# G1 - Organisation des génomes

Fig. 1 : Gregor Mendel (1822-1884)

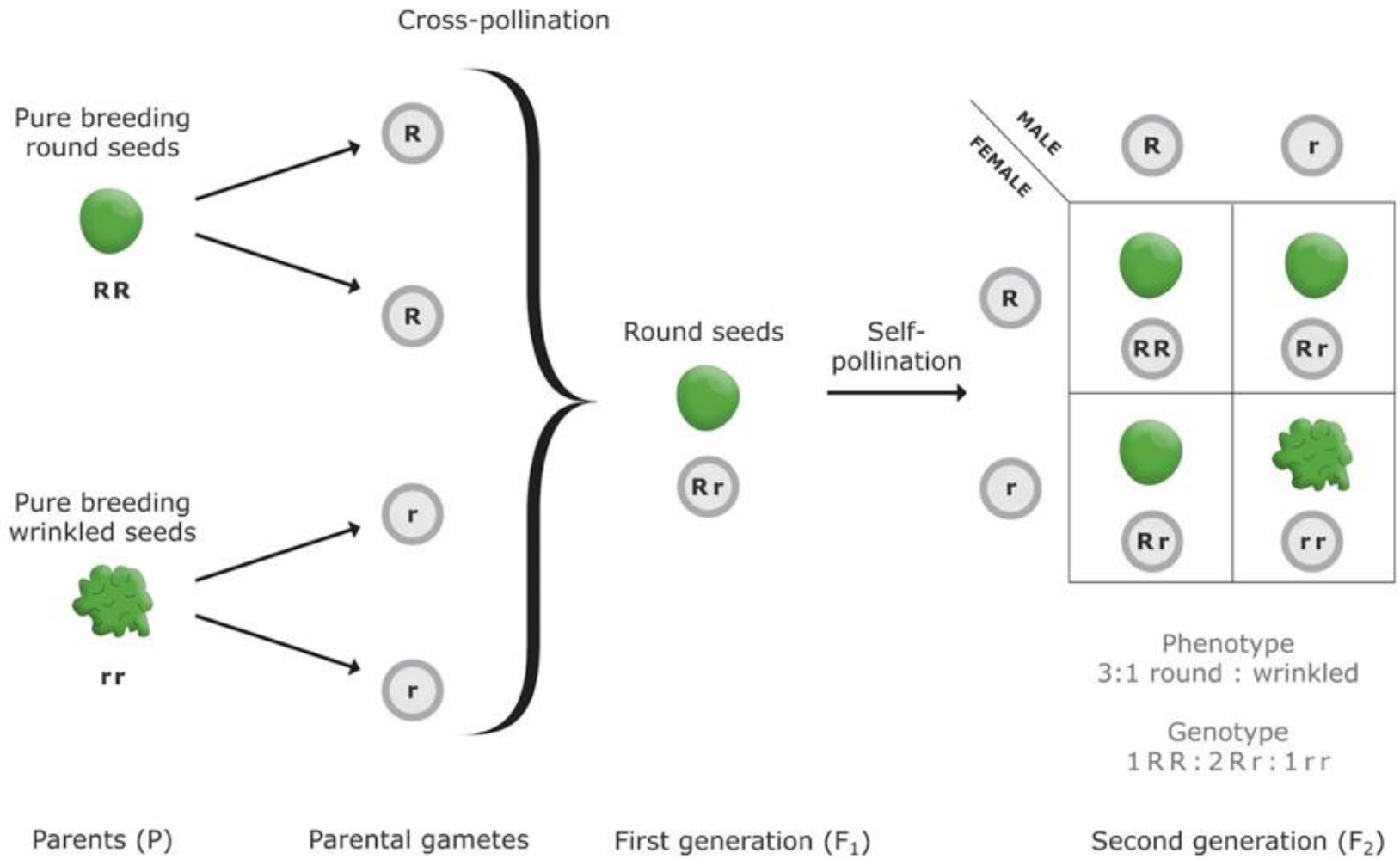





*Fig. 2 : Exemple type de croisements effectué par Gregor Mendel*

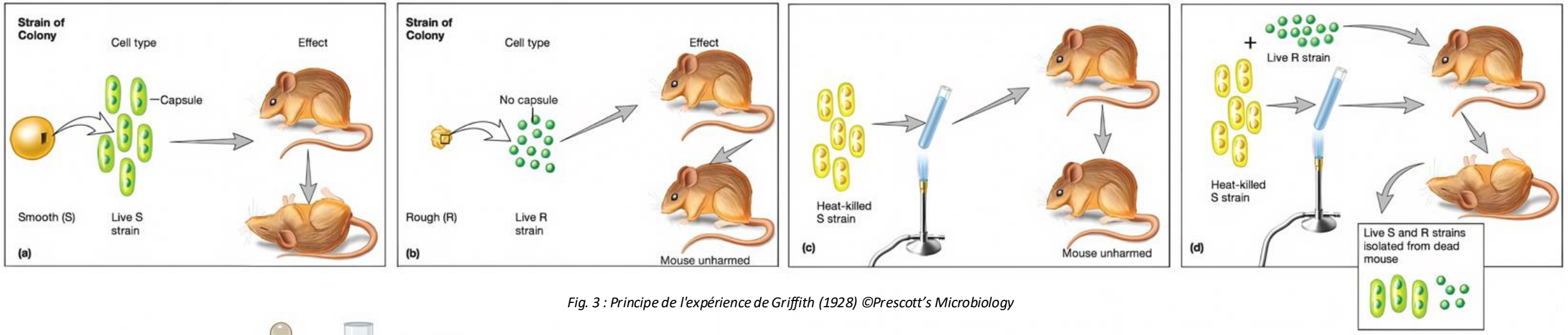
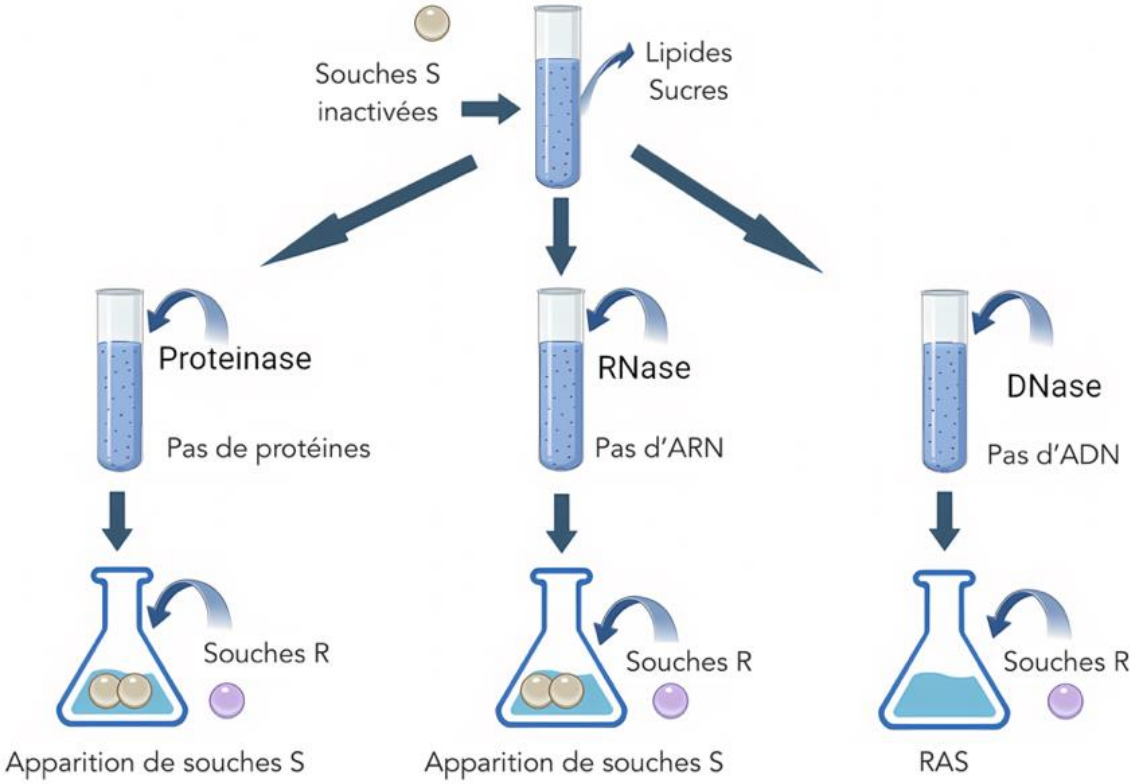



*Fig. 3 : Principe de l'expérience de Griffith (1928) ©Prescott's Microbiology*




… **nature** of the **substance inducing transformation** of **pneumococcal types**: **induction** of **transformation** by a **desoxyribonucleic acid fraction isolated** from **pneumococcus** …

OT Avery, CM MacLeod, M McCarty - Die Entdeckung der Doppelhelix …, 2017 - Springer

… of the **transforming** agent. Moreover, from the **transformed** cells themselves, a **substance** of … far in excess of that originally added to **induce** the **change**. It is evident, therefore, that not …

