Natural Is Not Neutral: Dangers of Natural Compounds Found in Produce and Dietary Supplements and Therapeutic Mechanisms of Flavone Luteolin on Neuroblastoma and Lymphoma

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One may be surprised to learn that the same ingredient, luteolin, is in a huge scope of supplements. Luteolin is the primary ingredient in therapeutic, neuroprotective, anti-inflammatory, antioxidant, immunity, muscle strength supplements, etc. Many of these supplements claim to prevent cancer. I aimed to investigate whether luteolin can have such a broad range of benefits, which is crucial for public health/safety since supplement consumption and trust in supplements are at a record high with a rise in >103 countries. Though labeled as natural, it is hard to tell how natural supplements truly are due to the lack of regulation. In Europe, supplements are held to a lower standard than drugs and in the US, supplement potency/purity are not cleared by the FDA and it is voluntary for companies to report adverse effects. So, it is vital to understand how supplements work. Research suggests that luteolin is therapeutic for leukemia and that various flavonoids used together are ideal, alluding to the notion that using multiple flavone-based supplements is supreme. I explored neuroblastoma and lymphoma through cellular assays, organoid models, flavone combinations, and to qualify the mechanisms, I used data science and molecular models in PyRx. Results indicate that luteolin does have therapeutic effects on both cancers likely via mitochondrial matrix 1; however, certain concentrations have adverse effects. Dose-dependency and combinations are not ideal. Multifaceted results combined with how 85% of labels do not contain the maximum dose nor dosage amount of each ingredient and how people tend to ignore disclaimers are calls to action to advocate for reform in the supplement industry and understand that natural does not mean neutral: caution and proactivity are imperative.

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