

# Amgen Biotech Experience (ABE) Program in Turkey

Reflections about Phase I & Phase II  
in Private Ankara Sınav Collage

**AMGEN® Biotech Experience**  
Sınıfta Bilimsel Keşif  
Türkiye

 **SINAV KOLEJİ**



**Chemistry Teacher**  
Private Ankara Sınav Collage  
ABE Turkey



**Biology Teacher**  
Private Ankara Sınav Collage  
ABE Turkey



# How teachers collaborate to learn from one another?

In our practices, collaborative learning environments were provided with our teachers in chemistry, biology, physics and history branches.

- debating, planning, and problem-solving together
- inquiring together, using evidence and research to guide decision-making
- capitalising on each other's strengths
- actively contributing to a respectful and supportive learning environment
- inviting other ABE Teachers outside our institution to observe our own practices.





By participating in the **face-to-face trainings** prepared by the ABE Turkey team, we received training on the new content in this program.





We **shared our experiences** by participating in the training organized for new teachers in the ABE program at the Department of Biological Sciences at METU.





Amgen Biotech Experience (ABE) Applications were **introduced** at the ECO Climate Summit held on 30 – 31 March 2022 in Ankara, visited by approximately 12 thousand people..!

Amgen Biotech Experience (ABE) Applications were **introduced** at Sınav College Science Fair, teachers and students visited.





We have **prepared content** with the social media team of our institution in order to raise awareness with the ABE applications we have made.



# How did we **plan** and **implement** ABE practices?

We have always designed our own ABE applications in two parts.

We planned the theoretical discussion sessions online via zoom in the evening, and the practices as face-to-face at the weekend from our school's laboratory.



How did we make the "AMGEN  
Biotechnology Experience"  
**interdisciplinary** in our  
practices?



In addition to the educational content provided to us before applying the ABE in our school, we prepared our own course contents by holding many **pre-meetings** in order to deepen in the fields of **chemistry, physics, biology** and **biotechnology**, to establish context with different branches and to reach the students' high-level cognitive learning outcomes.

By contacting the teachers in our school and relevant experts in their fields, we designed interesting daily life examples for the subjects we would convey to the students and brainstorming with the students what kind of questions.

## Questioning in terms of Divergent and Convergent

What is a DNA fingerprint?

Can we see DNA with the naked eye?

What is the Human Genome Project?

What is a Genetically Modified Organism?

How do you think GMO analysis of food products can be done?

What is hereditary disease? Which diseases are in the class of Hereditary Diseases?

What is DNA profiling?

Why is there no helicase enzyme in the PCR component?

Why is one cycle insufficient in PCR?

## Questioning in terms of Biology and Chemistry

Why does DNA have a double helix structure? So, is this structure stable?

What would happen if the force holding the nucleotides together was a covalent bond instead of a hydrogen bond?

What is the electrical charge of DNA?

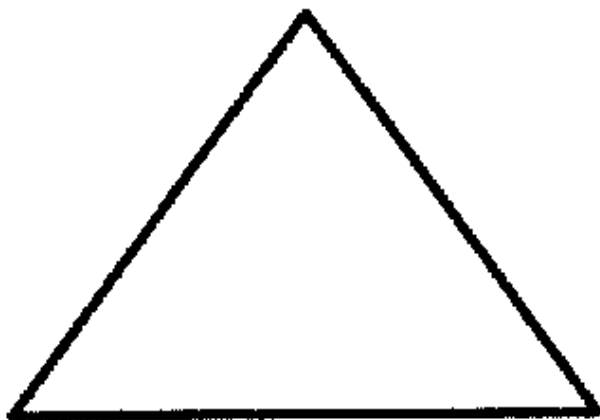
Why is Thymine (T) found in DNA structure, while Uracil (U) is present in RNA structure?

What does "dissolution" mean? Are dissolution and melting the same concepts?

What does Antiparallel Structure of DNA Strands mean?

How long do you think the DNA Replication process takes?

