

Wearable sensor that detects kids' disability

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SCIENTISTS HAVE DEVELOPED a soft, non-toxic wearable sensor that can be attached to the hand to monitor force of a grasp and the motion of the fingers.

Children born prematurely often develop neuromotor and cognitive developmental disabilities. The best way to reduce the impacts of those disabilities is to catch them early through a series of cognitive and motor tests.

However, accurately measuring and recording the motor functions of small children is tricky. As any parent will tell you, toddlers tend to dislike wearing bulky devices on their hands and have a predilection for ingesting things they shouldn't.

"We have developed a new type of conductive liquid that is no more dangerous than a small drop of salt water," said

The sensing solution is made from potassium iodide, which is a common dietary supplement, and glycerol, which is a common food additive

Siyi Xu, a graduate student at Harvard University in the US.

"It is four times more conductive than previous biocompatible solutions, leading to cleaner, less noisy data," Xu said. The sensing solution is made from potassium iodide, which is a common dietary supplement, and glycerol, which is a common food additive.

After a short mixing period, the glycerol breaks the crystal structure of potassium iodide and forms potassium cations (K+) and iodide ions (I-), making the liquid conductive.

Since glycerol has a lower evaporation rate than water, and the potassium iodide is

highly soluble, the liquid is both stable across a range of temperatures and humidity levels and highly conductive.

"Previous biocompatible soft sensors have been made using sodium chloride-glycerol solutions but these solutions have low conductivities, which makes the sensor data very noisy, and it also takes about 10 hours to prepare," said Xu.

"We've shortened that down to about 20 minutes and get very clean data," Xu said.

The design of the sensors also takes the need of children into account. Rather than a bulky glove, the silicon-rubber sensor sits on top of the finger and on the finger pad.

"We often see that children who are born early or who have been diagnosed with early developmental disorders have highly sensitive skin," said Eugene Goldfield, an associate professor at Boston Children's Hospital and Harvard Medical School.