



UEF3. Gene expression and mechanisms of regulation

Weekly workload	Coef	Cred
3h	3	6

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University of Jijel

Course Content

- **Chapter 1: Fundamentals of Gene Expression**
Gene Structure, Replication, Transcription, Translation
- **Chapter 2: Regulation of Gene Expression**
Transcriptional Regulation, Post-Transcriptional Regulation
- **Chapter 3: Agronomic or Biotechnological Applications**
Varietal Improvement, Animal Health

Self-directed projects

Students are asked to prepare and present (15 to 20 min) orally a self-directed project on one of the following topics:

-Plant breeding (SNPs, QTLs marker selection, CRISPR-Cas9 for wheat...)

-Animal health (lactation, growth....)

Guidelines

- Bibliographic review – recent articles (reviews or originals), no copy-paste
- Introduction – with alphabetical citations
- Written report (body)– structured, with references
- Conclusion – include your personal critical opinion
- Reference list – complete and consistent
- Figures/Tables – with captions and references
- Formatting – 8 to 10 pages, Times New Roman 12, line spacing 1.5,
- PowerPoint presentation – 15–20 minutes

Google Scholar biofilm industrial fermentation

Articles Environ 116 000 résultats (0,14 s)

Date indifférente
Depuis 2025
Depuis 2024
Depuis 2021
Période spécifique...

Trier par pertinence
Trier par date

Toutes les langues
Recherche dans les pages en Français

Tous les types
Articles de revue

☐ Inclure les brevets
☒ Inclure les citations

☒ Créer l'alerte

Current and future trends for **biofilm** reactors for **fermentation** processes
D Ercan, A Demirci - Critical reviews in biotechnology, 2015 - Taylor & Francis
... properties of a **biofilm** matrix to run the **biofilm** reactor at optimum ... of **biofilm** formation;
properties of a **biofilm** matrix and their roles in the **biofilm** formation; factors that improve the **biofilm** ...
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Multispecies **biofilms** in **fermentation**: **Biofilm** formation, microbial interactions, and communication
S Yao, L Hao, R Zhou, Y Jin, J Huang... - reviews in food science ..., 2022 - Wiley Online Library
... Here, in this review, we focus on multispecies **biofilms** in **fermentation**. More attention ... **biofilm**
formation on **biofilm** members' fitness, microbial community development, and **fermentation** ...
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Biofilm application in the microbial biochemicals production process
Y Jiang, Y Liu, X Zhang, H Gao, L Mou, M Wu... - Biotechnology ..., 2021 - Elsevier
... the biological application of **biofilms** in the microbial **fermentation** process. Accordingly,
this ... the **biofilms** formation mechanism and potential functions in the microbial **fermentation** ...
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Beneficial **biofilm** applications in food and agricultural industry
E Unal Turhan, Z Erginkaya, M Konukluoglu... - Health and safety ..., 2019 - Springer
... of beneficial **biofilms** in food and agricultural industry and ... **biofilm** applications in food and
agricultural industry are ... strain **biofilms**, microbial **biofilms** specific to certain fermented food ...
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Recherches associées
food industry microbial biofilms
microbial fermentation biofilm reactors
saccharomyces cerevisiae biofilm
formation immobilized fermentation

Activer Wind
Accédez aux par

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7

Google Scholar biofilm industrial fermentation

Articles Environ 116 000 résultats (0,14 s) Mon profil

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Recherches associées
food industry microbial biofilms
microbial fermentation biofilm reactors
saccharomyces cerevisiae biofilm
formation immobilized fermentation

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Citer

APA Jiang, Y., Liu, Y., Zhang, X., Gao, H., Mou, L., Wu, M., ... & Jiang, M. (2021). Biofilm application in the microbial biochemicals production process. *Biotechnology Advances*, 48, 107724

ISO 690 JIANG, Yujia, LIU, Yansong, ZHANG, Xiaoyu, et al. Biofilm application in the microbial biochemicals production process. *Biotechnology Advances*, 2021, vol. 48, p. 107724.

MLA Jiang, Yujia, et al. "Biofilm application in the microbial biochemicals production process." *Biotechnology Advances* 48 (2021): 107724.

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Ethical use of Gen-AI

To Do

- 1) **Use AI to brainstorm ideas or outline your report.** Example: Ask a chatbot to suggest possible topics for your report or help you organize your project outline.
- ✓ **Use AI to explain difficult concepts or terms.** Example: If you don't understand a scientific term, ask the AI to explain it in simple language.
- ✓ **Use AI to summarize articles or research papers.** Example: Paste a research abstract into an AI tool and ask for a summary to help you understand the main points.
- ✓ **Use AI for grammar and spelling checks.** Example: Run your draft through an AI tool to correct grammar mistakes before submitting your thesis.
- ✓ **Acknowledge AI assistance when required.** Example: Add a note in your report: "AI tools were used for grammar checking and summarizing sources."
- ✓ **Critically review AI-generated content before using it.** Example: Double-check facts or references suggested by AI to ensure they are accurate and relevant.