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*Fig. 4 : Principe de l'expérience de Avery; MacLeod et McCarthy (1944) ©Biorender*

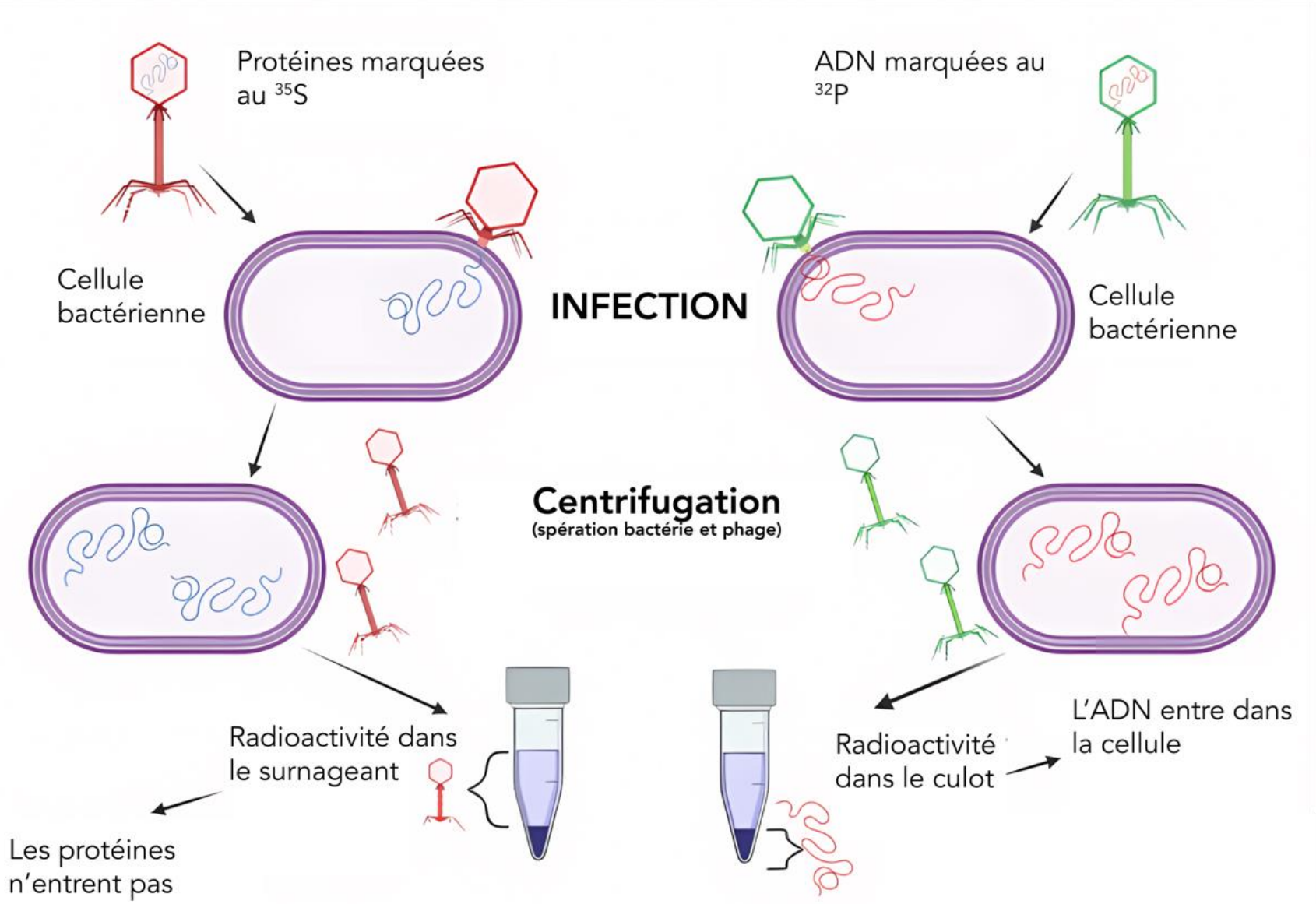
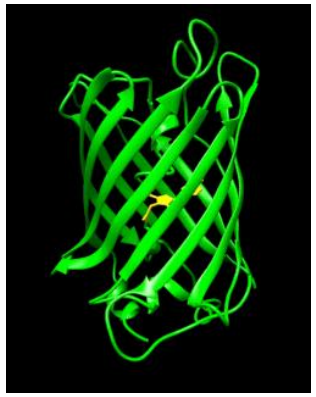
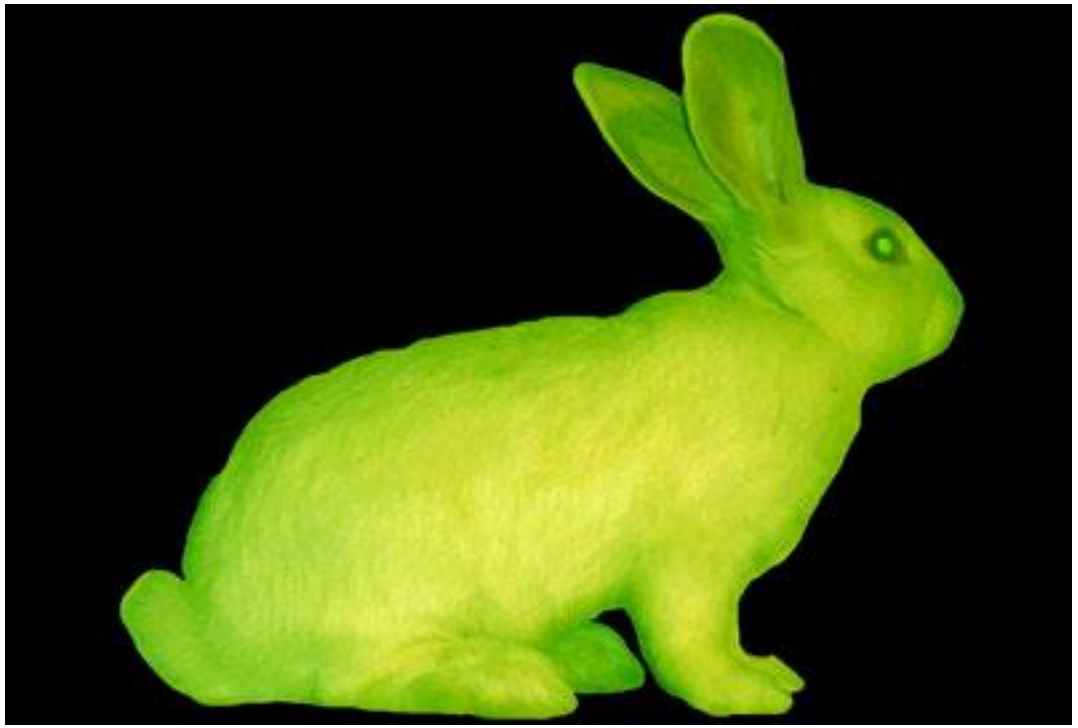



