

Chapitre 4 : la traduction
Le code génétique

Pr. Julien Fauré

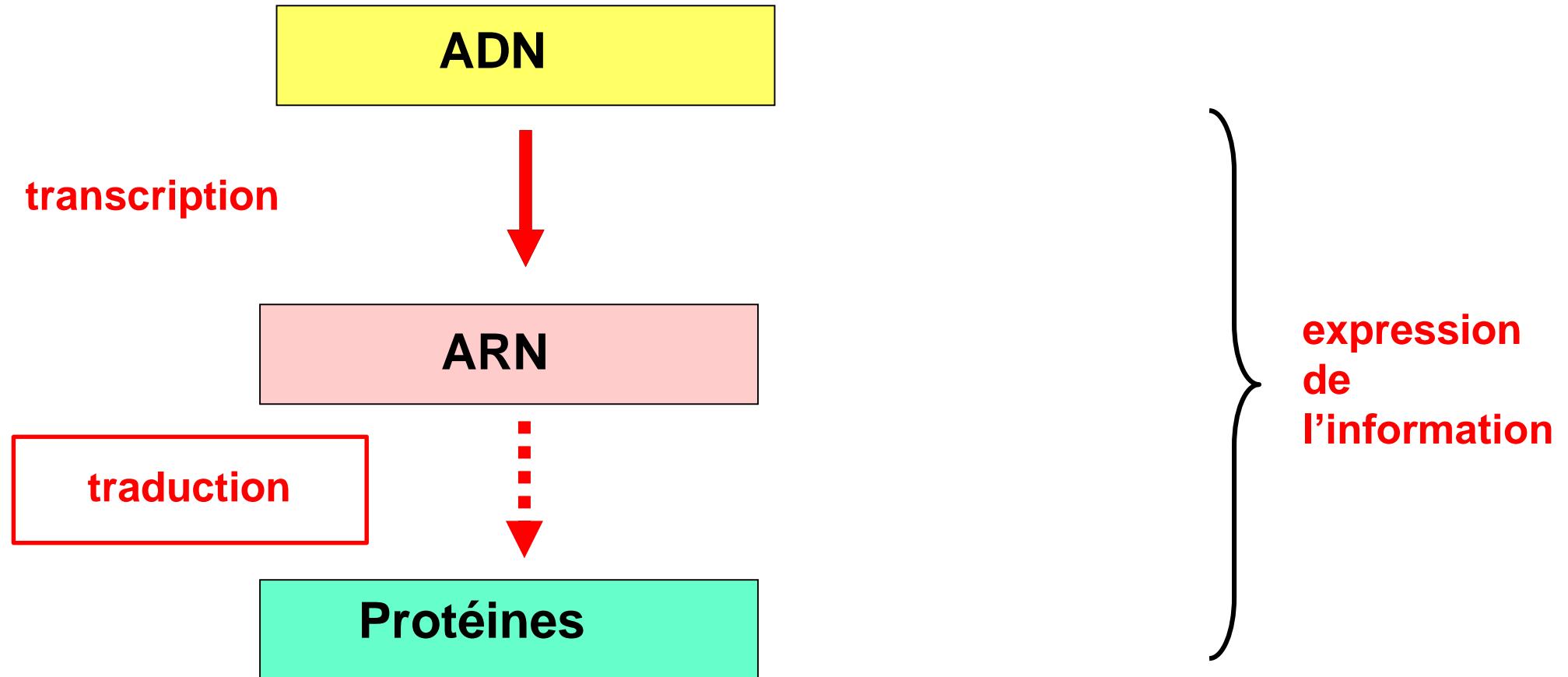
Plan du cours

- Le code génétique
- Le cadre de lecture

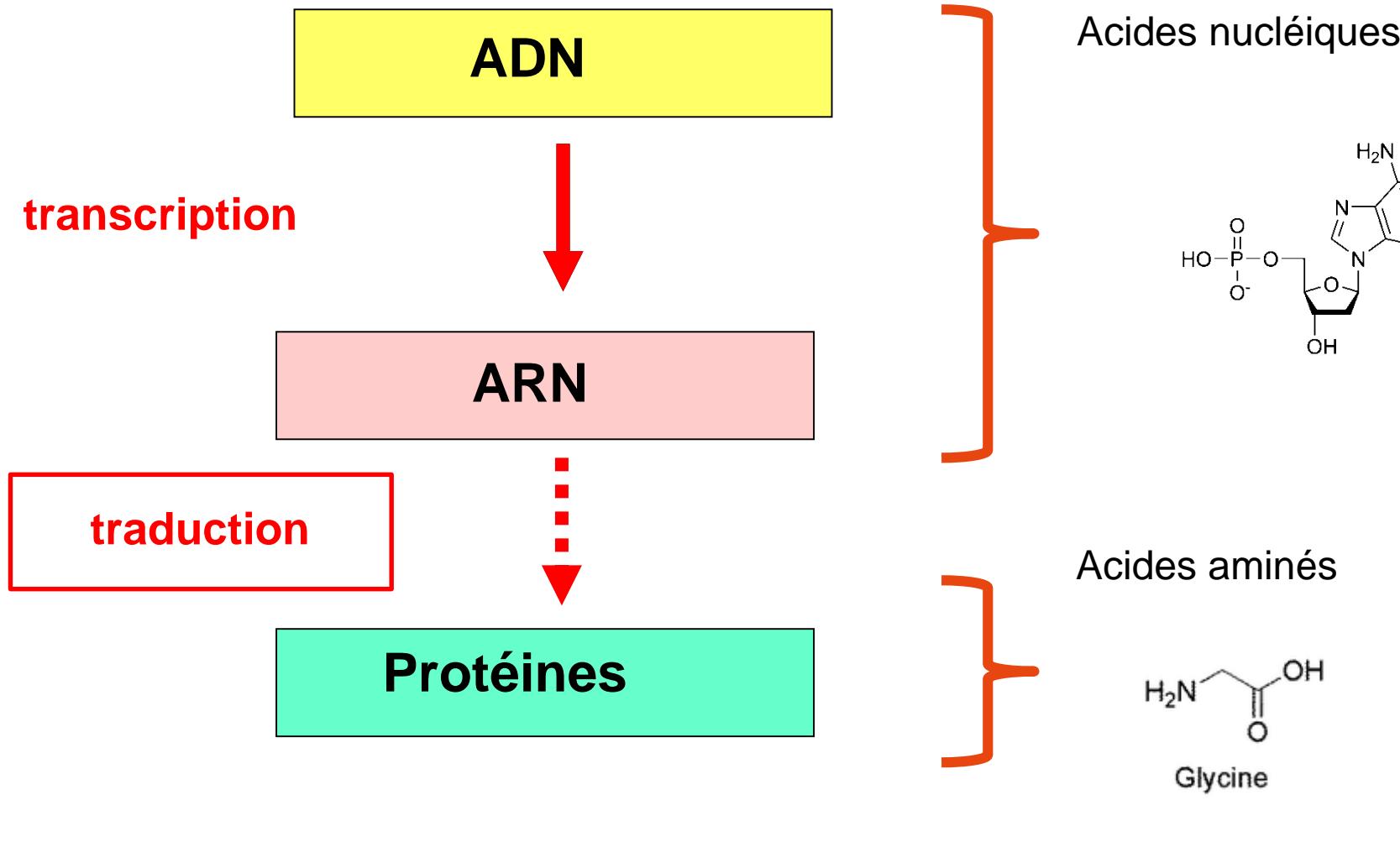
Objectifs pédagogiques du cours

- Savoir réaliser la traduction d'une séquence d'ARNm en protéine

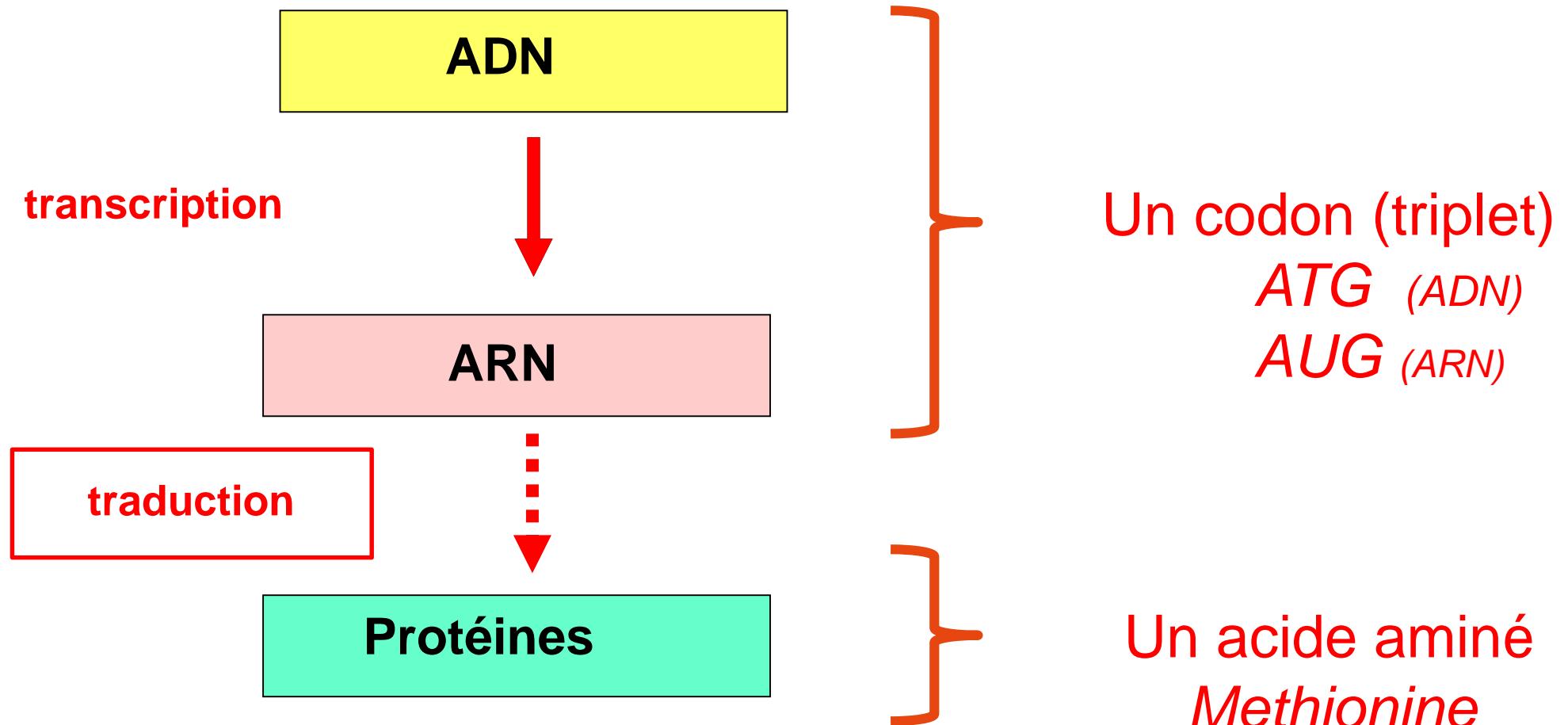
Rappels



Le code génétique



Le code génétique



Le code génétique

| le code génétique | | | | | | | | | | ijk |
|-------------------|--------------------|-----|-----|-----|-----|----------------------|-----|------|---|----------------------------|