Ethical use of Gen-AI

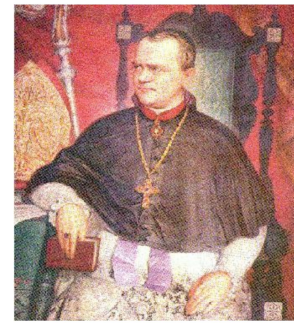
Do Not

- ✗ **Do not submit AI-generated text as your own work without acknowledgment.** Example: Copying and pasting an entire essay written by AI and submitting it as your own is not allowed.
- ✗ **Do not use AI to complete assignments where its use is forbidden.** Example: Using AI to translate a text during a language exam when the instructor says not to.
- ✗ **Do not enter personal, sensitive, or confidential information into AI tools.** Example: Uploading your classmates' grades or unpublished research data into an AI chatbot.
- ✗ **Do not use AI to fabricate data, results, or references.** Example: Generating fake experiment results or inventing citations for your thesis using AI.
- ✗ **Do not rely only on AI for critical thinking or analysis.** Example: Letting AI write your discussion or conclusion section without adding your own insights.
- ✗ **Do not use AI to plagiarize or copy content from protected sources.** Example: Asking AI to summarize a copyrighted book and then copying the summary into your report without citation.

History

1. The Emergence of Formal Genetics

Based on observations carried out on peas (*Pisum sativum*), he established as early as 1866 the three laws of heredity.

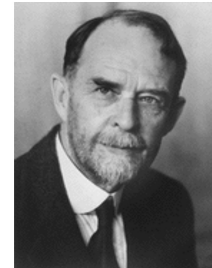


Gregor Mendel (1822 - 1884)

2. The Chromosome as the Support of Heredity

Study model: the fruit fly (*Drosophila melanogaster*) His work made it possible to recognize chromosomes as the physical support of genes and to establish the chromosomal theory of heredity: genes are organized in a linear series along the chromosome.

For this work, Morgan received the Nobel Prize in Physiology and Medicine in 1933.



Thomas Morgan (1866 - 1945)

3. The Convergence of Biochemistry and Genetics

The first relationship between a gene and an enzyme was established in 1902 by Archibald Garrod (St Bartholomew's Hospital, London), based on an observation concerning *alkaptonuria*, which is an excretion anomaly affecting the metabolism of tyrosine and phenylalanine.

This observation established for the first time a correlation between a gene and an enzyme.

This correlation was later generalized by Beadle and Tatum thanks to the metabolic mutants of *Neurospora crassa*.



George Wells Beadle (1903 - 1989) left and Edward Tatum (right)

4. DNA as the Support of Genetic Information

The first phenomenon that allowed progress in identifying the support of heredity was bacterial transformation, reported in 1928 by the English scientist **Fred Griffith** (1877–1941) at the Pathology Laboratory of the United Kingdom's Ministry of Health.

The biochemical nature of the genetic material highlighted by Griffith was elucidated in 1944 through the work of **Oswald Avery and his colleagues (Colin McLeod and McLyn McCarthy)** at the Rockefeller Institute in New York. They repeated Griffith's experiments on bacterial transformation and sought to purify the transforming factor of *Pneumococcus*.

In 1950, **Chargaff** showed that the C/G or A/T ratio is constant and almost equal to 1 in all species studied. This observation was decisive for the development of the DNA structural model by **Watson and Crick** a few years later.

In 1952, **Hershey and Chase** succeeded in detecting recombination phenomena in phages; similar observations were later reported by **Delbrück**.



Fred Griffith (1877 - 1941)



Oswald Avery (1877 - 1955)



Erwin Chargaff (1905 - 1992)

6. The Structure of DNA

The double-helix structure of DNA was elucidated by **Watson and Crick** in 1953.

Crick, Watson, and Wilkins received the Nobel Prize in 1962 for this work, which was described as “**The greatest scientific achievement of our century.**”

Rosalind Franklin would most likely have been associated with this prize if illness had not prematurely taken her life.



James Dewey Watson (1928 -)



Francis Harry Compton Crick (1916 - 2004)



Rosalind Franklin (1920 - 1958)

1953 : Watson and Crick : DNA double helix

1957 : Gene and primary structure of a protein

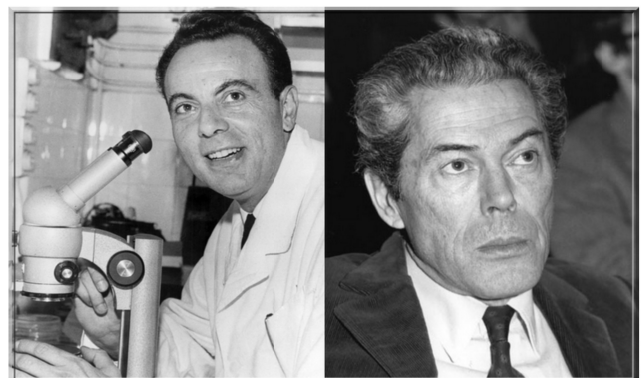
1961 : Concept messenger RNA “ one gene -one enzyme ” (Jacob and Monod)

1963 : Genetic code discovery (Nirenberg, Ochoa and Khorana)



**Birth of Molecular
Biology**

**Gene = A DNA fragment that codes
for a protein**



François Jacob (1920 -) and Jacques Monod (1910 - 1976)

From 1970 : technical developments : Genomic revolution
(*gene = tool = a manipulable entity*)

Discovery :
- Restriction enzymes
- Reverse transcriptase RNA → DNA)

- ✓ Gene sequencing (application to human genome)
- ✓ Gene molecular cloning (≠ organism cloning)
- ✓ Animal transgenesis (KO mouse) and plant (GMO)
- ✓ Cell factory : production of recombinant proteins (from 1980)
- ✓ Identification of disease related genes (mutations : diagnostic)
- ✓ Treatment of genetic diseases : gene therapy (genetic diseases, cancers)
- ✓ Cell therapy

Source : Alain Bernot et Olivier Alibert. La naissance de la biologie moléculaire. <http://www.genoscope.cns.fr/externe/HistoireBM/>