*Fig. 5 : Principe de l'expérience de Hershey & Chase (1952) ©SimpleBio.com*

*Aequorea victoria, propriétaire de la GFP (©Elena Carbonell)*



*La GFP (©wikipedia)*



*Alba dans le noir, éclairée au UV (©Artwiki.fr)*

*Eduardo Kac avec son Lapin (©Ekac.org)*

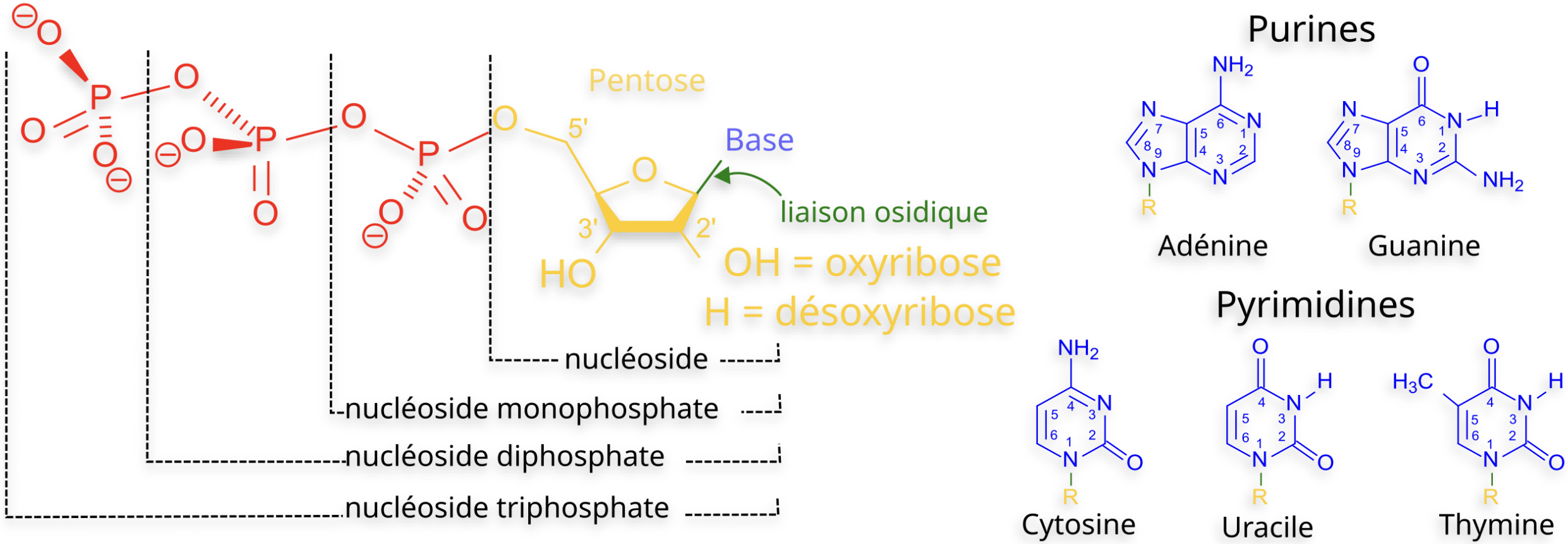
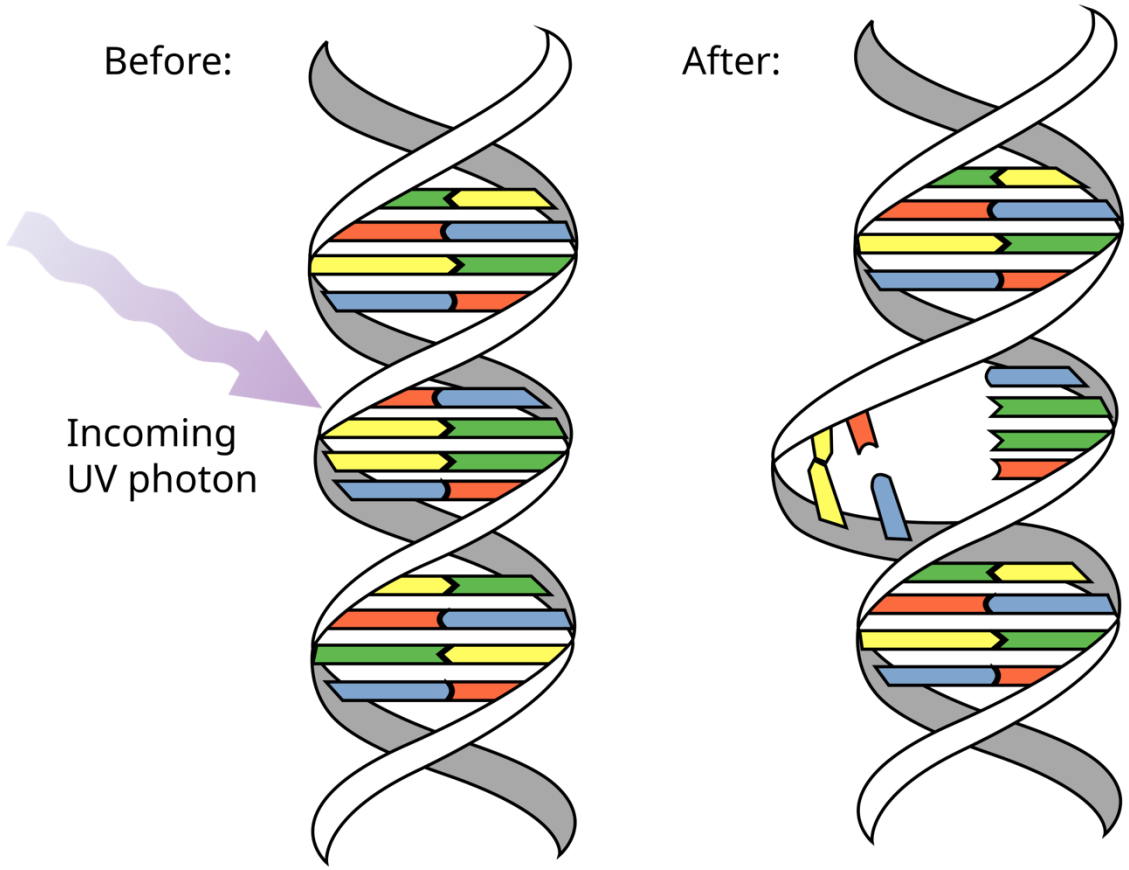



*Fig. 6 : Chimie des nucléotides*




*Formation des dimères de Thymine (©wikipedia)*

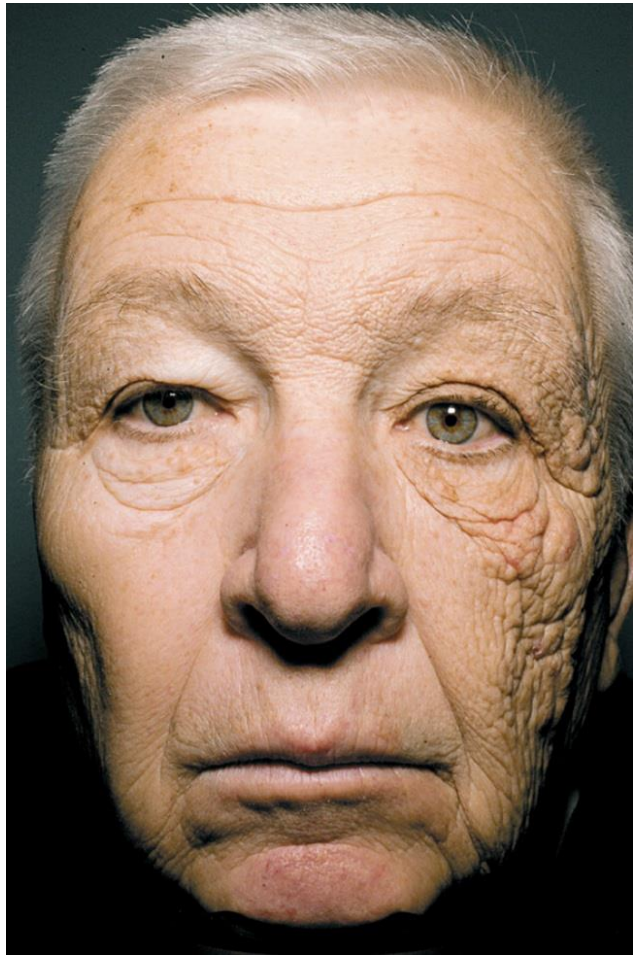
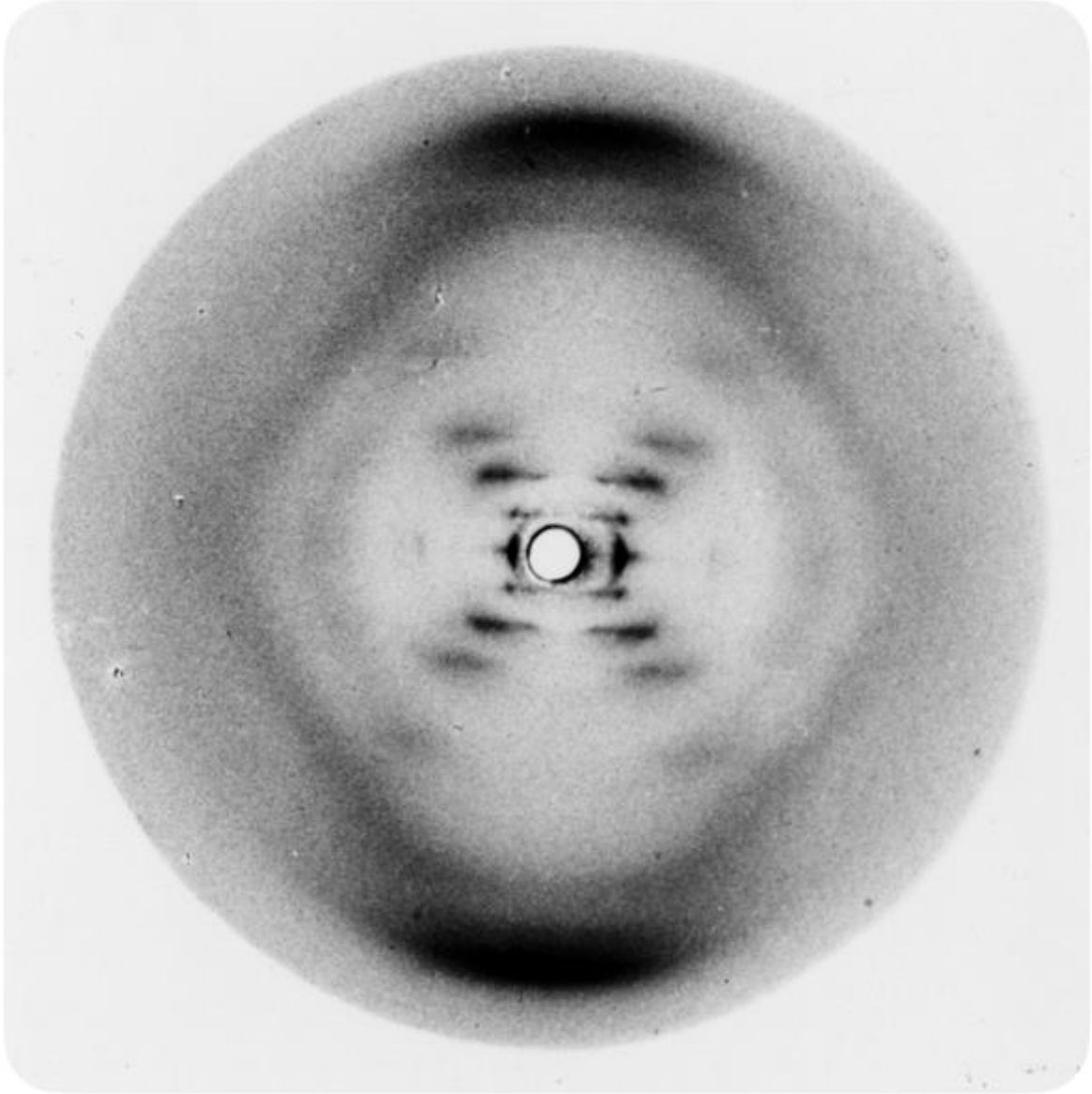


