

A novel method protects vaccines from heat degradation at RT for 3 yr

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The new method called "ensilication" encases the vaccine protein molecules in a non-toxic silica shell making vaccines thermally stable



Heat degradation of the proteins in vaccines render these expensive and precious biomedical products ineffective. Scientists have recently invented a way to keep vaccines at room temperature for up to three years. This will greatly assist low-income countries to manage the vaccine at less expense making it economical to protect their young population.

The researchers from the universities of Bath and Newcastle have found a way to make transportation and storage of vaccines safer without the need for refrigeration. The process is called "ensilication" which involves encasing the vaccine protein molecules in a non-toxic silica shell.

At higher temperatures, the proteins in vaccines can start to unravel making them ineffective. Encasing these protein molecules in a silica shell enables their structure to remain intact – allowing the vaccines to be stored at room temperature for up to three years. The process preserves both structural and functional properties of the vaccine and other biological substance allowing them to perform without temperature constraints.

The researchers tested ensilicated and regular samples of the tetanus vaccine on mice and found the silica-coated vaccines triggered an immune response, while the regular samples found ineffective.

At present, it's mandatory to store and ship the vaccines in a temperature-controlled supply chain maintained at 2°C and 8°C at all stages starting from manufacturing to administration. According to WHO nearly 50 per cent of vaccine doses are discarded before use due to logistical issues associated with temperature control.

The research team aims to enhance the stability of heat-sensitive medicines to avoid the loss during logistics and to make the medicines reach globally in their safest form. This will eventually eradicate vaccine-preventable diseases in low-income countries by limiting their dependence on cold chain and by letting all the vaccine vials shipped viable to use.