| | Deuxième lettre | | | | | | | | | ijk |
| | U | C | A | G | | | | | | |
| U | UUU | Phe | UCU | Ser | UAU | Tyr | UGU | Cys | U | |
| | UUC | Phe | UCC | Ser | UAC | Tyr | UGC | Cys | C | |
| | UUA | Leu | UCA | Ser | UAA | Stop | UGA | Stop | A | |
| | UUG | Leu | UCG | Ser | UAG | Stop | UGG | Trp | G | |
| C | CUU | Leu | CCU | Pro | CAU | His | CGU | Arg | U | Troisième lettre (côté 3') |
| | CUC | Leu | CCC | Pro | CAC | His | CGC | Arg | C | |
| | CUA | Leu | CCA | Pro | CAA | Gln | CGA | Arg | A | |
| | CUG | Leu | CCG | Pro | CAG | Gln | CGG | Arg | G | |
| A | AUU | Ile | ACU | Thr | AAU | Asn | AGU | Ser | U | |
| | AUC | Ile | ACC | Thr | AAC | Asn | AGC | Ser | C | |
| | AUA | Ile | ACA | Thr | AAA | Lys | AGA | Arg | A | |
| | AUG | Met | ACG | Thr | AAG | Lys | AGG | Arg | G | |
| G | GUU | Val | GCU | Ala | GAU | Asp | GGU | Gly | U | |
| | GUC | Val | GCC | Ala | GAC | Asp | GGC | Gly | C | |
| | GUA | Val | GCA | Ala | GAA | Glu | GGA | Gly | A | |
| | GUG | Val | GCG | Ala | GAG | Glu | GGG | Gly | G | |