*Illustration des dommages des Uvs (©Jennifer Gordon/NEJM)*



©Gosling, 1952

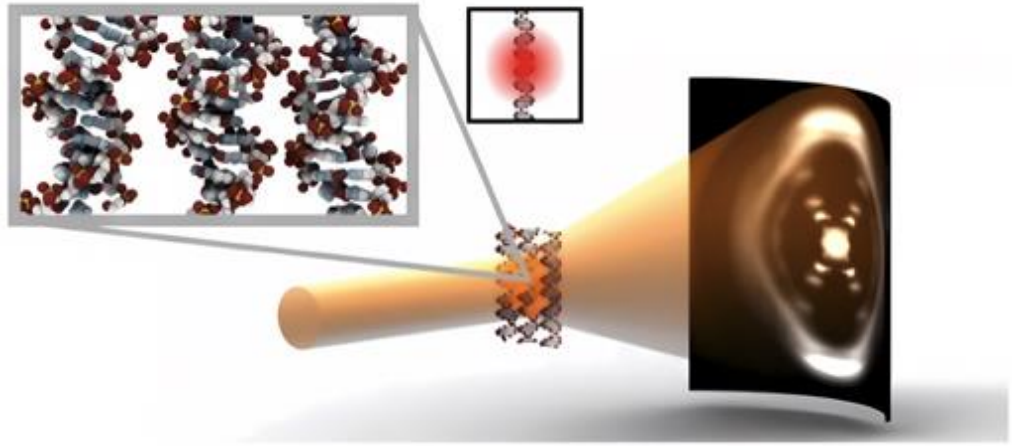


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*Fig. 7 : Fameux cliché 51 de l'ADN*

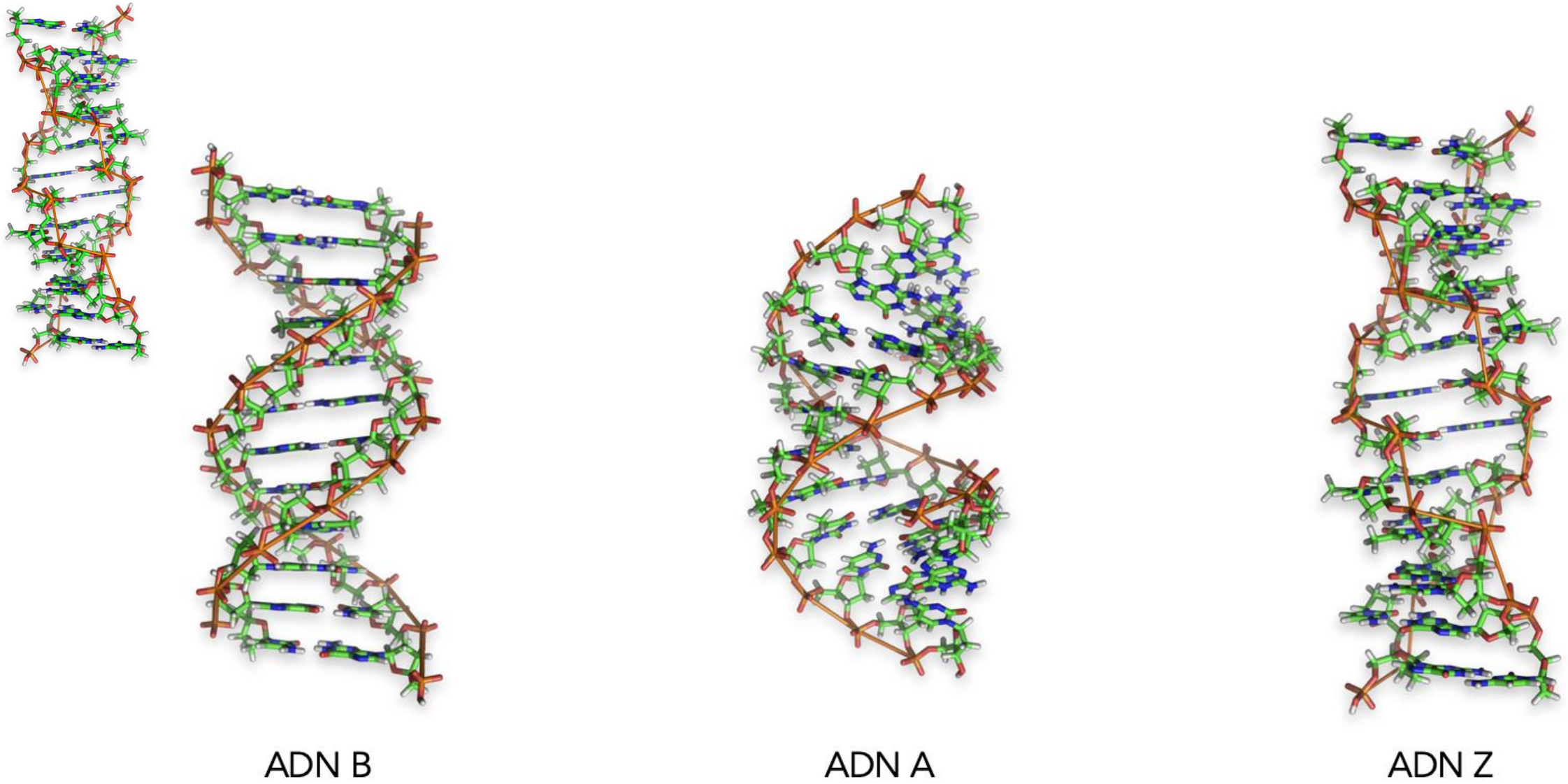



*Fig. 8 : Schémas d'ADN A, B et Z ©Wikipédia*

| Caractéristique | ADN B | ADN A | ADN Z |
|---|---|---|---|
| **Sens de l'hélice** | Droite | Droite | Gauche |
| **Conditions d'apparition** | Conditions physiologiques standards (hydratation normale) | Faible hydratation, forte force ionique, présence d'éthanol, hybrides ADN–ARN | Régions riches en GC, transcription active, superenroulements négatifs |
| **Diamètre de l'hélice** | ≈ 2,0 nm | ≈ 2,3 nm | ≈ 1,8 nm |
| **Pas de l'hélice** | ≈ 3,4 nm | ≈ 2,8 nm | ≈ 4,5 nm |
| **Nombre de paires de bases par tour** | ≈ 10,4 pb | ≈ 11 pb | ≈ 12 pb |
| **Position de l'axe de l'hélice** | Passe par le centre des paires de bases | Décalé par rapport aux paires de bases | Fortement décalé |
| **Sillons** | Grand sillon large et accessible, petit sillon étroit | Grand sillon étroit et profond, petit sillon large et peu profond | Grand sillon peu marqué, petit sillon étroit et profond |
| **Intérêt fonctionnel majeur** | Support principal de l'information génétique, fixation des protéines régulatrices | Intermédiaire lors de la transcription, stabilité en conditions de déshydratation | Régulation transcriptionnelle, réponse aux contraintes topologiques, instabilité génomique |
| **Présence in vivo** | Universelle | Rare mais observée (ex. bactéries en dessiccation) | Locale, transitoire, régulée |

