Specialty: Plant biotechnology 3rd year license

**History of plant biotechnology**

 The field of plant biotechnology has undergone significant historical development, with key milestones and breakthroughs that have revolutionized agriculture and plant science. Here's a brief overview of the historical development of plant biotechnology:

*Pre-1950s: The Predecessors*

 Early cultivation and selective breeding of plants by farmers and horticulturists were the precursors to modern plant biotechnology.

Gregor Mendel's work on inheritance and genetics in the mid-19th century laid the foundation for understanding the heredity of traits in plants.

*1950s-1970s: Advent of Tissue Culture:*

 Tissue culture techniques were developed, allowing plant cells to be grown in vitro. This opened the door to the manipulation of plant cells and tissues. The first successful regeneration of whole plants from tissue culture was achieved in the 1960s.

*1970s-1980s: Recombinant DNA Technology:*

 The advent of recombinant DNA technology in the 1970s marked a significant turning point in biotechnology. Scientists began to manipulate plant genomes, insert foreign genes, and create transgenic plants. The development of Agrobacterium-mediated gene transfer enabled the introduction of foreign genes into plant cells.

*1980s-1990s: Transgenic Crop Development:*

 The first genetically modified (GM) plants, such as the Flavr Savr tomato and insect-resistant crops, were developed and commercialized in the 1990s. These crops offered benefits like reduced pesticide use and increased crop yields.

*1990s-2000s: Biotechnology Advancements:*

 The development of marker-assisted breeding allowed for more precise selection of desirable traits in plants. Genomics projects, like the sequencing of the Arabidopsis thaliana genome, provided valuable insights into plant genetics.

*2000s-Present: Genome Editing and CRISPR:*

The advent of CRISPR-Cas9 technology in the 2010s revolutionized plant biotechnology.RISPR-Cas9 allows for precise and targeted genome editing, enabling the development of crops with specific traits without the introduction of foreign genes.Several CRISPR-edited crops have been developed and are undergoing regulatory evaluation.

*2020s and Beyond: Sustainable Agriculture:*

 The focus in plant biotechnology is shifting towards sustainability and climate-resilient crops. Research is ongoing to develop crops that are more drought-resistant, disease-resistant, and able to thrive in changing environmental conditions. Throughout this historical development, plant biotechnology has played a crucial role in addressing global challenges related to food security, environmental sustainability, and agriculture. It continues to be a dynamic and evolving field with significant potential for further advancements in the future.

**Key words/ scientific**

* selective breeding: التربية الانتقائية
* horticulturists: البستانيين
* precursors**:** الأسلاف
* genetics: علم الوراثة
* heredity: الوراثة
* traits in plants: الصفات في النباتات
* Tissue culture: زراعة الأنسجة
* plant cells: زرع الخلايا
* vitro: المختبر
* Manipulation of plant cells: التلاعب بالخلايا النباتية
* regeneration: تجديد
* recombinant DNA: الحمض النووي معاد التركيب
* plant genomes: الجينومات النباتية
* foreign genes: الجينات الأجنبية
* transgenic plants: النباتات المعدلة وراثيا
* Agrobacterium-mediated: بوساطة البكتيريا الزراعية
* foreign genes into plant cells: الجينات الأجنبية إلى الخلايا النباتية
* genetically modified: معدل جينيا
* insect-resistant crops: المحاصيل المقاومة للحشرات
* reduced pesticide: انخفاض المبيدات الحشرية
* increased crop yields: زيادة غلة المحاصيل
* marker-assisted breeding: تربية بمساعدة علامة
* traits: سمات
* Genomics projects: مشاريع الجينوم
* Sequencing: التسلسل
* plant genetics: الوراثة النباتية
* targeted genome editing: تحرير الجينوم المستهدف
* crops: المحاصيل
* climate-resilient crops: المحاصيل المقاومة للمناخ
* drought-resistant: مقاومة للجفاف
* disease-resistant: مقاومة المرض
* environmental sustainability: الاستدامة البيئية