Triglyceride

A triglyceride (TG, triacylglycerol, TAG, or triacylglyceride) is an ester derived from glycerol and three fatty acids.

As a blood lipid, it helps enable the bidirectional transference of adipose fat and blood glucose from the liver. There are many triglycerides: depending on the oil source, some are highly unsaturated, some less so.

Saturated compounds are “saturated” with hydrogen — all available places where hydrogen atoms could be bonded to carbon atoms are occupied. Unsaturated compounds have double bonds (C=C) between carbon atoms, reducing the number of places where hydrogen atoms can bond to carbon atoms. Saturated compounds have single bonds (C-C) between the carbon atoms, and the other bond is bound to hydrogen atoms (for example =CH-CH=, -CH2-CH2-, etc.).

Unsaturated fats have a lower melting point and are more likely to be liquid at room temperature. Saturated fats have a higher melting point and are more likely to be solid at room temperature.

Triglycerides are the main constituents of vegetable oil (typically more unsaturated) and animal fats (typically more saturated).

Triglycerides are a major component of human skin oils.

Injury severity is correlated with poor prognosis after traumatic brain injury (TBI). It is not known whether triglycerides (TGs) or total cholesterol (TC) is a good biomarker of increased injury of neuroinflammation and apoptosis in a high-fat diet (HFD)-treated rat after TBI episodes. Five-week-old male Sprague-Dawley (SD) rats were fed a HFD for 8 weeks. The anesthetized male SD rats were divided into three sub-groups: sham-operated and TBI with 1.6 atm or with 2.4 atm fluid percussion injury (FPI). Cell infarction volume (triphenyltetrazolium chloride stain), tumor necrosis factor-alpha (TNF-α) expression in the microglia (OX42 marker) and astrocytes (Glial fibrillary acidic protein marker), TNF-α receptor expression in the neurons (TNFR1 and TNFR2 markers), and the extent of neuronal apoptosis (TUNEL marker) were evaluated by immunofluorescence, and the functional outcome was assessed by an inclined plane test. These tests were performed 72 h after TBI. Serum triglyceride and cholesterol levels were measured at 24, 48 and 72 h after TBI. The FPI with 2.4 atm significantly increased body weight loss, infarction volume, neuronal apoptosis and TNF-α expression in the microglia and astrocytes, and it decreased the maximum grasp degree and TNFR1 and TNFR2 expression in neurons at the 3rd day following TBI. The serum TG level was positively correlated with FPI force, infarction volume, Neu-N-TUNEL, GFAP-TNFα, and OX42-TNFα Simultaneously; the serum TG level was negatively correlated with Neu-N-TNFR1 and Neu-N-TNFR2. TG is a good biomarker of increased injury for neuroinflammation and apoptosis at the 3rd day after TBI in HFD rats [1].

1)
Kuo JR, Lim SW, Zheng HX, Ho CH, Chang CH, Chio CC, Wee HY. Triglyceride is a Good Biomarker of Increased Injury Severity on a High Fat Diet Rat After Traumatic Brain Injury. Neurochem Res. 2020 Mar 28. doi: 10.1007/s11064-020-03018-x. [Epub ahead of print] PubMed PMID: 32222876.