Etoposide

Etoposide, sold under the brand name Etopophos among others, is a chemotherapy medication used for the treatments of a number of types of cancer. This includes testicular cancer, lung cancer, lymphoma, leukemia, neuroblastoma, and ovarian cancer.

It is used by mouth or injection into a vein.

Side effects are very common.

They can include low blood cell counts, vomiting, loss of appetite, diarrhea, hair loss, and fever.Other severe side effects include allergic reactions and low blood pressure.

Use during pregnancy will likely harm the baby.

Etoposide is in the topoisomerase inhibitor family of medication. It is believed to work by damaging DNA.

Etoposide was approved for medical use in the United States in 1983.

Hage et al., from the Saint George Hospital University Medical Center, Beirut, Lebanon report a case of recurrent Posterior reversible encephalopathy syndrome (PRES) with cerebellar involvement associated with noncommunicating hydrocephalus in a 2-year-old child with renal failure on peritoneal dialysis after receiving Etoposide for macrophage activation syndrome [1)].

Topoisomerases are enzymes that regulate the overwinding or underwinding of DNA. The winding problem of DNA arises due to the intertwined nature of its double-helical structure. During DNA replication and transcription, DNA becomes overwound ahead of a replication fork. If left unabated, this tension would eventually stop the ability of RNA & DNA polymerase involved in these processes to continue down the DNA strand.

In order to prevent and correct these types of topological problems caused by the double helix, topoisomerases bind to either single-stranded or double-stranded DNA and cut the phosphate backbone of the DNA. This intermediate break allows the DNA to be untangled or unwound, and, at the end of these processes, the DNA backbone is resealed again. Since the overall chemical composition and connectivity of the DNA do not change, the tangled and untangled DNAs are chemical isomers, differing only in their global topology, thus their name. Topoisomerases are isomerase enzymes that act on the topology of DNA.

Bacterial topoisomerase and human topoisomerase proceed via the same mechanism for replication and transcription.

In a study Al-Ghafari et al have utilized the C6 glioma cell line to investigate the response to long-term, clinically relevant application of topoisomerase I and II inhibitors. Treatment with etoposide resulted in an increase in resistance to this topoisomerase II inhibitor. By contrast, the continuous exposure to a topoisomerase I inhibitor did not result in increased drug resistance, but was associated with a reduction in cell migration. This data supports further investigation of topoisomerase I

inhibition as a means to inhibit glioma invasion without the development of parallel chemoresistance [2]

[1]
Hage P, Kseib C, Hmaimess G, Jaoude PA, Noun P. Recurrent posterior reversible encephalopathy syndrome with cerebellar involvement leading to acute hydrocephalus. Clin Neurol Neurosurg. 2018 Jul 5;172:120-123. doi: 10.1016/j.clineuro.2018.07.005. [Epub ahead of print] PubMed PMID: 29990959.

[2]
Al-Ghafari AB, Punjaruk W, Storer LC, Carrier DJ, Hussein D, Coyle B, Kerr ID. Long-term exposure to irinotecan reduces cell migration in glioma cells. J Neurooncol. 2016 Jan 30. [Epub ahead of print] PubMed PMID: 26830091.