DNA project.

Artilect

June 13, 2016

bases & acides aminés

- 4 bases codant l'ADN:

A T G C

bases & acides aminés

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  A T G C

- 3 bases (codon) $\rightarrow$ 1 acide aminé

bases & acides aminés

- 4 bases codant l'ADN:

  A T G C

- 3 bases (codon) $\rightarrow$ 1 acide aminé
- 20 acides aminés codant les protéines:

  A C D E F G H I K L M
  N P Q R S T V W Y

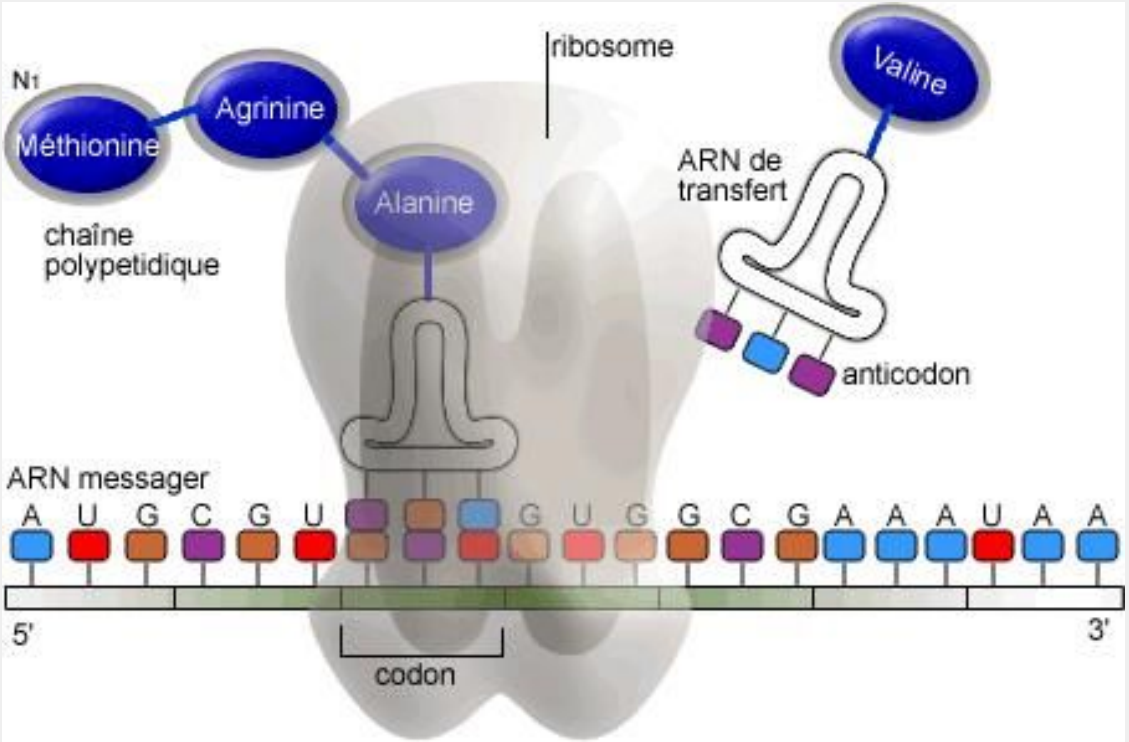
bases & acides aminés

- 4 bases codant l'ADN:
  A T G C
- 3 bases (codon) $\rightarrow$ 1 acide aminé
- 20 acides aminés codant les protéines:
  A C D E F G H I K L M
  N P Q R S T V W Y
- première combinaison de bases ATG $\rightarrow$ M:
  Signal START

bases & acides aminés

- 4 bases codant l'ADN:
  A T G C
- 3 bases (codon) $\rightarrow$ 1 acide aminé
- 20 acides aminés codant les protéines:
  A C D E F G H I K L M
  N P Q R S T V W Y
- première combinaison de bases ATG $\rightarrow$ M:
  Signal START
- 3 combinaisons de bases:
  Signal STOP

Mécanisme


ribosome
N1
Méthionine
Agrinine
Alanine
Valine
ARN de
transfert
chaîne
polypetidique
anticodon
ARN messager
A U G C G U G U G G C G A A A U A A
5'
3'
codon

Sequences

>Homo sapiens hemoglobin, **DNA**

CATAAACCCTGGCGCGCTCGCGGCCCGGCACTCTTCTGGTCCCCACAGACTCAGAGAGAACCCACCATGG
TGCTGTCTCCTGCCGACAAGACCAACGTCAAGGCCGCCTGGGGTAAGGTCGGCGCGCACGCTGGCGAGTA
TGGTGCGGAGGCCCTGGAGAGGATGTTCCTGTCCTTCCCCACCACCAAGACCTACTTCCCGCACTTCGAC
CTGAGCCACGGCTCTGCCCAGGTTAAGGGCCACGGCAAGAAGGTGGCCGACGCGCTGACCAACGCCGTGG
CGCACGTGGACGACATGCCCAACGCGCTGTCCGCCCTGAGCGACCTGCACGCGCACAAGCTTCGGGTGGA
CCCGGTCAACTTCAAGCTCCTAAGCCACTGCCTGCTGGTGACCCTGGCCGCCCACCTCCCCGCCGAGTTC
ACCCCTGCGGTGCACGCCTCCCTGGACAAGTTCCTGGCTTCTGTGAGCACCGTGCTGACCTCCAAATACC
GTTAAGCTGGAGCCTCGGTGGCCATGCTTCTTGCCCCTTGGGCCTCCCCCCAGCCCCTCCTCCCCTTCCT
GCACCCGTACCCCCGTGGTCTTTGAATAAAGTCTGAGTGGGCGGCAAAAAAAAAAAAAAAAAAAAA