**Macroscopic**  
(experiments and experiences)



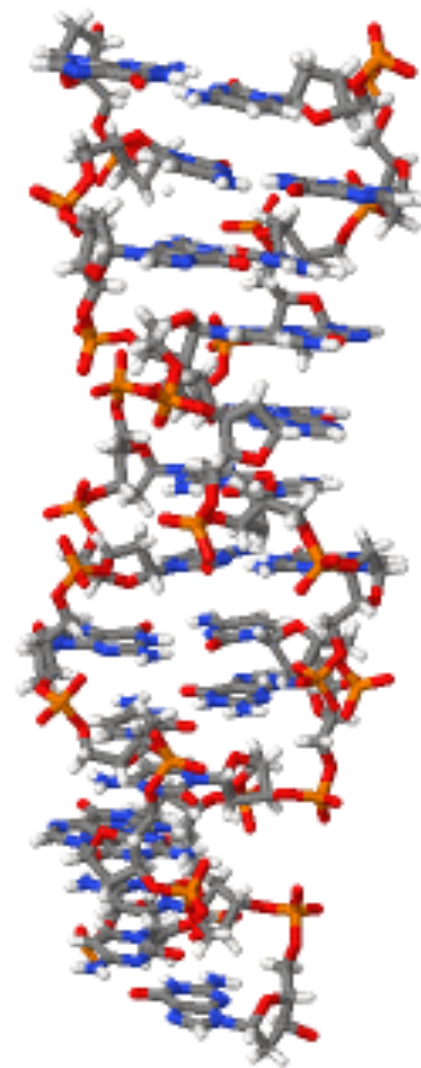
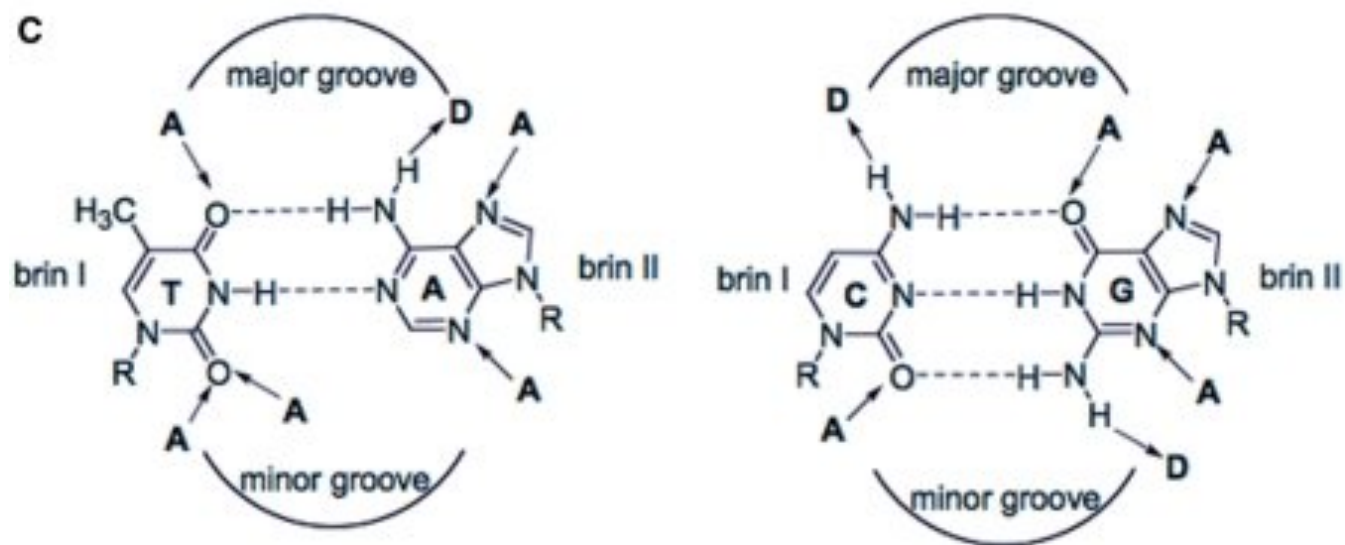