*Tableau 1 : Comparaison des ADN A, B et Z*

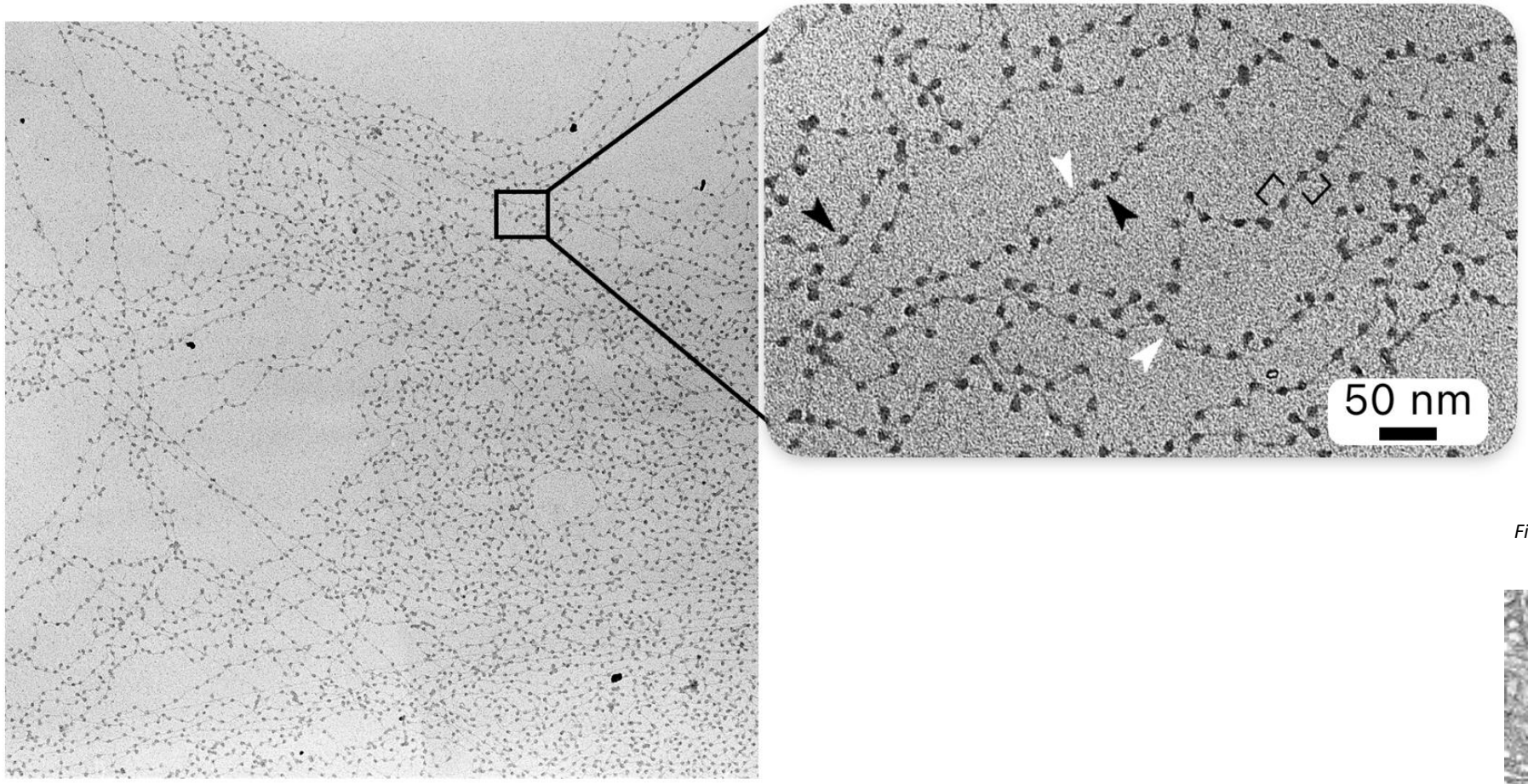
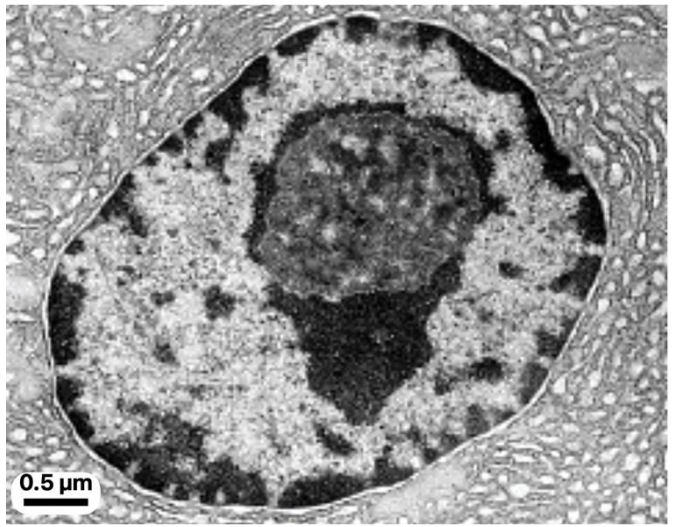



*Fig. 10 : Observation de structure en collier de perle sur de l'ADN d'érythrocyte de poule traité au tampon faible teneur en sel et haut pH (©Chris Woodcock)*

*Fig. 9 : Observation au MET de noyau de CAP (©J-C Callen, Dunod)*



| | | Parentaux | | Recombinés | |
|---|---|---|---|---|---|
| | | $a^- b^+$ | $a^+ b^-$ | $a^+ b^+$ | $a^- b^-$ |
| Parentaux | $a^- b^+$ | $\underline{a^-}\ \underline{b^+}$<br>$a^- b^+$ | $\underline{a^+}\ \underline{b^-}$<br>$a^- b^+$ | $\underline{a^+}\ \underline{b^+}$<br>$a^- b^+$ | $\underline{a^-}\ \underline{b^-}$<br>$a^- b^+$ |
| | $a^+ b^-$ | $\underline{a^-}\ \underline{b^+}$<br>$a^+ b^-$ | $\underline{a^+}\ \underline{b^-}$<br>$a^+ b^-$ | $\underline{a^+}\ \underline{b^+}$<br>$a^+ b^-$ | $\underline{a^-}\ \underline{b^-}$<br>$a^+ b^-$ |
| Recombinés | $a^+ b^+$ | $\underline{a^-}\ \underline{b^+}$<br>$a^+ b^+$ | $\underline{a^+}\ \underline{b^-}$<br>$a^+ b^+$ | $\underline{a^+}\ \underline{b^+}$<br>$a^+ b^+$ | $\underline{a^-}\ \underline{b^-}$<br>$a^+ b^+$ |
| | $a^- b^-$ | $\underline{a^-}\ \underline{b^+}$<br>$a^- b^-$ | $\underline{a^+}\ \underline{b^-}$<br>$a^- b^-$ | $\underline{a^+}\ \underline{b^+}$<br>$a^- b^-$ | $\underline{a^-}\ \underline{b^-}$<br>$a^- b^-$ |

*Fig. 11 : Échiquier des gamètes pour les calculs de Morgan (©gec.sdv.univ-paris-diderot.fr)*

