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Natural (Δ^9-THC) and synthetic (JWH-018) cannabinoids induce seizures through the cannabinoid CB1 receptor

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Natural cannabinoids and their synthetic substitutes are the most popular recreational drugs. Marijuana often seen as a soft drug without harmful health effects. And the synthetic cannabinoids spread easily due to the dynamic engineering of new not yet banned structures. Studies on cannabinoid pharmacokinetics and adverse effects are extremely limited resulting in completely unknown pharmacology, relevant safe doses and mechanisms of neurotoxic properties. Here we report that an intraperitoneal administration of the natural cannabinoid Δ^9-THC, one of the main constituent of marijuana, or the synthetic cannabinoid JWH-018, triggered electrographic seizures in mice. Pretreatment of mice with AM-251, a cannabinoid receptor 1 (CB_1R)-selective antagonist, completely prevented these cannabinoid-induced seizures. In addition, CB_1RKO mice show no electrographic or behavior seizures after cannabinoid administration, which suggests those seizures are mediated through the cannabinoid receptor 1. This data, first of all, shows that abuse of cannabinoids can be extremely dangerous and presents an emerging public health threat. Seizures induced by cannabinoids different form classical epileptic seizures: they are pretty mild, but last much longer, therefore might be overlooked in emergency departments. Additionally, our data strongly suggests that AM-251 could be used as a crucial abortive therapy for cannabinoid-induced seizures or similar life-threatening conditions.

Biography

Olga Malyshevskaya has completed her PhD at the age of 29 years from Osaka University, Japan and continued to work as a researcher at WPI-IIIS at the University of Tsukuba, where globally prominent scientists from multiple research fields gather under the leadership of Director Masashi Yanagisawa to develop new strategies to assess and treat sleep diseases as well as the closely associated metabolic and mental disorders. In a recently published study she demonstrated that seizures, a life-threatening condition, can be induced by natural Δ9-THC (main constituent of marijuana) or the synthetic cannabinoid JWH-018 (known on the streets as "Spice"). This data received a big resonance and being extensively discussed on neuroscience and forensic toxicology meetings.

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