31. MOLECULAR AND CELLULAR BIOMARKERS OF EPILEPSY

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Introduction. From over 50 million people that suffer from epilepsy, more than 30% stay uncontrolled, despite the availability of a large diversity of antiepileptic drugs. Epilepsy pathogenesis is still not clearly understood even though many studies have proved an evident relation to apoptosis, glial regeneration, inflammatory reactions, genetic molecularity and most recently a new discovery showed that oxidative stress has a major role in the pathogenesis of epilepsy. Taking all the studies into consideration there is still no sure way to prevent epilepsy from happening, that is why an existence of sensible markers may help in providing a better approach to patients' diagnosis, management and prognosis. Relevant and specific biomarkers would determine the effectiveness of treatment, stages the disease, monitoring and most importantly will reassure the development of promising antiepileptic medications.

Aim of study. This review has the intention to present the diversity of molecular and cellular biomarkers of epilepsy available at this moment.

Methods and materials. For the study were analyzed available online medical platforms such as PubMed Databases and other scientific libraries. Were selected and analyzed 30 articles including case studies and reviews, published in the last 15 years.

Results. The mechanisms of epilepsy linked with biomarkers suffer from a lack of reliable information and studies that will underline the diversity of epilepsy causes, such as genetic, cell loss and synaptic plasticity, malformations of cortical development, and autoimmune disorders, etc. Some biomarkers showed their strong yet not completely understood and unspecific relation to epileptogenesis: HMGB1 isoforms, oxidative stress markers are used also due to the fact that oxidative stress and metabolic malfunction are stimulated by epileptogenic injuries. Tissue, plasma, and urine 8-hydroxy-2-deoxyguanosine and F2-isoprostanes are additionally plasma biomarkers of metabolic perturbation. miRNAs showed its association with the many pathological processes involved in epilepsy; neuronal cell apoptosis, glial regeneration and inflammatory reactions and that due to its unique properties of profile expression changes which might be used as another marker. All these markers are still not one hundred percent and are constantly studied.

Conclusion. The uncertainty of epilepsy pathogenesis and lack of sensible relevant markers make the diagnosis and incidence of the disorder to be uncontrolled, more studies should and will be done to try to get the needed information from the source of the problem all up to the epileptic episode. Biomarker is the aim and main goal to make it easier to treat and to monitor epileptic suspects, an offer mentioned is that a predictive power will most likely require a combination of all the possible discovered markers at different post injury time points to get the one with the highest sensitivity and specificity.