MedicalXpress

Childhood epilepsy research offers new hope for seizure control

October 22 2007

Scientists still do not know what causes epileptic seizures, but researchers from Melbourne's Howard Florey Institute are one step closer to solving this puzzle with the help of their newly developed genetically modified epileptic mouse.

This is the first human genetic mutation based mouse model in the world that mimics childhood absence epilepsy (CAE). The mouse is now helping Dr Steven Petrou and his team to understand the genesis of epilepsy, which will aid in the development of better anti-seizure drugs.

CAE involves brief staring spells, during which the child is not aware or responsive. These episodes can occur one to 50 times per day and the age of onset is usually three to 10 years.

In about 30% of people, anti-epileptic drugs do not adequately control their seizures and many drugs have side-effects such as rashes, lethargy and memory problems.

Dr Petrou said new treatment strategies were urgently needed to create beneficial drugs without side-effects.

"The problem with current drugs is that they treat the symptoms, not the root cause," Dr Petrou said.

"To develop new treatment strategies we need to understand the genesis of epilepsy, and this mouse model should provide a window into that

fundamental process.

“We all know seizures occur if the brain’s cortex goes haywire, but something is happening prior to that event to cause neurons to misfire, and we want to understand that initial event.

“Because mice grow so quickly, changes in the brain can be readily seen and measured.

“In a week the mouse can go from no seizures to seizures, so we can investigate what changes are occurring in that period and what is happening in the critical time window that leads to seizures.

“Initial findings suggest there is a defect in the brain’s cortex which may be related to the beginning of seizures in CAE but we are delving into deeper brain structures as well,” Dr Petrou said.

The inherited human gene mutation that causes CAE was first detected by Dr Petrou’s collaborator, Prof Samuel Berkovic from Austin Health. Through genetic manipulation, Dr Petrou has introduced this human mutation into the mouse DNA, allowing the researchers to study a mouse version of the human condition.

The mutation itself is rare in humans but it causes CAE, which is one of the more common forms of epilepsy.

Dr Petrou said that modelling genetic epilepsies in mice will allow researchers to understand epilepsy from the molecular level all the way through to physical behaviour.

“Creating this link in the human brain is impossible due to the highly invasive methodology required, so mouse models provide us with a unique opportunity to discover mechanisms of seizure genesis,” Dr

Petrou added.

Source: Research Australia