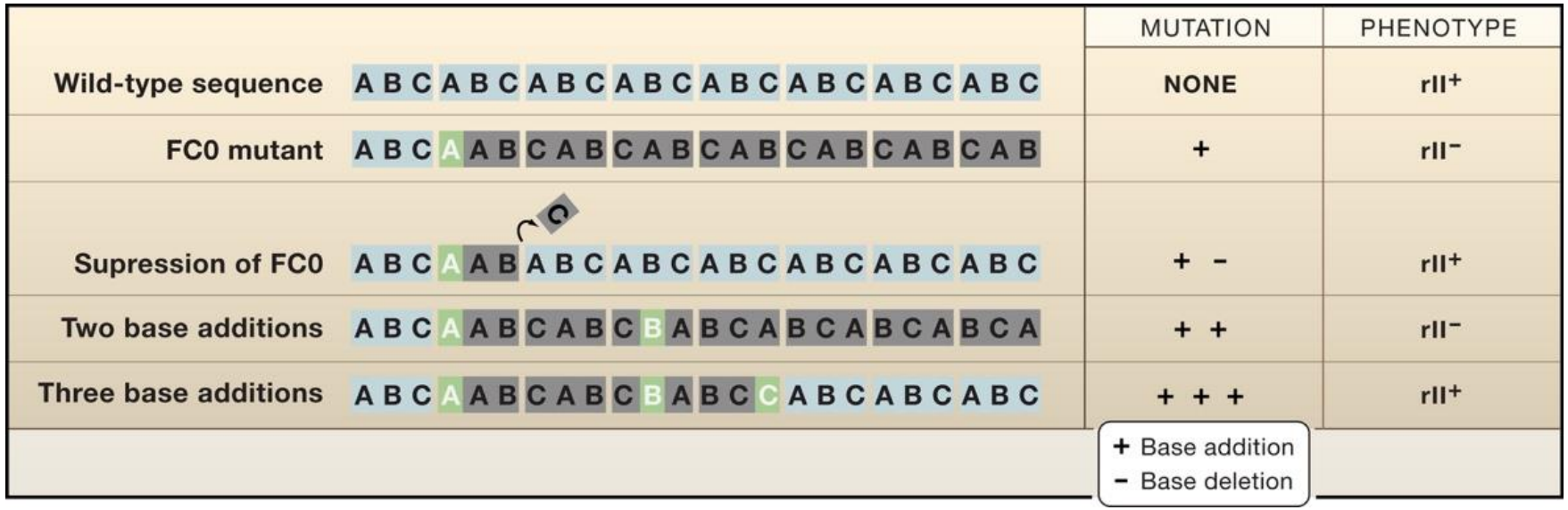



*Fig. 12 : Détermination du caractère triplet du code génétique (©Yanofsky)*

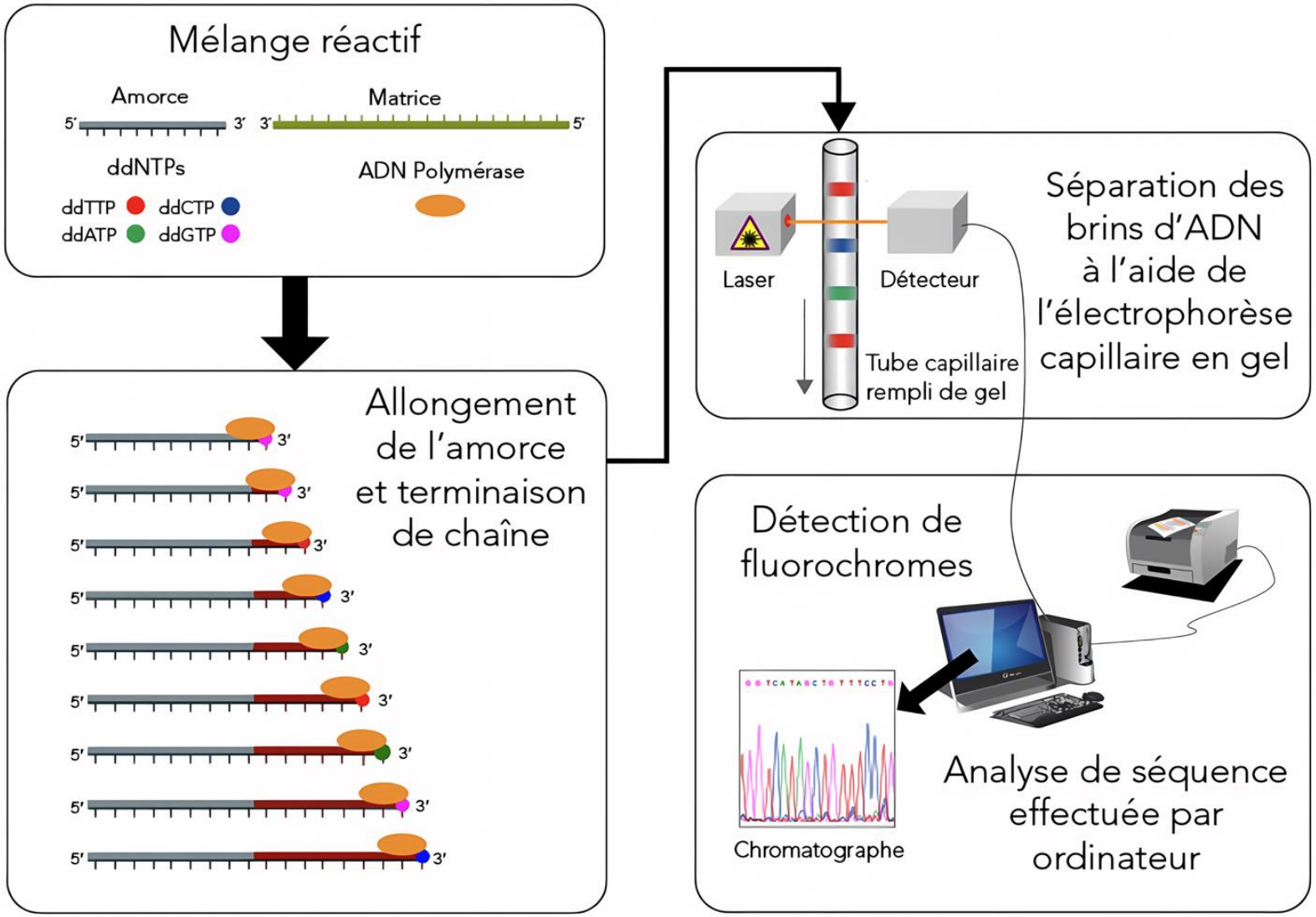



*Fig. 13 : Séquençage de l'ADN de Sanger (© 2020 Parlons sciences)*

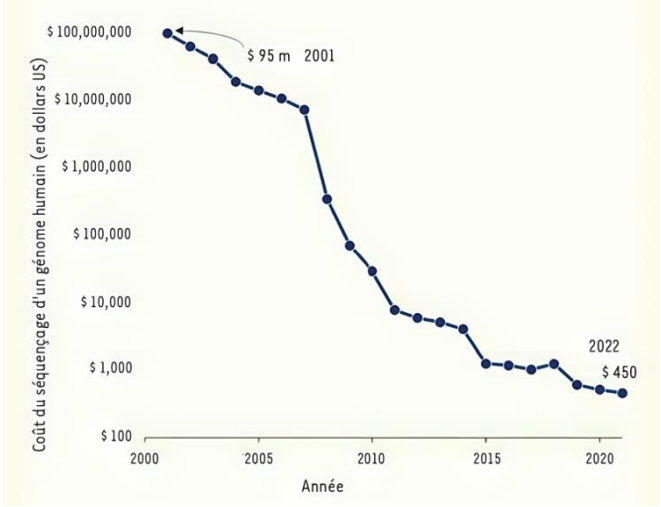



Fig. 14 : Évolution du coût du séquençage d'un génome humain au cours des vingt dernières années (©B. Jordan, 2023)

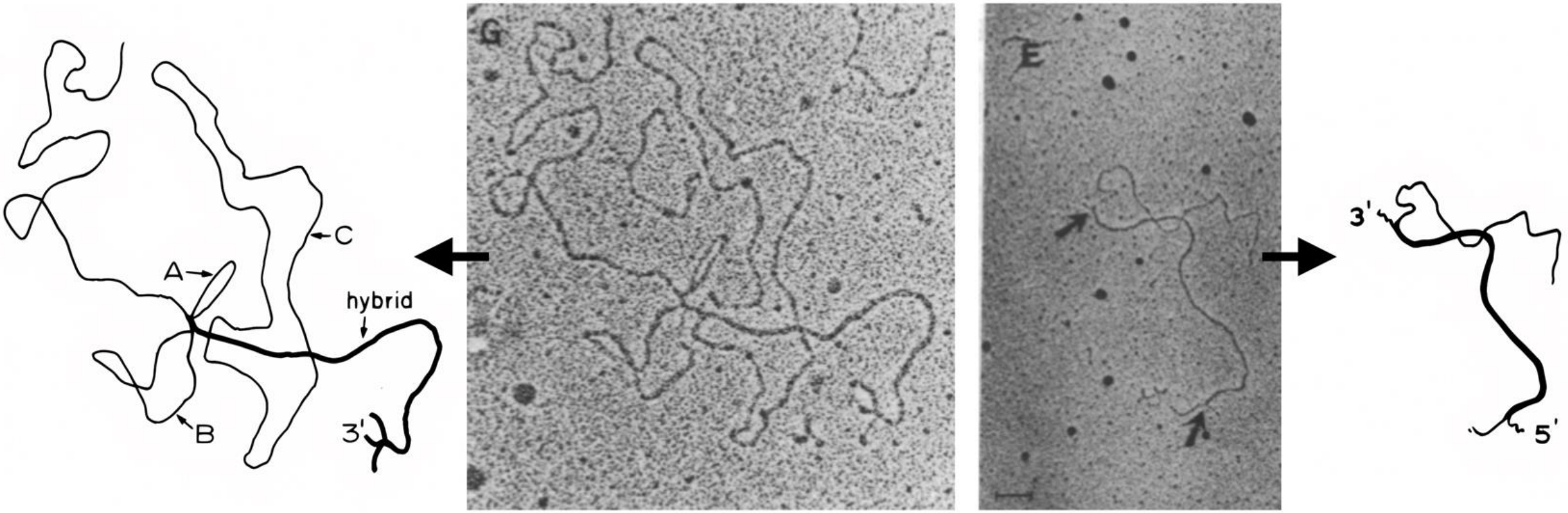



*Fig. 15 : Deux exemples d'hétéroduplex ADN-ARN ©Berget et al., 1977 (Sharp est dernier auteur ^^) A, B et C sont des boucles ADNc*