>Homo sapiens hemoglobin, **amino acids**

MVLSPADKTNVKAAWGKVGAHAGEYGAEALERMFLSFPTTKTYFPHFDLSHGSAQVKGHGKKVADALTNA

VAHVDDMPNALSALSDLHAHKLRVDPVNFKLLSHCLLVTLAAHLPAEFTPAVHASLDKFLASVSTVLTSKYR

Sequences

>Homo sapiens hemoglobin, **DNA**

CATAAACCCTGGCGCGCTCGCGGCCCGGCACTCTTCTGGTCCCCACAGACTCAGAGAGAACCCACCATGG
TGCTGTCTCCTGCCGACAAGACCAACGTCAAGGCCGCCTGGGGTAAGGTCGGCGCGCACGCTGGCGAGTA
TGGTGCGGAGGCCCTGGAGAGGATGTTCCTGTCCTTCCCCACCACCAAGACCTACTTCCCGCACTTCGAC
CTGAGCCACGGCTCTGCCCAGGTTAAGGGCCACGGCAAGAAGGTGGCCGACGCGCTGACCAACGCCGTGG
CGCACGTGGACGACATGCCCAACGCGCTGTCCGCCCTGAGCGACCTGCACGCGCACAAGCTTCGGGTGGA
CCCGGTCAACTTCAAGCTCCTAAGCCACTGCCTGCTGGTGACCCTGGCCGCCCACCTCCCCGCCGAGTTC
ACCCCTGCGGTGCACGCCTCCCTGGACAAGTTCCTGGCTTCTGTGAGCACCGTGCTGACCTCCAAATACC
GTTAAGCTGGAGCCTCGGTGGCCATGCTTCTTGCCCCTTGGGCCTCCCCCCAGCCCCTCCTCCCCTTCCT
GCACCCGTACCCCCGTGGTCTTTGAATAAAGTCTGAGTGGGCGGCAAAAAAAAAAAAAAAAAAAAA

>Homo sapiens hemoglobin, **amino acids**

MVLSPADKTNVKAAWGKVGAHAGEYGAEALERMFLSFPTTKTYFPHFDLSHGSAQVKGHGKKVADALTNA

VAHVDDMPNALSALSDLHAHKLRVDPVNFKLLSHCLLVTLAAHLPAEFTPAVHASLDKFLASVSTVLTSKYR

Genetic code

1st base	2nd base								3rd base
	U		C		A		G		
U	UUU	Phenylalanine (F)	UCU	Serine (S)	UAU	Tyrosine (Y)	UGU	Cysteine (C)	U
	UUC		UCC		UAC		UGC		C
	UUA	Leucine (L)	UCA		UAA	stop codon	UGA	stop codon	A
	UUG		UCG		UAG		UGG	Tryptophan (W)	G
C	CUU		CCU	Proline (P)	CAU	Histidine (H)	CGU	Arginine (R)	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine (Q)	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine (I)	ACU	Threonine (T)	AAU	Asparagine (N)	AGU	Serine (S)	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine (K)	AGA	Arginine (R)	A
	AUG	Methionine (M) & start codon	ACG		AAG		AGG		G
G	GUU	Valine (V)	GCU	Alanine (A)	GAU	Aspartic Acid (D)	GGU	Glycine (G)	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic Acid (E)	GGA		A
	GUG		GCG		GAG		GGG		G

. . .	acc	ATG	GTG	CTG	TCT	. . .	TAA	ttc
. . .								

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	U		C		A		G		
U	UUU	Phenylalanine (F)	UCU	Serine (S)	UAU	Tyrosine (Y)	UGU	Cysteine (C)	U
	UUC		UCC		UAC		UGC		C
	UUA	Leucine (L)	UCA		UAA	stop codon	UGA	stop codon	A
	UUG		UCG		UAG		UGG	Tryptophan (W)	G
C	CUU		CCU	Proline (P)	CAU	Histidine (H)	CGU	Arginine (R)	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine (Q)	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine (I)	ACU	Threonine (T)	AAU	Asparagine (N)	AGU	Serine (S)	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine (K)	AGA	Arginine (R)	A
	AUG	Methionine (M) & start codon	ACG		AAG		AGG		G
G	GUU	Valine (V)	GCU	Alanine (A)	GAU	Aspartic Acid (D)	GGU	Glycine (G)	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic Acid (E)	GGA		A
	GUG		GCG		GAG		GGG		G

