A Brief History of Flu Vaccines

**Egg Culture**

- **1918-19**
  - Flu pandemic: 30 million to 50 million died worldwide

- **1931**
  - Discovery: viruses can be grown in eggs

- **1935**
  - First egg culture vaccination (smallpox)

- **1935-41**
  - First human influenza vaccines tested

- **1942-43**
  - Extensive influenza vaccine studies at army posts

- **1946-47**
  - Discovery: influenza strains change annually

**Cell Culture**

- **1958**
  - Madin-Darby Canine Kidney (MDCK) cell line developed for harvesting viruses

- **1960-present**
  - Cell cultures used for many vaccines, e.g., polio

**2007**

- Novartis: first licensed, commercially distributed, cell culture-based influenza vaccine in Europe

**2011**

- US government announced Novartis facility first to be pandemic ready

**2012**

- FDA approves the first cell culture influenza vaccine

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**References:**

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**Timeline**

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- 1931: Discovery of viruses can be grown in eggs.
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- 1935-41: First human influenza vaccines tested.
- 1942-43: Extensive influenza vaccine studies at army posts.
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