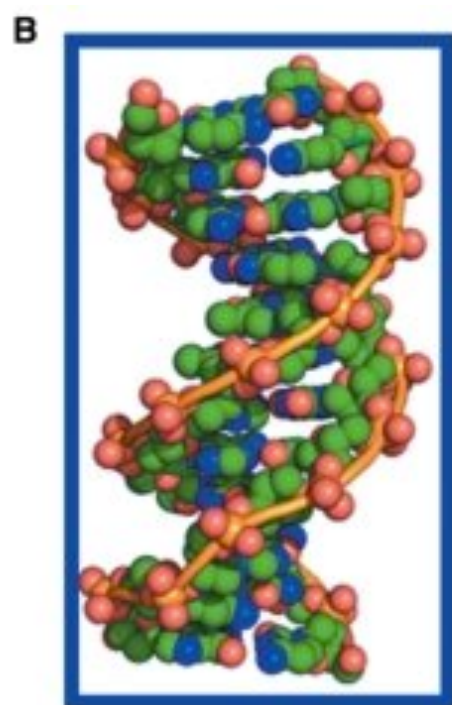
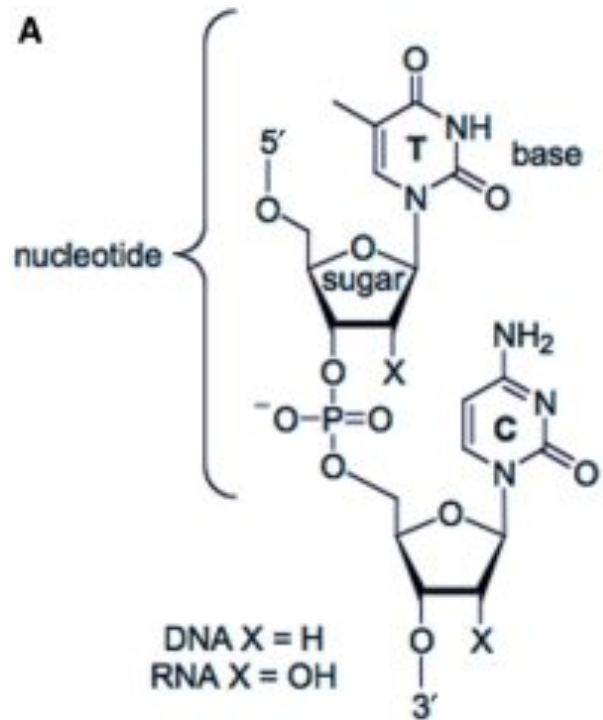
**Symbolic**

