# mRNA vaccine against several food allergies shows promise in mice

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## News

Researchers at the Technical University of Denmark (DTU) have designed a single mRNA vaccine against a group of related food and pollen allergens and tested it in mice; the work was reported on 19 November 2026. The study appeared online in Nature Communications on 16 March 2026. It targets the allergen family called lipid transfer proteins (LTPs), found in peach, nuts, peanut and olive pollen: a 'consensus allergen' (cnsLTP1) combining several LTPs was designed and its mRNA packed in lipid nanoparticles (LNPs). In healthy mice it produced high levels of protective IgG antibodies without harmful IgE, and these blocked IgE binding in allergic patients' blood samples. In allergic mice the vaccine was well tolerated but did not give full protection against anaphylaxis. This is a proof-of-concept stage; it has not been tested in humans. The Lundbeck Foundation is funding the work with 5 million Danish kroner, and the next goal is approval for human trials.

## Key facts for the exam

| Point | Details |
|---|---|
| **Institution** | Technical University of Denmark (DTU) |
| **Journal** | Nature Communications (online 16.03.2026) |
| **Vaccine type** | mRNA in lipid nanoparticles (LNP) |

| Point | Details |
|---|---|
| **Target** | Lipid transfer proteins – peach, nuts, peanut, pollen |
| **Strategy** | 'Consensus allergen' cnsLTP1 combining several LTPs |
| **Result** | Protective IgG raised; IgE binding blocked |
| **Limitation** | No full protection from anaphylaxis |
| **Stage** | Mice and lab only; no human trials yet |

## Background

- How allergy works: food allergy is mostly an IgE-mediated 'type I hypersensitivity'. On re-exposure, mast cells and basophils release histamine and other mediators, causing itching, swelling and breathing difficulty.
- Risk and treatment: peanuts and tree nuts are the leading causes of fatal anaphylaxis in children. An adrenaline (epinephrine) injection is the first-line treatment for anaphylaxis. Today, avoiding the allergen is the main means of prevention.
- New strategy: proteins of one allergen family resemble each other, so a person may react to many foods (cross-reactivity). The idea is that vaccine-induced IgG acts as a 'blocking antibody', catching the allergen before it reaches IgE. LTP allergy is common in southern and central Europe.
- mRNA technology: the same platform used in COVID-19 vaccines. Katalin Karikó and Drew Weissman won the 2023 Nobel in Medicine for discoveries on nucleoside base modifications that enabled effective mRNA vaccines. GEMCOVAC-OM, an mRNA-based Omicron booster made in India, was developed by Gennova with DBT–BIRAC support and launched on 24 June 2023.

**Tamil Nadu link:** The study has no direct Tamil Nadu link. Tamil Nadu has a long vaccine history – the Pasteur Institute of India was set up at Coonoor, Nilgiris district, in 1907, and the King Institute of Preventive Medicine works at Guindy, Chennai. Groundnut (peanut) is one of Tamil Nadu's main oilseed crops (APEDA lists Tamil Nadu among the major producing States).

## Frequently asked questions

**What is this news about?**

Researchers at the Technical University of Denmark (DTU) have designed a single mRNA vaccine against a group of related food and pollen allergens and tested it in mice; the work was reported on 19 November 2026.

**What are the key facts to remember for the exam?**

Institution: Technical University of Denmark (DTU); Journal: Nature Communications (online 16.03.2026); Vaccine type: mRNA in lipid nanoparticles (LNP); Target: Lipid transfer proteins – peach, nuts, peanut, pollen.

**What is the background to this news?**

How allergy works: food allergy is mostly an IgE-mediated 'type I hypersensitivity'. On re-exposure, mast cells and basophils release histamine and other mediators, causing itching, swelling and breathing difficulty.

## Practice questions (with answers)

**1. Which antibody class mainly drives immediate (type I) allergic reactions such as food allergy?**

**A)** IgA

**B)** IgG

**C) IgE**

**D)** IgM

**Answer: C** – Explanation: IgE – it sits on mast cells and triggers them when the allergen arrives. The new vaccine raises IgG that blocks this IgE binding.

**2. Which chemical released by mast cells during an allergy causes itching, swelling and sneezing?**

**A) Histamine**

**B)** Thyroxine

**C)** Dopamine

**D)** Melatonin

**Answer: A** – Explanation: Histamine – which is why 'antihistamine' tablets are given for mild allergies.

**3. Which company developed GEMCOVAC-OM, the indigenous mRNA-based Omicron booster vaccine launched in June 2023?**

**A)** Bharat Biotech

**B)** Serum Institute

**C)** Biological E

**D) Gennova**

**Answer: D** – Explanation: Gennova (Pune) – funded by DBT and BIRAC; the fifth vaccine developed under Mission COVID Suraksha.

**4. What is the first-line emergency drug for anaphylaxis?**

**A) Adrenaline**

**B)** Paracetamol

**C)** Antibiotic

**D)** Aspirin

**Answer: A** – Explanation: Adrenaline (epinephrine), usually injected into the thigh muscle; it raises blood pressure and opens the airways.

**5. Who won the 2023 Nobel in Medicine for nucleoside base modifications that enabled mRNA vaccines?**

**A)** Doudna & Charpentier

**B) Karikó & Weissman**

**C)** Svante Pääbo

**D)** Ambros & Ruvkun

**Answer: B** – Explanation: Katalin Karikó and Drew Weissman. Doudna–Charpentier: CRISPR (2020 Chemistry); Pääbo: 2022; Ambros–Ruvkun: microRNA (2024).