Studying babies’ brain activity has led to a world-leading breakthrough in detecting autism.

The possibility of detecting autism in babies as young as six months made headlines around the world in January 2012, after a team from Birkbeck’s Centre for Brain and Cognitive Development (CBCD) and the Institute of Education published their ground-breaking research in the science journal *Current Biology*.

There are currently no reliable methods of predicting autism in children under the age of two. Diagnosis relies on detecting symptoms, such as impaired social and communication skills, or rigid and repetitive behaviour, that typically develop in a child’s second or third year. Detecting autism at an earlier age may potentially lead to ways of better supporting a child during his or her early development, improving their life chances.

Previous research had shown that typical infants’ sensitivity to eye gaze in the first year of life predicts a range of social and communication skills that emerge later. In this new study, led by Professor Mark Johnson, Head of the CBCD, the research teams looked at a group of six- to 10-month-old babies at greater risk of developing autism because of a family history of the condition.

The scientific research is funded by the Medical Research Council (MRC) and the charity Autistica; the MRC has also provided significant
financial support for other projects at the internationally-recognised CBCD.

The researchers placed passive sensors on the babies’ scalps to register brain activity while the babies watched an image of an adult’s face whose eyes moved from looking away from the baby to directly at them, or vice versa. The researchers then considered whether there was a relationship between differences in brain activity in response to these eye movements at six to 10 months old and the development of autism in the same children at three years old.

Babies who did not develop autism later showed large spikes in brain activity when they saw these so-called ‘dynamic eye-gaze shifts’. Much smaller spikes in brain activity were detected in the infants who went on to develop autism, raising the prospect that autism could be identified much earlier than is currently clinically possible.

“The study is only a first step toward earlier diagnosis, but our findings demonstrate for the first time that, in their first year of life, babies who will go on to develop autism are already processing social information in a different way,” says Professor Johnson.

“While the CBCD study highlights a potential early method of identifying children who are likely to develop autism, the tests were not 100 per cent accurate at predicting outcome. Developing this type of test into something that can be routinely used to detect autism in infants will require more research on larger groups of infants,” adds Professor Johnson.

Encouraging opportunities lie ahead, however. In March 2012, the CBCD learned that it would be a key part of European Autism Interventions – a Multicentre Study for Developing New Medications (EU-AIMS), a five-year €29.6m project to investigate autism. The project, the largest single grant for autism in the world, is bringing top scientists from 14 European centres of excellence together with major industry partners and autism charities including Autism Speaks.

“This is an unprecedented research collaboration,” says Professor Johnson. “We’re delighted to be part of it because it’s vital that we can expand our studies. Our role is to further the basic understanding of the original causal factors or brain problems that might cause autism. We are looking for those early warning signs.

“The more we understand about the core science of autism, the more chance we have to develop other treatments. If we want to be able to intervene, we need to target babies at highest risk. This is where basic research is translated into clinical work.

“We have already begun this process; we are now working with colleagues in Manchester to develop an early parent-mediated intervention programme for babies at risk, which is applied before the onset of behavioural symptoms. Hopefully, preliminary results for this trial will become available next year.”

By Fiona MacLeod