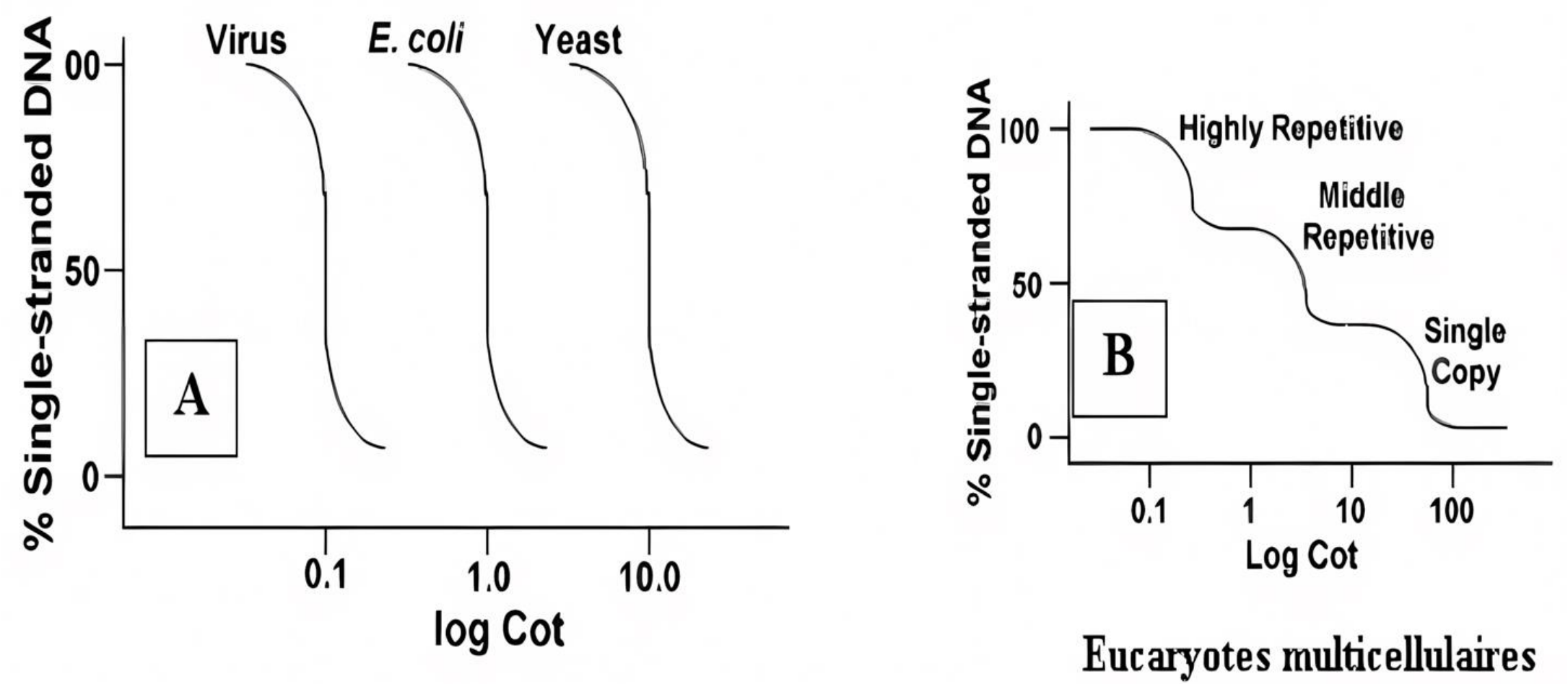
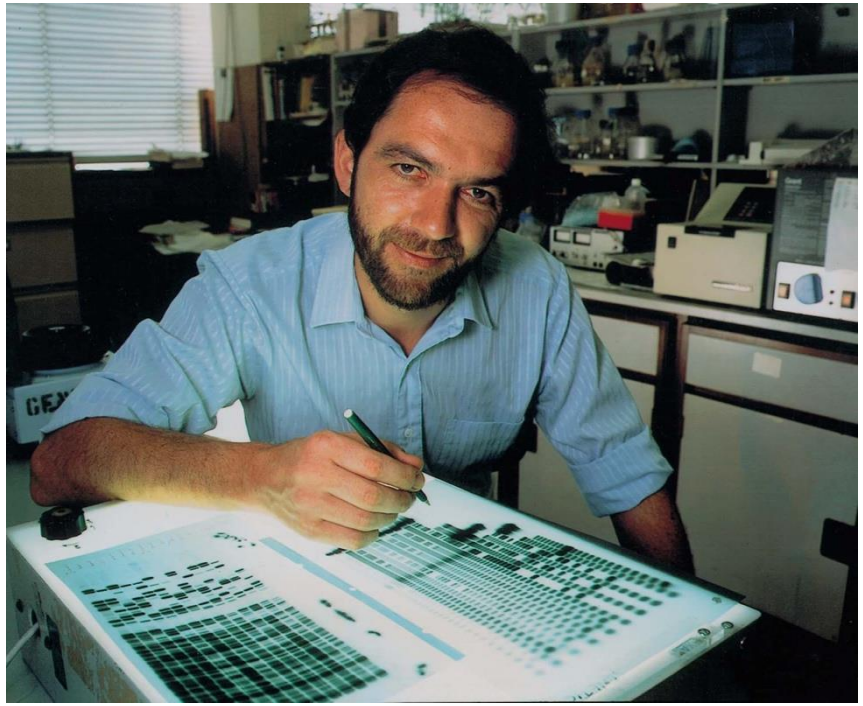



*Fig. 16 : Courbes de Cot sur quelques organismes*



*Alec Jeffrey (©Anita Corbin and John O'Grady, British Council 1989)*

# Genetic test traps girls' killer

**By Paul Hoyland**

A man who killed two 15-year-old girls and was caught as the result of the first mass screening for genetic fingerprints, was sent to prison for life yesterday. He had tried to avoid the test by talking a workmate into taking it instead.

Mr Justice Otton, sentencing Colin Pitchfork, aged 27, at Leicester Crown Court, said he was a danger to young women. Had it not been for the development of the genetic fingerprint test, which identifies unique chromosome patterns from a sample of blood or saliva, he might still be at large.

Pitchfork, of Littlethorpe, near Leicester, who is married with two children, admitted strangling teenagers Lynda Mann and Dawn Ashworth in 1983 and 1986. He was sentenced to life imprisonment on two counts of murder, and was also gaoled for ten years on two counts of raping the girls.

He admitted two charges of indecently assaulting two other girls and was gaoled for three years on each count. He also received three years for conspiring to pervert the course of justice by getting Ian Kelly to take his place on the genetic test. All sentences are to run concurrently.

Kelly, aged 23, of Leicester, admitted conspiracy and was jailed for two years, suspended for 18 months. The prosecution accepted that he did not know he was shielding the killer. The deception was revealed by another workmate.

**Colin Pitchfork: tried to avoid DNA-test**

The court heard that Pitchfork had killed Lynda Mann after driving his wife to an evening class. He left his four-month-old son in a carrycot in the car while he stalked the girl on a footpath near Narborough. He was alleged to have told police: "I ripped her clothes off and jumped on her and beat her up".

Mr Brian Escott Cox, QC, prosecuting, said: "He exhibited great self control and what must have been a total lack of remorse — neither his wife, whom he picked up later, nor anyone else, suspected he had been involved in this terrible crime."

Three years later he carried out the identical rape and murder of Dawn Ashworth, who suffered "appalling injuries". A man working nearby heard her screams but thought someone was playing about.

Pitchfork told police he killed the girls because he feared they would identify him. The court heard he enjoyed exposing himself to young women and was a sexual psychotic.