| | codon d'initiation | | | | | codon de terminaison | | | | |

64 codons possibles

21 acides amines

Le code génétique

| le code génétique | | | | | | | | | |
|---------------------------|--------------------|-----------------|---------|----------------------|----------|---|----------------------------|--|--|
| | | Deuxième lettre | | | | | | | |
| | | U | C | A | G | | | | |
| Première lettre (côté 5') | U | UUU Phe | UCU Ser | UAU Tyr | UGU Cys | U | | | |
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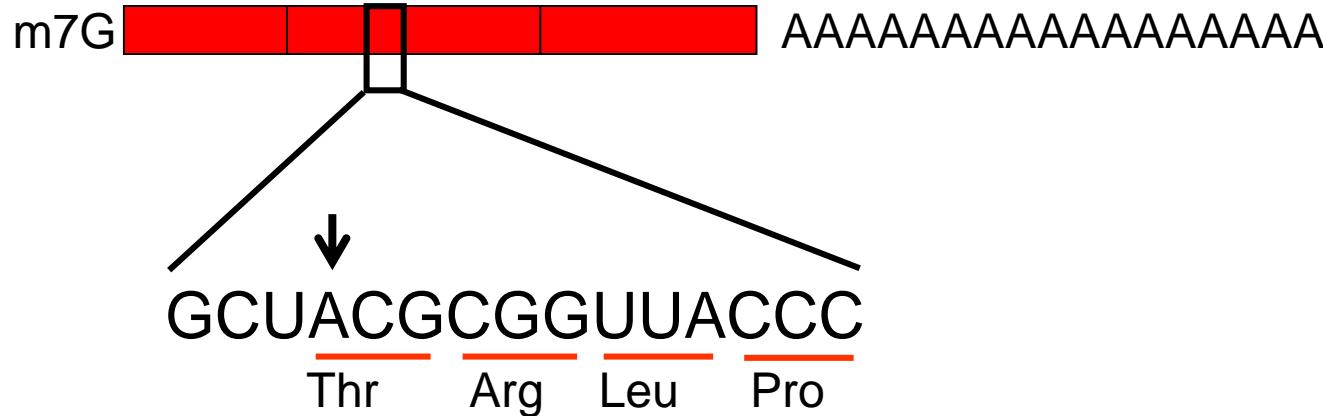
Le code génétique

