

The research team of the Experimental Neurology laboratory (Dr F. Noe' and Dr A. Vezzani) at the Mario Negri Institute in Milano, in collaboration with the teams of Dr M. During at the Ohio State University, Dr A. Pitkanen at the Virtanen Institute in Kuopio, Dr G. Sperk at the Medical University in Innsbruck and Neurologix Inc. in New Jersey, has developed a promising gene therapy approach for temporal lobe epilepsy using a model of provoked spontaneous seizures in rats. The DNA sequence responsible for the production of neuropeptide Y (NPY), a neuroprotective compound endogenous to the brain, has been injected into the brain region of seizures origin in rats with frequent spontaneous seizures, using a carrier vector derived from a harmless virus (adeno-associated viral vector). This approach allows the long term production of NPY in neurons and its release in the injected brain area; consequently, the frequency of spontaneous recurrent seizure, which were otherwise resistant to Dilantin® , was dramatically reduced in these epileptic animals. The injection of this vector did not cause brain inflammation or cell toxicity, and the restricted expression of NPY at the site of vector injection in the seizure-generating brain area, will reduce the possibilities of side-effects. This therapeutic approach appears to be safe in experimental animals since it does not induce impairments in learning and memory or in locomotion, and it does not affect emotional behaviors. These findings open the perspective that a gene therapy approach may offer a valid alternative to brain surgery for those patients with drug-refractory temporal lobe epilepsy.