(e.g. ball & stick models,  
structural formula, empirical  
formula, computer models,  
chemical equations)

**Sub-microscopic**

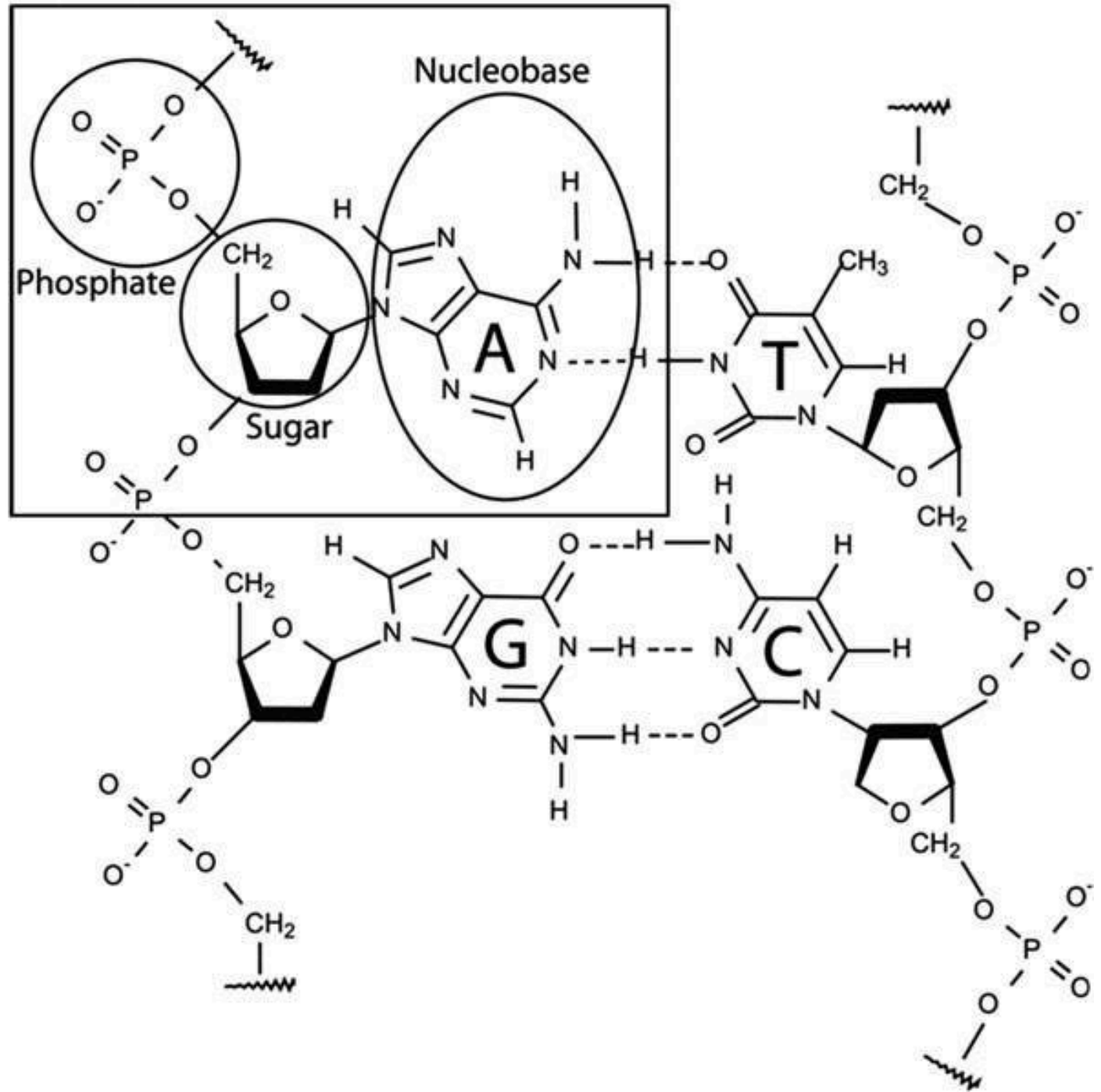
(e.g. electrons, molecules,  
atoms)