- code « universel »
- code spécifique
1 codon = 1 aa
- code dégénéré
1 aa = 1 à 6 codons
- code ponctué
 - codon initiateur
 - 3 codons stop

| le code génétique | | | | | | | | | | |
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| Première lettre (côté 5') | U | U | C | A | G | | | | | |
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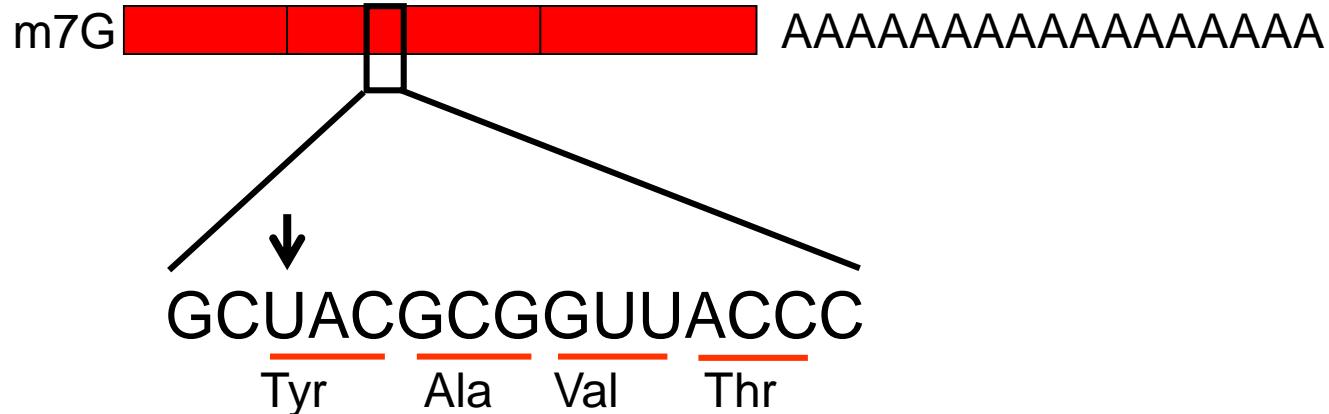
64 codons possibles
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Le code génétique et le cadre de lecture



| le code génétique | | | | | | | | | | | | |
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| | C | codon d'initiation | | | | codon de terminaison | | | | | | |
| | C | | | | | | | | | | | |

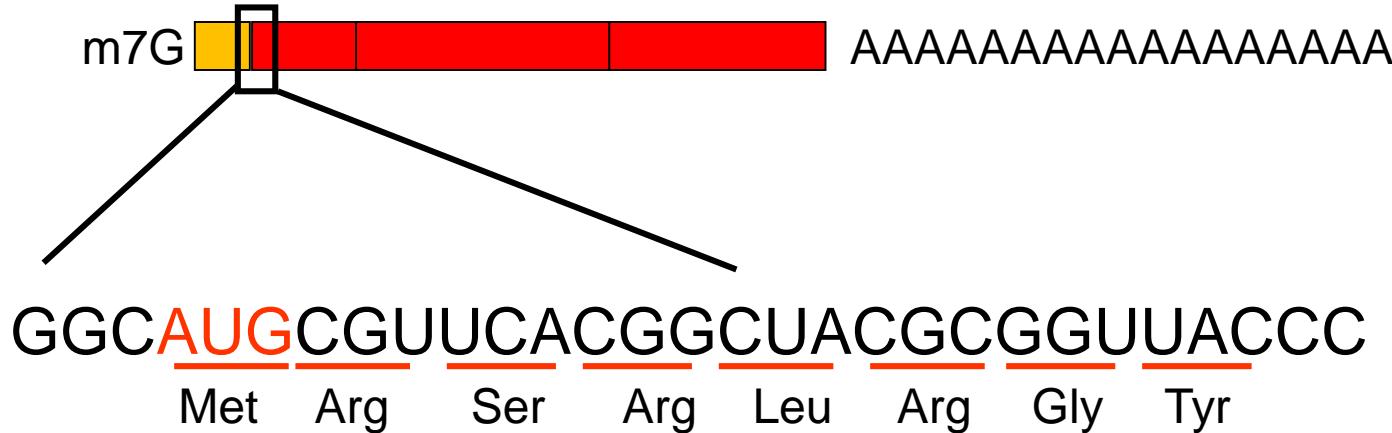
Le code génétique et le cadre de lecture



