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Grade 12 student develops magnetic nanoparticle prototype to explore microplastic removal from human blood

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The project won Gold at the IRIS National Fair and a Zydus Special Award at Regeneron ISEF 2026



What happens to microplastics once they enter the human bloodstream? As researchers continue to investigate their potential implications for health, this question has become the starting point for NanoClear, a research project by Suramrit Singh Kohli, a Grade 12 student at Jayshree Periwal International School, Jaipur. His work explores whether magnetic nanoparticles could offer a way to capture microplastics from blood, an approach that has earned recognition at two major science competitions.

The project began to take shape during Brown University's Summer@Brown programme under Dr Thomas Webster. In August 2025, Suramrit continued his research at ReeLABs Research Centre in Mumbai under Dr Abhijit Bhopadikar, working with human blood samples for approximately 20 hours a week.

The research involved nanoparticles measuring approximately 91 nanometres, with a positively charged inner coating designed to attract negatively charged plastic particles. Building on this principle, Suramrit developed an external magnetic separation system in which blood is intended to mix with the nanoparticles and pass through a magnet-lined coil. The system is designed to capture the resulting clusters before the blood returns to the circuit.

The project's progress has earned recognition beyond the laboratory. At the IRIS National Fair in January 2026, NanoClear won Gold and the Yale Science and Engineering Association's Award for Most Outstanding Exhibit in STEM, one of three such awards among approximately 120 finalists. The Gold award secured the project a place among roughly 20 projects representing India at the Regeneron International Science and Engineering Fair (ISEF) 2026 in Phoenix, Arizona. At ISEF, NanoClear received a Special Award from Zydus carrying a prize of \$1,250.

The project also has an Indian design patent, a provisional patent filing and an ongoing United States patent filing.