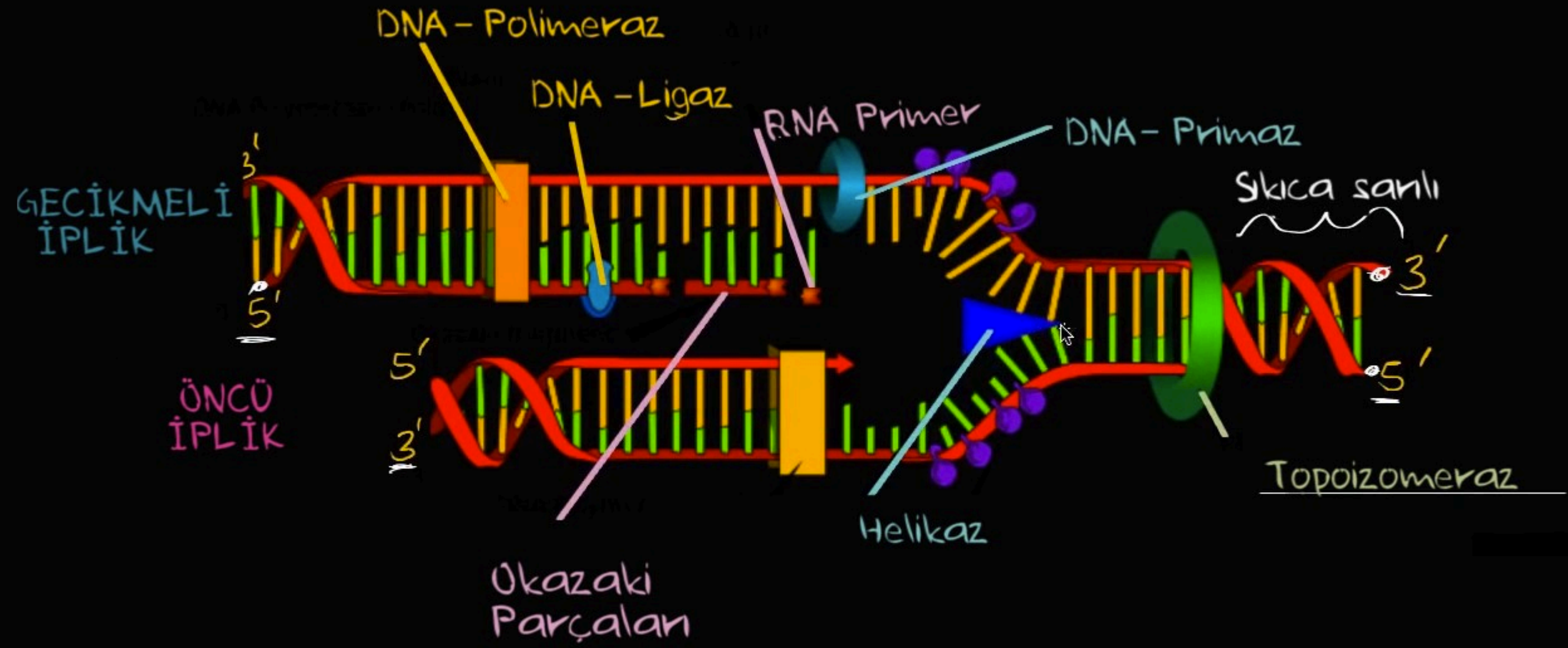
In order to ensure a collaborative learning environment, we have evaluated each corner of this triangle with the concepts that we will always convey to the students with our colleagues.