**Evasive double killer, page 4**

*L'affaire Lynda Mann (©TheGuardian)*

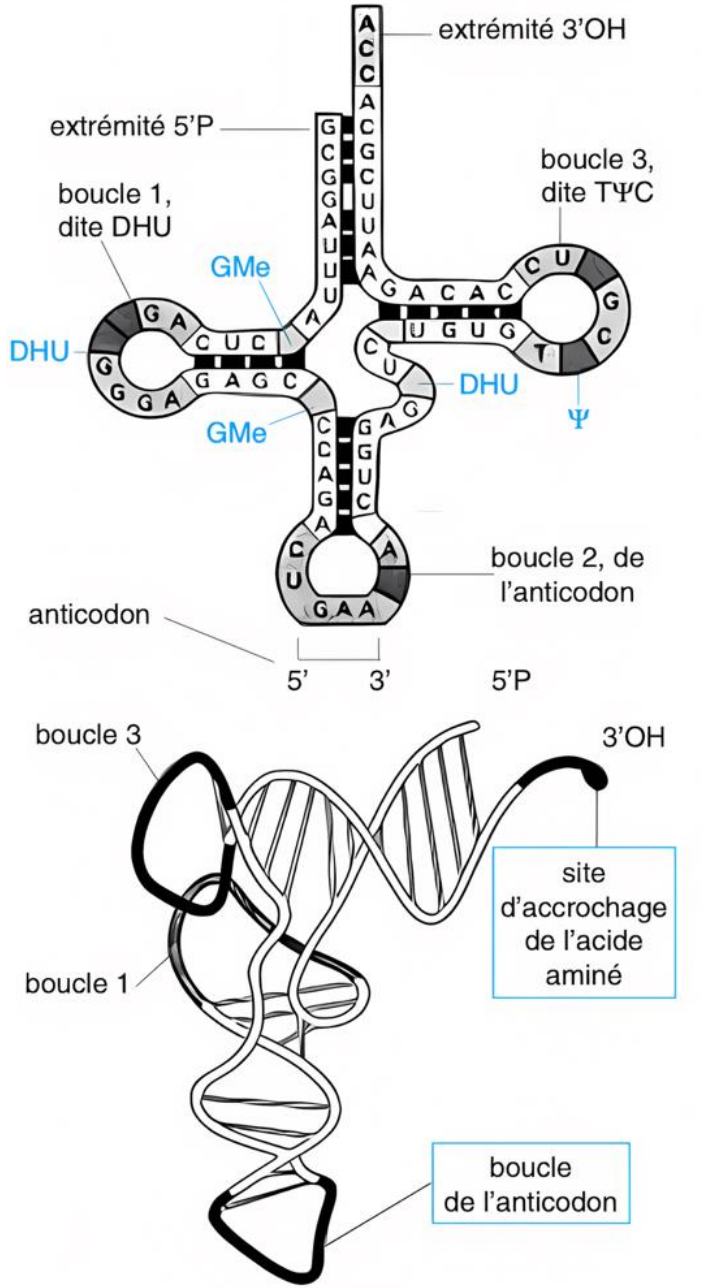



*Fig. 17 : Structure IIaire et IIIaire de l'ARNt (©Biologie cellulaire, Dunod)*

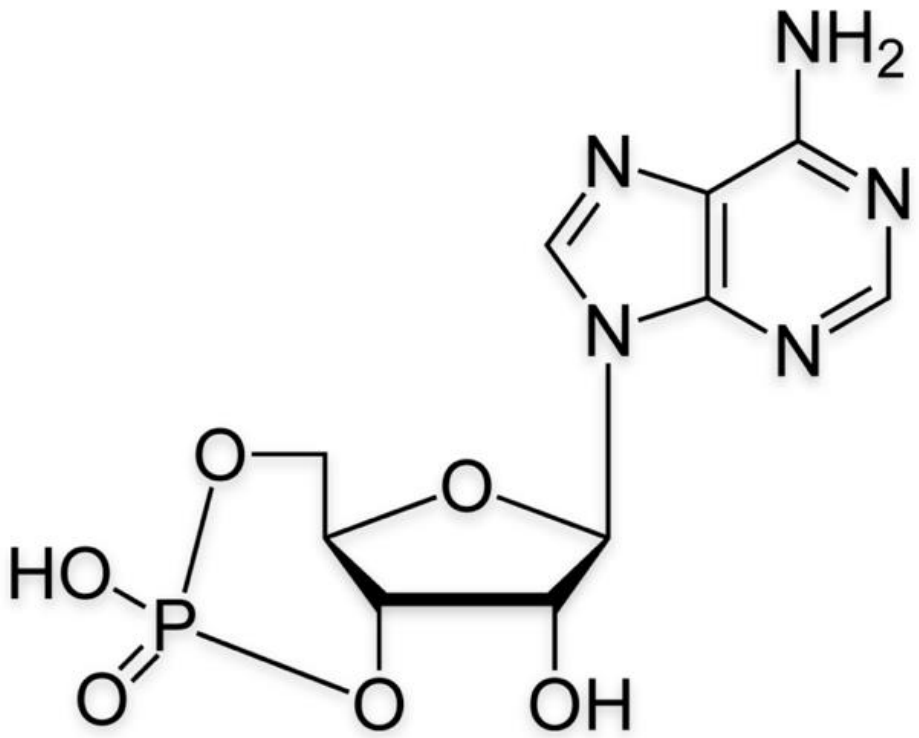



Fig. 18 : Schéma de l'AMPc (©wikimedia)

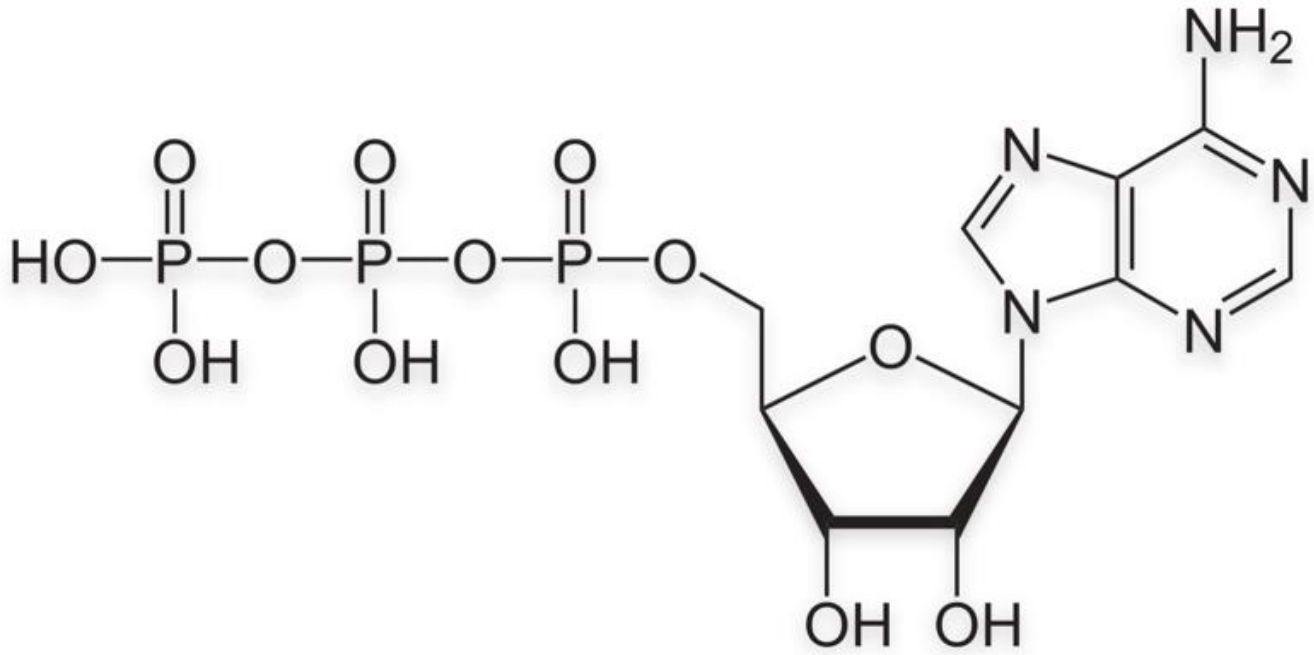



Fig. 19 : Schéma de l'ATP (©wikimedia)

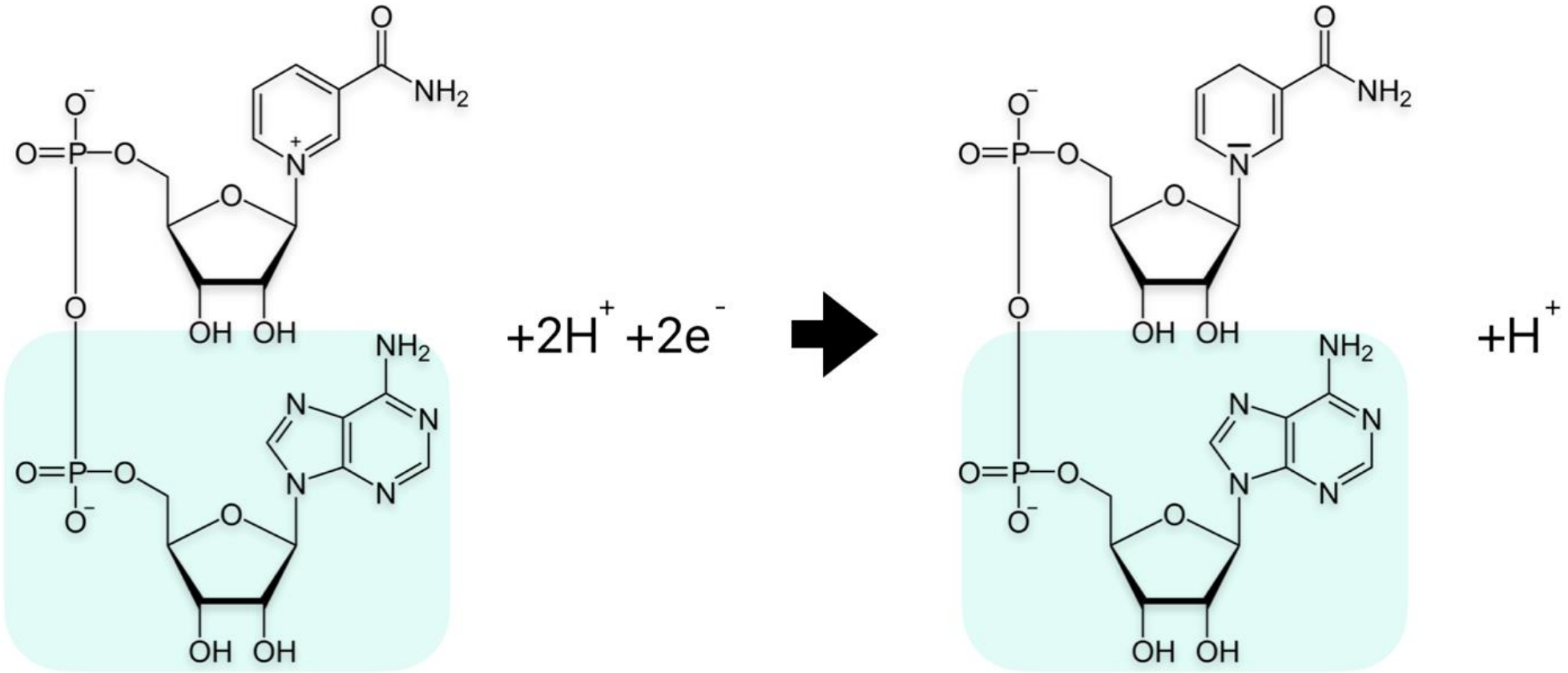



*Fig. 20 : Schéma de la réduction du $NAD^+$*