...	acc	ATG	GTG	CTG	TCT	...	TAA	ttc
...	●							

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	UUC		UCC		UAC		UGC		C
	UUA	Leucine (L)	UCA		UAA	stop codon	UGA	stop codon	A
	UUG		UCG		UAG		UGG	Tryptophan (W)	G
C	CUU		CCU	Proline (P)	CAU	Histidine (H)	CGU	Arginine (R)	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine (Q)	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine (I)	ACU	Threonine (T)	AAU	Asparagine (N)	AGU	Serine (S)	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine (K)	AGA	Arginine (R)	A
	AUG	Methionine (M) & start codon	ACG		AAG		AGG		G
G	GUU	Valine (V)	GCU	Alanine (A)	GAU	Aspartic Acid (D)	GGU	Glycine (G)	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic Acid (E)	GGA		A
	GUG		GCG		GAG		GGG		G

...	acc	ATG	GTG	CTG	TCT	...	TAA	ttc
...	•	M						

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	UUG		UCG		UAG		UGG	Tryptophan (W)	G
C	CUU		CCU	Proline (P)	CAU	Histidine (H)	CGU	Arginine (R)	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine (Q)	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine (I)	ACU	Threonine (T)	AAU	Asparagine (N)	AGU	Serine (S)	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine (K)	AGA	Arginine (R)	A
	AUG	Methionine (M) & start codon	ACG		AAG		AGG		G
G	GUU	Valine (V)	GCU	Alanine (A)	GAU	Aspartic Acid (D)	GGU	Glycine (G)	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic Acid (E)	GGA		A
	GUG		GCG		GAG		GGG		G

...	acc	ATG	GTG	CTG	TCT	...	TAA	ttc
...	•	M	V					

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	UUA	Leucine (L)	UCA		UAA	stop codon	UGA	stop codon	A
	UUG		UCG		UAG		UGG	Tryptophan (W)	G
C	CUU		CCU	Proline (P)	CAU	Histidine (H)	CGU	Arginine (R)	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine (Q)	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine (I)	ACU	Threonine (T)	AAU	Asparagine (N)	AGU	Serine (S)	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine (K)	AGA	Arginine (R)	A
	AUG	Methionine (M) & start codon	ACG		AAG		AGG		G
G	GUU	Valine (V)	GCU	Alanine (A)	GAU	Aspartic Acid (D)	GGU	Glycine (G)	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic Acid (E)	GGA		A
	GUG		GCG		GAG		GGG		G

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...	•	M	V	L				

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	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine (Q)	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine (I)	ACU	Threonine (T)	AAU	Asparagine (N)	AGU	Serine (S)	U
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...	•	M	V	L	S			

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	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine (Q)	CGA		A
	CUG		CCG		CAG		CGG		G
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	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine (K)	AGA	Arginine (R)	A
	AUG	Methionine (M) & start codon	ACG		AAG		AGG		G
G	GUU	Valine (V)	GCU	Alanine (A)	GAU	Aspartic Acid (D)	GGU	Glycine (G)	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic Acid (E)	GGA		A
	GUG		GCG		GAG		GGG		G

...	acc	ATG	GTG	CTG	TCT	...	TAA	ttc
...	•	M	V	L	S	...		

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	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine (Q)	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine (I)	ACU	Threonine (T)	AAU	Asparagine (N)	AGU	Serine (S)	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine (K)	AGA	Arginine (R)	A
	AUG	Methionine (M) & start codon	ACG		AAG		AGG		G
G	GUU	Valine (V)	GCU	Alanine (A)	GAU	Aspartic Acid (D)	GGU	Glycine (G)	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic Acid (E)	GGA		A
	GUG		GCG		GAG		GGG		G

...	acc	ATG	GTG	CTG	TCT	...	TAA	ttc
...	•	M	V	L	S	...	X	

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	UUA	Leucine (L)	UCA		UAA	stop codon	UGA	stop codon	A
	UUG		UCG		UAG		UGG	Tryptophan (W)	G
C	CUU		CCU	Proline (P)	CAU	Histidine (H)	CGU	Arginine (R)	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Glutamine (Q)	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Isoleucine (I)	ACU	Threonine (T)	AAU	Asparagine (N)	AGU	Serine (S)	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lysine (K)	AGA	Arginine (R)	A
	AUG	Methionine (M) & start codon	ACG		AAG		AGG		G
G	GUU	Valine (V)	GCU	Alanine (A)	GAU	Aspartic Acid (D)	GGU	Glycine (G)	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic Acid (E)	GGA		A
	GUG		GCG		GAG		GGG		G

...	acc	ATG	GTG	CTG	TCT	...	TAA	ttc
...	•	M	V	L	S	...	X	•

Fréquence de codage des AA

Acide Aminé	L	R	V	S	P	T	A	G	I	X
Nb codons	6	6	4	4	4	4	4	4	3	3

Acide Aminé	Y	H	Q	N	K	D	E	C	S	M	W
Nb codons	2	2	2	2	2	2	2	2	2	1	1