



مقدمه عن أسس التقنيات الاحيائية

# Lec1 \ Introduction to Biotechnology

قسم علوم التقنيات الاحيائية الطبية  
المرحلة الاولى

اعداد

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الايميل :  
رمز الصف :

# قصة (“من قطعة خبز إلى إنقاذ الأرواح”)



- قبل آلاف السنين، لاحظ الإنسان أن قطعة العجين إذا تركت فترة تتحول إلى خبز هش ولذيد. لم يكن يعلم أن كائنات مجهرية تُدعى الخمائر هي السبب . بعد قرون، استخدم العلماء هذه الكائنات نفسها لإنتاج الإنسولين لمرضى السكري ، واللقاحات، والمضادات الحيوية، وحتى الوقود الحيوي . السؤال هو: كيف انتقل الإنسان من ملاحظة بسيطة في المطبخ إلى التحكم بالخلايا والجينات داخل المختبر ؟ هنا تبدأ قصتنا مع التقنيات الأحيائية .
- التقنيات الأحيائية هي العلم الذي يوظف الكائنات الحية أو أجزاء منها لخدمة الإنسان، وهذا ما سنتعرف عليه اليوم من خلال أساسها ومبادئها

# What Is Biotechnology

Biotechnology – using **living organisms**, or the **products** of living organisms, for human benefit to make a product or solve a problem

## Historical Examples

- Fermentation
- Selective breeding
- Use of antibiotics



# Example of Biotechnology – Selective Breeding

- What feature of Casper makes it a "model organism" to study migration of cancer cells compared to wildtype fish?
- Via selective breeding التربية الانتقائية by mating a zebrafish mutant that lacked reflective pigment with a zebrafish that lacked black pigment, Casper is transparent. This feature allows scientists to inject fluorescent cancer cells into Casper's abdominal cavity and then track the migration of those cells to specific locations in his body.

(a)



Normal zebrafish

(b)



"Casper" zebrafish – made  
by selective breeding

Activ  
Go to !

# Modern Examples

- Gene cloning
- Genetic engineering
- Recombinant DNA technology
- Human Genome Project



# Development of Biotechnology:

Over the **last 100 hundred** years or so, biotechnology emerged with the following discoveries and advancements:

- 1919. Hungarian scientist **Karl Ereky** coins the term **biotechnology**.
- 1928. Alexander Fleming **discovers penicillin**, the first true **antibiotic**.

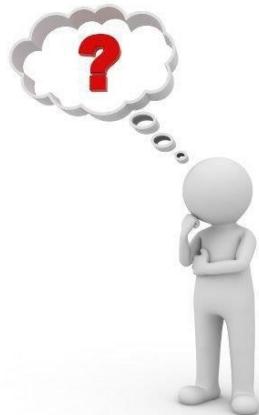


- 2020. **MRNA vaccine and monoclonal antibody technology** is used to treat the **SARS-CoV-2 virus**.



## سؤال جماعي للمناقشة

اذكروا أي منتج أو تقنية في حياتنا اليومية تعتقدون أنها تعتمد على الأحياء المجهرية ؟



الخنزير

اللبن

المضادات الحيوية

اللقاحات

فحص DNA

الهندسة الوراثية

# Example of "modern" biotechnology:

- recombinant DNA technology started modern biotech as an industry
- **Examples of applications**
- development of disease-resistant plants
- food crops that produce greater yields
- "golden rice" engineered to be more nutritious
- genetically engineered bacteria that can degrade environmental pollutants