# Nucleotide





## **Providing historical background information about topic**

How was DNA discovered?

What questions in the minds of scientists led to this discovery?

Injustice to Rosalind Franklin

Brief history of PCR

What is ancient DNA?

What is used to isolate Ancient DNA from anthropological bone samples?

According to the nucleotide sequence database; What can you say about whether wheat was cultivated in Anatolia 8400 years ago?



# Who discovered the helical structure of DNA?

*Surprise – It's not who you think!*

by Moira M. Grant, BSc, MEd, ART, MLT, Toronto, ON

*"The instant I saw the picture my mouth fell open and my pulse began to race....The black cross of reflections which dominated the picture could arise only from a helical structure.... Mere inspection of the X-ray picture gave several of the vital helical parameters."*

These are the words of amazement that James Watson used to describe his first response to the X-ray diffraction patterns in photographs that revealed the helical structure of DNA. He and two of his colleagues went on to win a Nobel Prize and much praise from the science community for their elucidation of DNA's double helix.

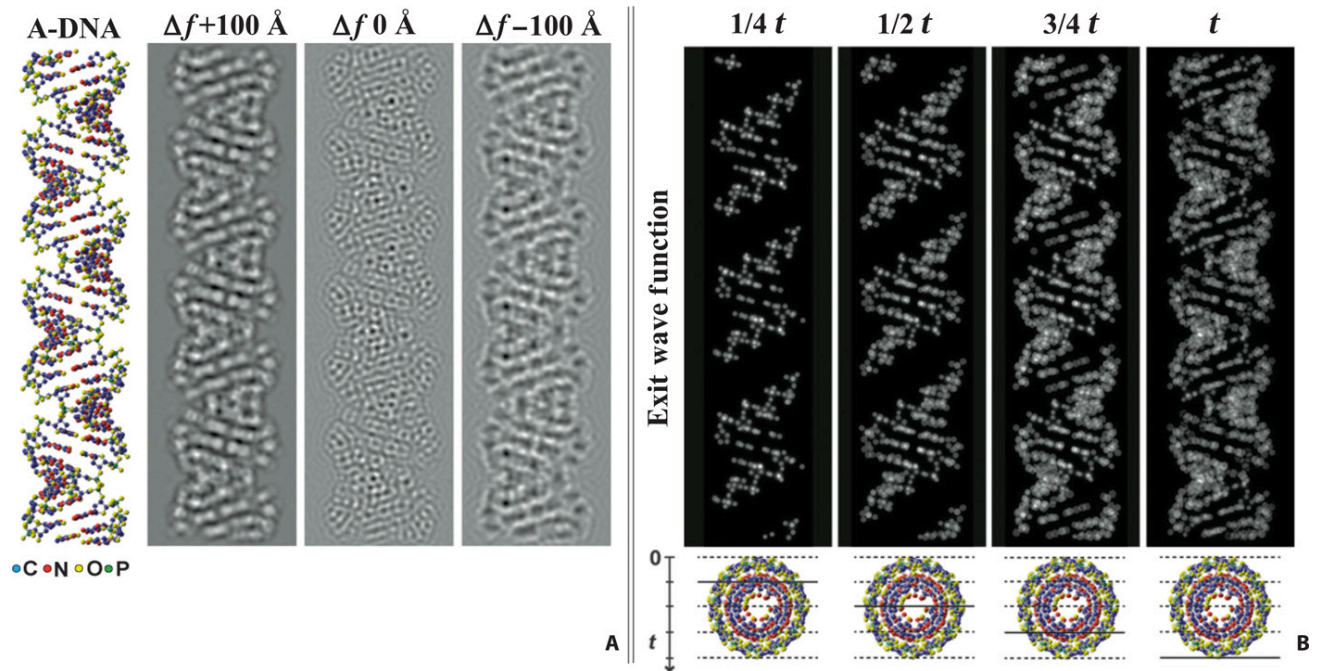
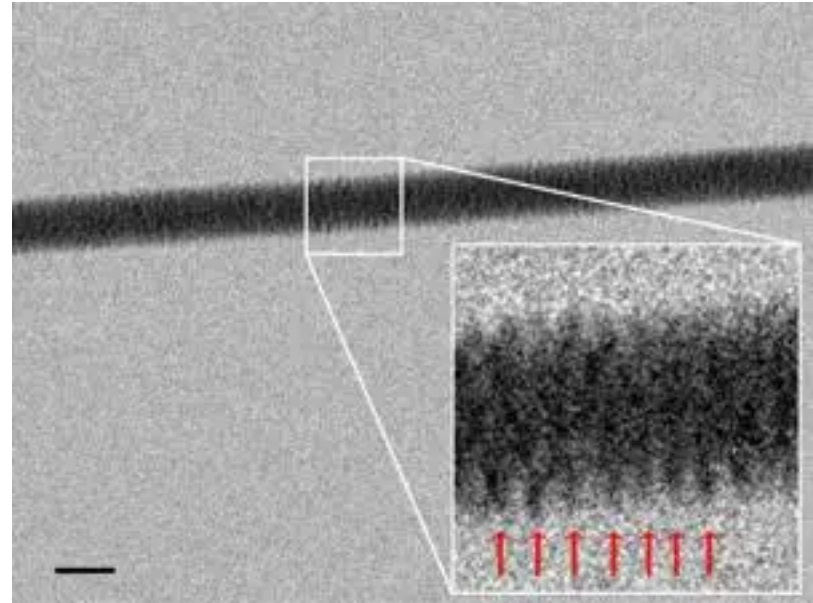
However, Watson's wonderment arose, not from the results of his own work, but upon seeing X-ray crystallographs that had been produced and studied by a colleague, Rosalind Franklin. Yet, Franklin's contribution to our understanding of DNA has gone largely unacknowledged and uncredited. As medical laboratory technology becomes enriched with the skills and knowledge of medical genetics, there is a benefit to knowing the true research origins of the DNA discovery on which so many new laboratory techniques are based.

