European Commission

Defence Industry and Space

Biotechnology in Defence

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DEFENCE APPLICATIONS

Biotechnologies provide novel ways to prevent, detect, and respond to emerging threats

Biotech enhance the resilience and operational performance of armed forces to counter emerging CBRN threats

Biotechnologies harness biological processes, living cells, or cellular components to develop products, materials, and solutions

Why does biotech matter for defence?

Biotechnologies are increasingly relevant for defence due to their transformative potential, as they provide novel ways to prevent, detect, and respond to emerging threats, while also strengthening the resilience and performance of armed forces.

Examples of biotechnologies and human enhancement with defence applications:

- **Medical biotechnology:** Rapid field-deployable diagnostics and vaccines against biological warfare agents; regenerative medicine for treatment of combat injuries.
- **Prosthetics:** Military-grade artificial limbs enabling wounded personnel to regain operational functionality.
- **Exoskeletons:** Load-bearing suits enhancing soldiers' strength and endurance during dismounted operations.
- **Brain-computer interfaces:** Neural systems enabling control of unmanned vehicles or communication equipment through cognitive signals.
- **Wearable physiology trackers:** Real-time monitoring of soldier fatigue, stress, and hydration to maintain combat readiness.
- **Food biotechnology:** Compact, high-calorie rations with extended shelf life for sustained deployments.
- **Industrial biotechnology:** Bio-based fuels and lubricants reducing supply-chain dependency in contested areas.

What does the EU aim to achieve?

The **White Paper for European Defence – Readiness 2030** identifies biotechnology as one of the critical and foundational technologies essential for maintaining military pre-eminence.

Key actions under the European Defence Fund (EDF) to strengthen EU leadership in defence biotechnology include active engagement in biotech-related research and development since 2021, covering defence medical support, CBRN threats, biotech innovations, and human factors.

A total of **€191 million from the EDF** has been allocated to a portfolio of biotechnology research and development actions.

Main advantages of using biotechnology in defence

- On-demand field medicine
- Performance optimisation
- Faster recovery and resilience
- Improved CBRN detection
- Enhanced training
- Cognitive and stress resilience

Main vulnerabilities arising from the use of biotechnology in defence

- Bioweapon potential
- Biohacking and proliferation
- Cost and complexity
- Contamination risks
- Unpredictable mutation
- Legal and normative ambiguity

When will EDF project results be translated into military capabilities?

As part of its forward-looking agenda, the Commission will propose in 2026 a dedicated **EU Biotech Act** to establish a more innovation-friendly framework across biotechnology sectors as well as a new matchmaking interface to connect startups, industry, and investors, building on the strong pipeline of projects within the European Innovation Council portfolio.

A prominent example under the European Defence Fund is the **COUNTERACT** project, which is establishing a robust and agile network across the EU to develop and deploy medical countermeasures against major CBRN threats. These include terrorist attacks, nuclear accidents, novel weapons, and epidemics caused by emerging high-consequence pathogens.

Another key example is the **RESILIENCE** series of projects, developed under the EDF Defence Medical Countermeasures Alliance which aim to enhance EU preparedness by enabling immediate and coordinated responses to emerging CBRN threats, thereby strengthening the resilience of citizens and critical infrastructure. Other important projects is **EPIIC** which advances disruptive human-machine cooperation for fighter cockpits, including adaptive HMI, virtual assistants, large-area and helmet-mounted displays; and the **NEUROQUAD** project that aims to revolutionise pilot performance by combining advanced neurotechnology, AI, and quantum computing to enhance cognitive abilities and decision-making in real-time.

EDF projects expected to deliver results in 2026

COUNTERACT
The project aims to establish a robust and agile network within the EU capable of developing and deploying medical countermeasures against major CBRN threats
EU financing: €49.1M

WEMOR
The project studies feasibility of a holistic health and wellness management system through a wearable biomarker monitor device to maximise soldier effectiveness, protection and recovery
EU financing: €3.2M

EDF projects expected to deliver results beyond 2027

EPIIC
Enhanced Pilot Interfaces & Interactions for fighter Cockpit
EU financing: €75M

NEUROQUAD
NEURO-QUantum-AI technology symbiosis
EU financing: €4M

RESILIENCE-R-2023
First research action for Medical counter measures performed in the frame of the RESILIENCE FPA consortium
EU financing: €25M

RESILIENCE-R-2024
Second research action for Medical counter measures performed in the frame of the RESILIENCE FPA consortium
EU financing: €19.8M

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