le cadre de lecture détermine la nature du message

| le code génétique | | | | | | | | | | | | |
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| codon d'initiation | | | | | | codon de terminaison | | | | | | |

Le code génétique et le cadre de lecture



le cadre de lecture détermine
la nature du message

| le code génétique | | | | | | | | | | | | | |
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| | | | | Deuxième lettre | | | | Troisième lettre (côté 3') | | | | | |
| | | | | U | UUU Phe | UCU Ser | UAU Tyr | UGU Cys | U | | | | |
| | | | | U | UUC Phe | UCC Ser | UAC Tyr | UGC Cys | C | | | | |
| | | | | C | UUA Leu | UCA Ser | UAA Stop | UGA Stop | A | | | | |
| | | | | C | UUG Leu | UCG Ser | UAG Stop | UGG Trp | G | | | | |
| | | | | | | Deuxième lettre | | | | | | | |
| | | | | | | U | UUU Phe | UCU Ser | UAU Tyr | UGU Cys | U | | |
| | | | | | | U | UUC Phe | UCC Ser | UAC Tyr | UGC Cys | C | | |
| | | | | | | C | UUA Leu | UCA Ser | UAA Stop | UGA Stop | A | | |
| | | | | | | C | UUG Leu | UCG Ser | UAG Stop | UGG Trp | G | | |
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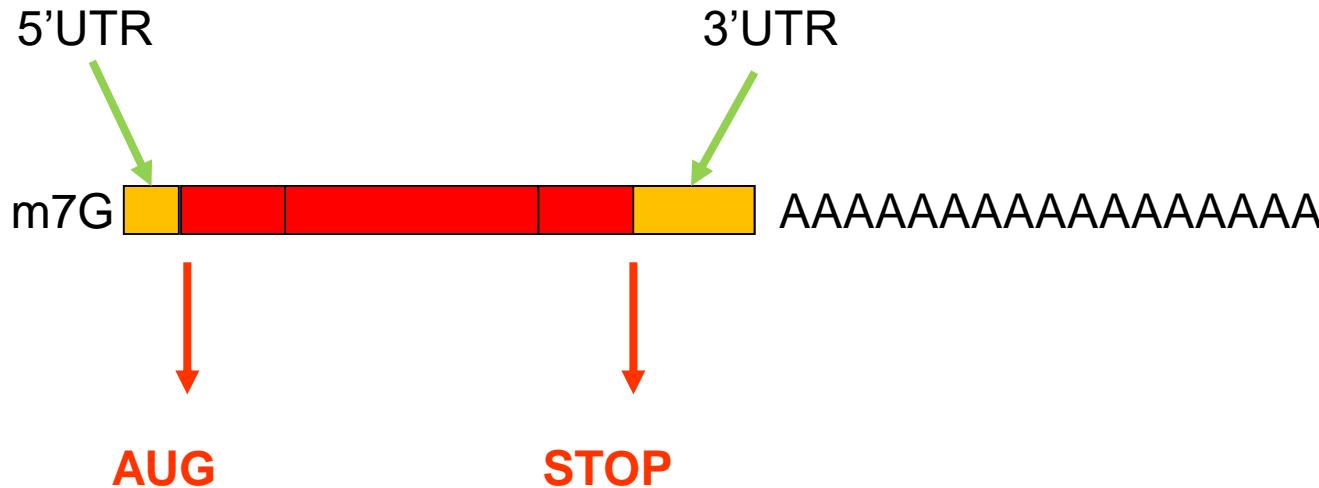
Le code génétique et le cadre de lecture



le cadre de lecture détermine la nature du message

| le code génétique | | | | | | | | | | | |
|-------------------|-----|-----------------|-----|--------------------|-----|------|----------------------|------|---|--|--|
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| | | | | codon d'initiation | | | codon de terminaison | | | | |