Rosalind Franklin has been described in various sources as a physicist, an X-ray crystallographer, a biologist, a molecular biologist, and a chemist – attesting to the numerous fields of study that proudly lay claim to association with her work. However, it was not always so. She emerged from her studies in England and France into a post-World

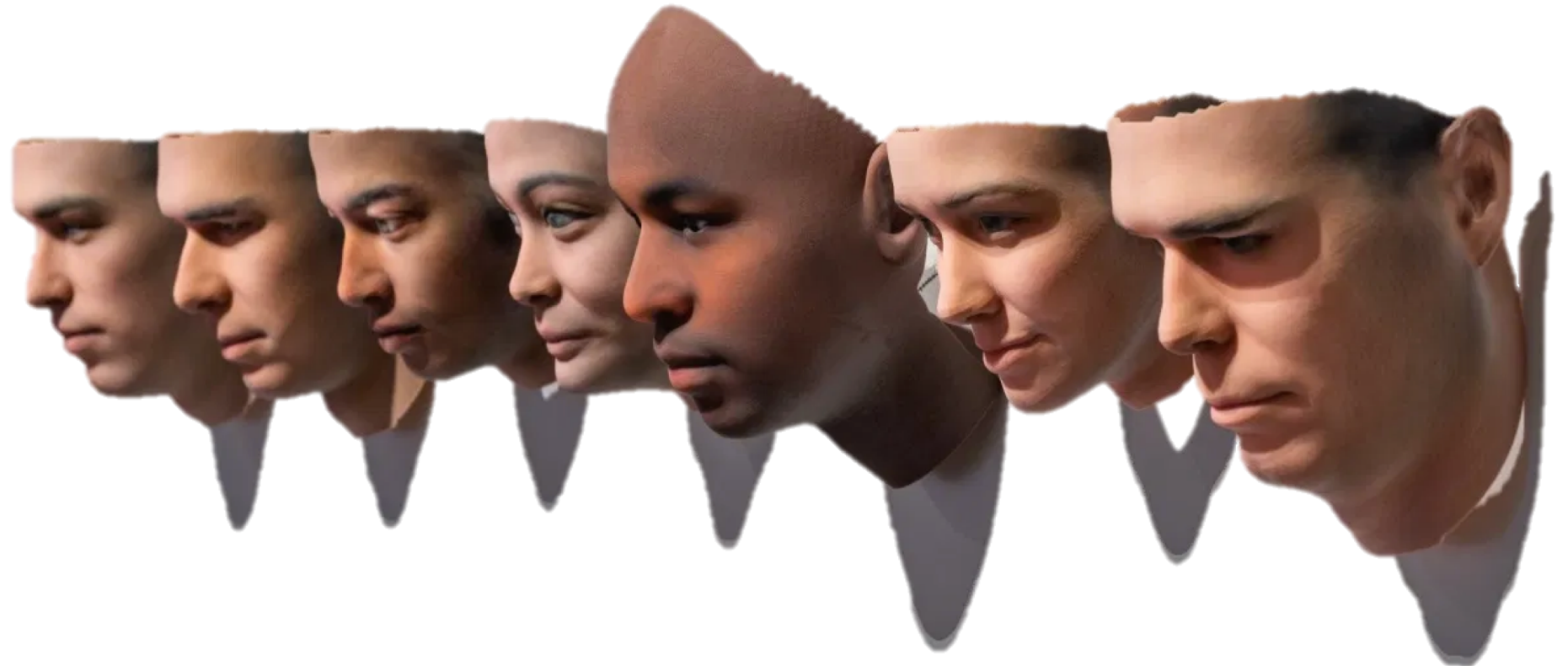


Rosalind Franklin

War II research environment that was distinctly hostile towards both Jewish and female scientists. At that time, many professional and social opportunities were closed to women and to Jews. The workplace offered no respite



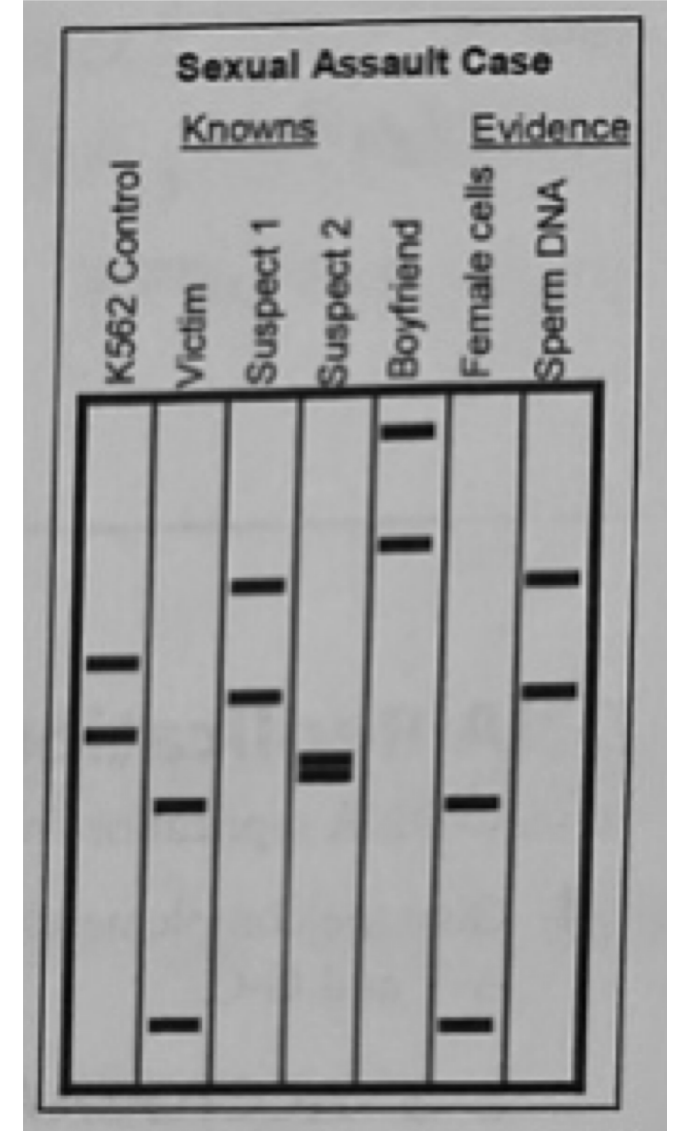
# DNA from Cigarette Butts Turned into 3D Printed Portraits





