

他誌掲載論文 (2021年10月~2022年9月)

(1) Sequential Changes in Blood Tetrodotoxin Concentrations in Lethal Puffer Fish Poisoning: A Case Report

(Yusuke Okazaki^{*1}, Shiori Kobayashi^{*1}, Akie Nakashima, Yasumasa Iwasaki^{*2}, Journal of Clinical Toxicology, 11 (5), 491, 2021)

Severe symptoms of tetrodotoxin poisoning caused by the ingestion of puffer fish include respiratory muscle paralysis, hypotension, and cardiopulmonary arrest. However, the blood concentration of tetrodotoxin that causes cardiopulmonary arrest remains unknown. We herein present a case of tetrodotoxin poisoning in a 76-year-old man, who died later. We measured the blood tetrodotoxin levels over time in a patient with severe tetrodotoxin poisoning. A 76-year-old man had tetrodotoxin poisoning after consuming three puffer fish. He complained of numbness in his mouth after 10min and developed cardiopulmonary arrest when ambulance crews arrived 43min after ingestion. Cardiopulmonary resuscitation was performed, and he had a return of spontaneous circulation shortly before arriving at our hospital. The blood tetrodotoxin concentration was 119ng/mL after 5hours. On day 5, he died due to multiple organ failure. Thus, the blood tetrodotoxin concentration causing cardiopulmonary arrest was approximately 100ng/mL in this case.

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(2) High Levels of Tetrodotoxin in the Flesh, Usually an Edible Part of the Pufferfish *Takifugu flavipterus*, Caused by Migration from the Skin and the Regional Characteristics of Toxin Accumulation

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The consumption of a pufferfish, *Takifugu flavipterus* or komonfugu in Japanese, formerly known as

Takifugu poecilonotus, is popular in Japan. However, *T. flavipterus* is frequently involved in cases of tetrodotoxin (TTX) poisoning in Japan. Although victims have usually consumed inedible parts, some cases are related to consumption of flesh. To improve the risk management of pufferfish poisoning, we studied TTX level in the flesh and skin of *T. flavipterus*. Ninety-seven specimens obtained from the Seto Inland Sea and landed in Fukuoka Prefecture were analyzed by liquid chromatography-tandem mass spectrometry. The flesh from six specimens was toxic (>10MU/g = 2.2mg/kg): one was in poor condition (not freeze-thawed); three were freeze-thawed before sample preparation; and two freshly prepared and in good condition (not freeze-thawed). The fillets were divided into outer and inner portions; the TTX levels in the outer portions were notably higher. The skin of the six specimens was moderately to extremely toxic: 165MU/g (36.3mg/kg) in the fresh specimen not in good condition, 600-950MU/g (132-200mg/kg) in freeze-thawed specimens, and 4500 and 6000MU/g (990 and 1320mg/kg) in the two fresh specimens. We concluded that TTX in the flesh migrated from the highly toxic skin. In addition, TTX levels in the skin appeared to be regionally specific. We recommend that toxic portions of *T. flavipterus* are removed as soon as possible after individuals are caught, and that fish from known highly toxic areas are not consumed.

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(3) 広島県における微小粒子状物質 (PM2.5) の発生源解析—2地点間の比較及び高濃度時の特徴—

(竹本 光義, 久保田 光, 渡部 緑, 大原 俊彦, 全国環境研究会誌, 46, 4, 40-45, 2021)

県中央部に位置する西条と県西部沿岸の大竹でPM2.5を採取し, 2地点間の成分分析結果を比較した。西条では自動車による影響を示すアンチモン (Sb), 亜鉛 (Zn) 及び元素状炭素 (EC) の濃度が高く, 自動車による影響をより強く受けていると推測された。大竹で

は、重油燃焼の影響を示すニッケル (Ni) 及びバナジウム (V) の濃度が高く、重油燃焼の影響をより強く受けていると推測された。また、高濃度日では、二酸化硫黄 (SO₂) 濃度が高くなっており、気象データ等を用いて解析した結果、火山由来のSO₂を含んだ気塊が移流してきたものと示唆された。