per second



DNA



- But what about junk DNA?
- Only about 5% of DNA used for protein building
- Some say that DNA is 95% junk.

Recent Discoveries About the Supposed "Junk DNA"

Evidence that suggests that such DNA is probably functional

- **Most non-protein coding DNA is coded into various RNA's**
- **Many non-protein-coding DNA sequences are conserved (similar in different organisms)**

The Myth of Junk DNA by Dr. J. Wells

Recent Discoveries About the Supposed "Junk DNA"

Evidence for specific biological functions of non-protein-coding DNA

- **RNA's from this DNA play significant roles in controlling whether, where & to what extent protein-coding regions are transcribed**

The Myth of Junk DNA by Dr. J. Wells

Recent Discoveries About the Supposed "Junk DNA"

Evidence for specific biological functions of non-protein-coding DNA

- **Introns have functions**
  - **Rich in splicing-factor recognition sites**
  - **Encode a majority of the small RNA's**
  - **RNA's from introns influence gene expression by modifying chromatin**

The Myth of Junk DNA by Dr. J. Wells

Recent Discoveries About the Cell's Informational System

Densely concentrated, specified information in DNA

- **Multiple messages stored in the same sequence of bases**
- **"Spliceosomes" and "editosomes"**
- **Code within a code**
- **Dual and overlapping messages**

Signature in the Cell by Dr. S. Meyer

Recent Discoveries About the Supposed "Junk DNA"

Evidence for specific biological functions of non-protein-coding DNA

- **Pseudogenes**
  - **Some have produced functional proteins**
  - **Some produce RNA's that suppress the expression of their corresponding functional genes.**
  - **Some produce RNAs that increase the expression of their corresponding functional genes**

The Myth of Junk DNA by Dr. J. Wells

Recent Discoveries About the Supposed "Junk DNA"

Evidence for specific biological functions of non-protein-coding DNA

- Repetitive non-protein-coding DNA
  - LINEs – Long Interspersed Nuclear Elements
  - SINEs – Short Interspersed Nuclear Elements
  - ERVs – Endogenous Retroviruses

The Myth of Junk DNA by Dr. J. Wells

Recent Discoveries About the Cell's Informational System

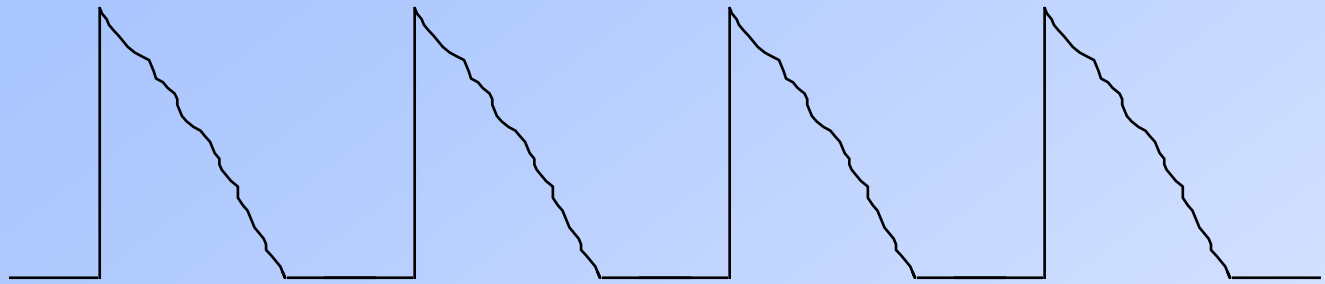
A files-within-folders system to make retrieving, manipulating, and expressing information-rich data more efficient

- **Similar to words, sentences, & paragraphs**
- **Genes, gene folders and superfolders, & "isochores" (megafolders)**

Signature in the Cell by Dr. S. Meyer

SETI

Search for Extra - Terrestrial Intelligence



Signal Received from Space

If we received a message from space containing just the genetic code and an explanation of how it is used to build proteins, everyone would conclude the source was intelligent!!

Intelligent Design or Natural Causes Which is more reasonable?

- "Everywhere we look, from the macroscopic to the microscopic things look like they are MADE"
- "A loud, clear, piercing cry of DESIGN!!"

Darwin's Black Box by Dr. M. Behe

Life Itself

"An honest man, armed with all the knowledge available to us now, could only state that in some sense, the origin of life appears at the moment to be almost a miracle, so many are the conditions which would have had to have been satisfied to get it going. But this should not be taken to imply that there are good reasons to believe that it could not have been started on the earth by a perfectly reasonable sequence of fairly ordinary chemical reactions…

If it was highly likely, there is no problem. But if it turns out that it was rather unlikely, then we are compelled to consider whether it might have arisen in other places in the universe where possibly, for one reason or another, conditions were more favorable." Francis Crick, *Life Itself: Its Origin and Nature*, Winner of the Nobel Prize for Physiology or Medicine, 1962, p. 92

If I can just synthesize life here…then I'll have proven that no intelligence was necessary to form it in the beginning!