Le code génétique et le cadre de lecture



L'intégralité de l'ARN messager n'est pas codant

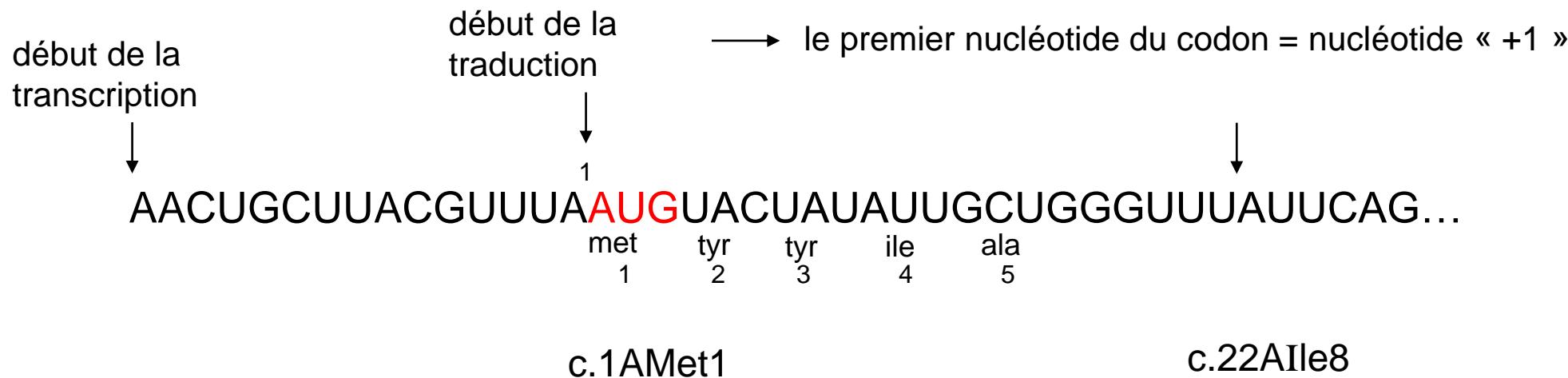


Présence de séquences non traduites:
5'UTR et 3'UTR (UTR= untranslated)

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|-------------------|--|-----------------|--|--|--|---|---------------------------|------------------|--|----------------------|--|--|
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| | | C | CUU Leu CUC Leu CUA Leu CUG Leu | CCU Pro CCC Pro CCA Pro CCG Pro | CAU His CAC His CAA Gln CAG Gln | CGU Arg CGC Arg CGA Arg CGG Arg | Arg Arg Arg Arg | U C A G | | | | |
| | | A | AUU Ile AUC Ile AUA Ile AUG Met | ACU Thr ACC Thr ACA Thr ACG Thr | AAU Asn AAC Asn AAA Lys AAG Lys | AGU Ser AGC Ser AGA Arg AGG Arg | Ser Ser Arg Arg | U C A G | | | | |
| | | G | GUU Val GUC Val GUA Val GUG Val | GCU Ala GCC Ala GCA Ala GCG Ala | GAU Asp GAC Asp GAA Glu GAG Glu | GGU Gly GGC Gly GGA Gly GGG Gly | Gly Gly Gly Gly | U C A G | | | | |
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Le code génétique et le cadre de lecture

Nomenclature des bases codantes



Messages essentiels du cours

- Le code génétique et ses caractéristiques
- Séquences 5' et 3' UTR
- Nomenclature des bases

Mentions légales

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