## more examples of applications



Low cost production of proteins used to treat diseases



-Development of recombinant enzymes to be used by molecular biologists

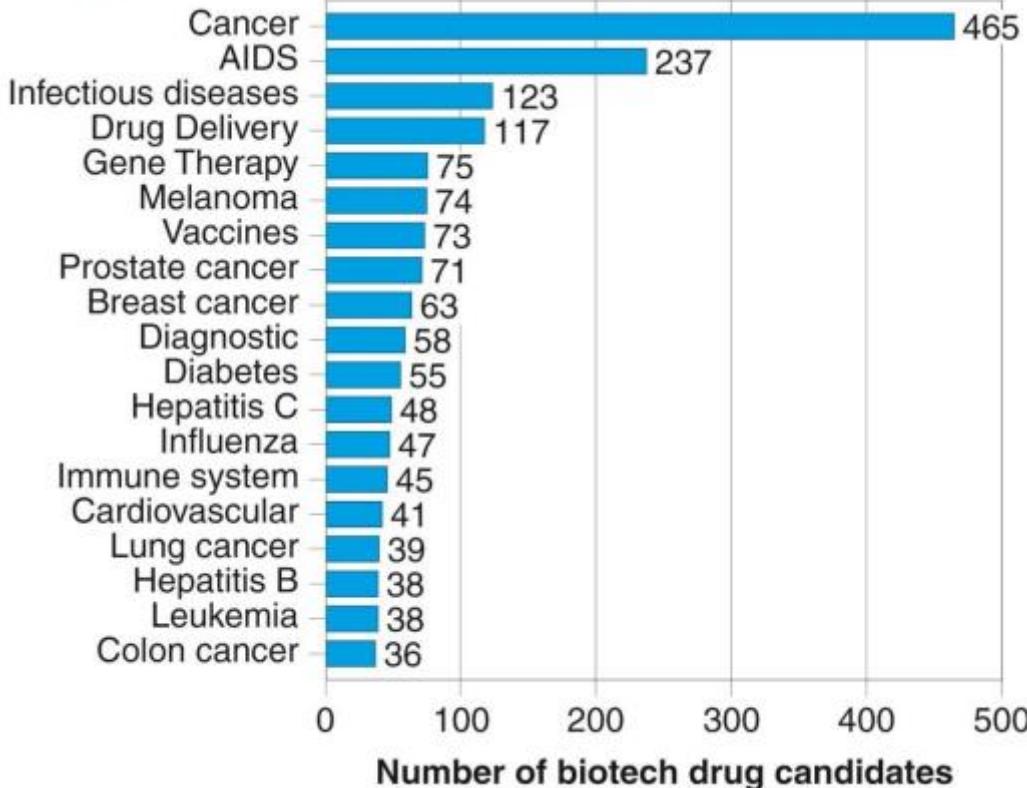


- for research

Most drugs are developed to  
combat محاربة diseases affecting  
humans – Why?

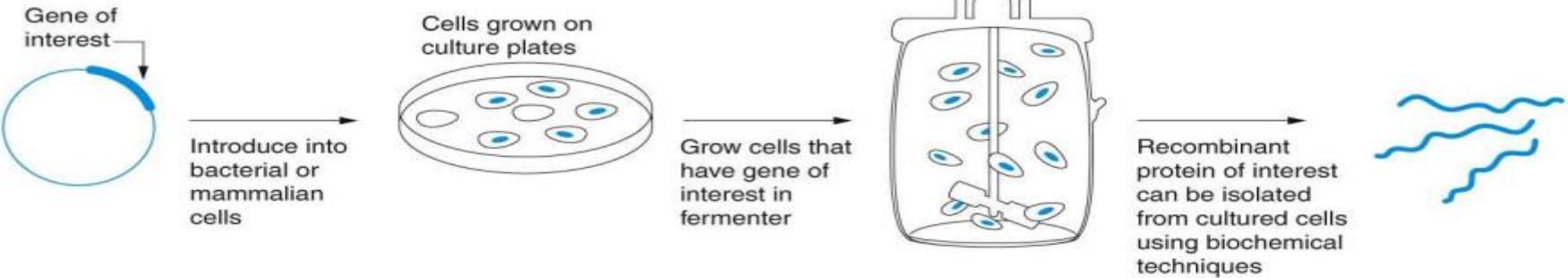
- Which disease has the most drug candidates ?Why does that disease have more drug candidates than hepatitis C ?





# Use genetically modified cultured cells to make protein

a)



b)



## Biotech examples

أمثله على التكنولوجيا الحيوية

1. Medicine
2. Agriculture
3. Environment
4. Forestry
5. Food and Drinks processing

# Medicine

Therapeutic - product used to maintain health or prevent disease Biopharmaceuticals – drug or vaccine developed through biotechnology Called designer drugs

Certain blood – derived products needed in human medicine can be produced in the milk of goats



# Environment

- Any biotechnological process that may promote a **good environment**
- Organisms developed during the gulf war to “eat” oil
- Organism used in gold mining to “**eat**” contaminants



Reference

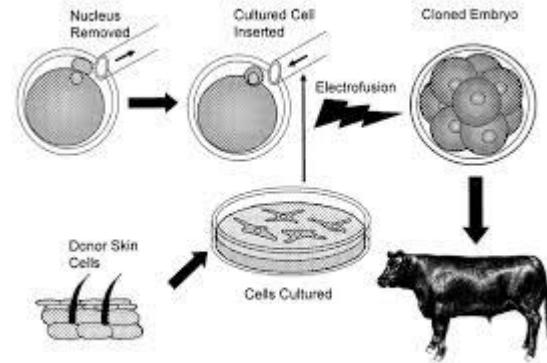


90-100% Plant Oiling



# Forestry

- Plant biotech
- Animal biotech



# Forestry

- Plant biotech
- Improve plants and the products produced from them
- Insect and disease resistance
- Engineered to have desired characteristics

- Animal biotech
- Improve animals or the products they produce
- Animals may be used to produce products that promote human health