# Sample Case: Who killed Sally?

Soğuk bir ocak akşamında çalıştığı kuyumcu dükkanını kapamak üzere olan Sally, kasayı sayarken başından aldığı darbe sonucu tezgahın üzerine yığılmış halde bulunmuştur. Yapılan incelemeler sonrası maktulün cinsel saldırıya uğradığı tespit edilmiştir. Olay yerinde öldürülen kadın maktulün elbisesinin üzerine bulaşmış spermden, olay esnasında bölgede bulunduğu tespit edilen iki şüpheliden ve Sally'nin ayrılmak üzere olduğu erkek arkadaşından DNA örnekleri alınmıştır. DNA analizleri yapıldıktan sonra gözlemlenen sonuçlar yandaki gibi olduğuna göre, hangi şüpheli muhtemelen suçludur?

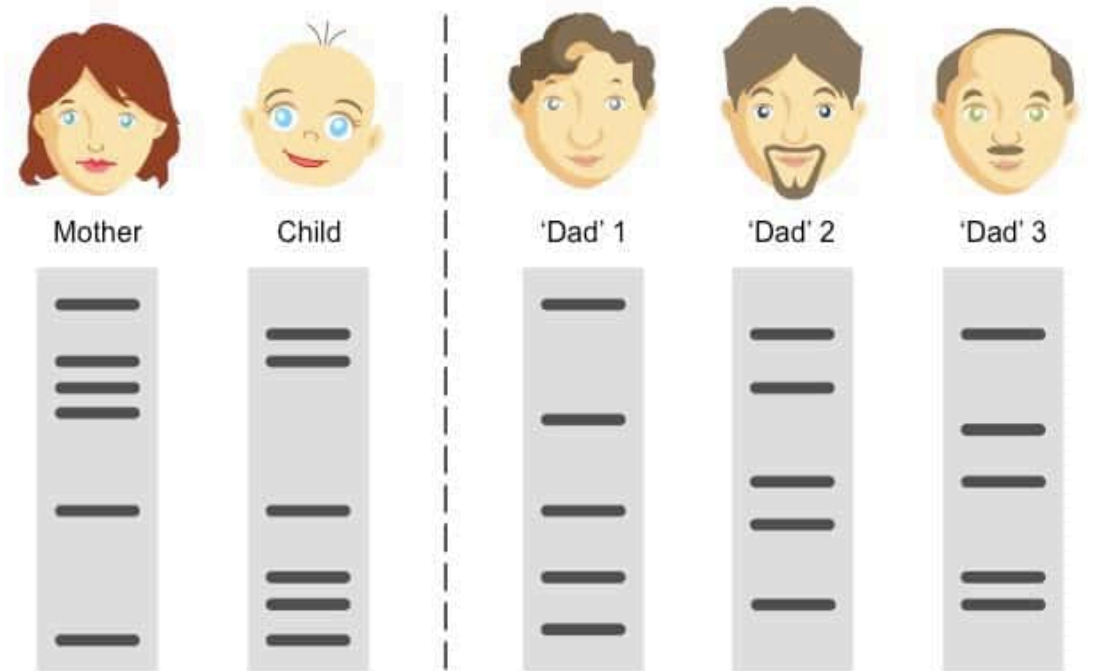




## Sample Case: Who is the biological father of this child?

Elizabeth Hurley, hamile olduđu sırada Steve Bing ile birlikteydi. Ancak adam çocuđun babasının kendisi olmadığını iddia ediyordu. Steve Bing'e göre o sıralar aralarında derin bir ilişki yoktu. Ancak Elizabeth durumu yalanlayarak ona karşı asla ihanet etmediđini ve sadık olduğunu dile getirdi. Bu ilişki öncesinde ünlü aktör Hugh Grant ile sarsıntılı bir ilişki geçiren ve ona olan bađlılığı herkes tarafından bilinen Elizabeth kendini babalık tartışmasının ortasında buldu.

Açılan davalar sonucunda yapılan babalık testi için olası babalardan DNA örnekleri alındı ve analiz edildi. Mahkemede açıklanan karara göre bu çocuđun biyolojik babası kimdir?





# Ancient DNA: Was Wheat Farming Made in Our Country 8400 Years Ago?





