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Experimental technology for monitoring drug levels in the body

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A team of Stanford electrical engineers have developed a drug delivery tool that could make it easier for people to get the correct dose of lifesaving drugs.

The new technology has three basic components: a real-time biosensor to continuously monitor drug levels in the bloodstream, a control system to calculate the right dose and a programmable pump that delivers just enough medicine to maintain a desired dose.

The sensor contains molecules called aptamers that are specially designed to bind a drug of interest. When the drug is present in the bloodstream, the aptamer changes shape, which an electric sensor detects. The more drug, the more aptamers change shape.

The team plans to miniaturize the system so that it can be implanted or worn by the patient. At present the technology is an external apparatus, like a smart IV drip. The biosensor is a device about the size of a microscope slide. The current setup might be suitable for a chemotherapy drug, but not for continual use. The group is also adapting this system with different aptamers so that it can sense and regulate the levels of other biomolecules in the body.