

Form B-2
(FY2020)
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Date (日付)
22/12/2020 (Date/Month/Year:日/月/年)

Activity Report -Science Dialogue Program-
(サイエンス・ダイアログ事業 実施報告書)

- Fellow's name (講師氏名): 孫 献亮 (Sun Xian Liang) (ID No. P19113)
- Name and title of the accompanying person (講義補助者の職・氏名)

- Participating school (学校名): 筑波大学附属駒場中・高等学校
- Date (実施日時): 07/12/2020 (Date/Month/Year:日/月/年)
- Lecture title (講義題目):
Effect of dioxin exposure on human health in Vietnam and China
- Lecture format (講義形式):
◆Lecture time (講義時間) 80 min (分), Q&A time (質疑応答時間) 20 min (分)
◆Lecture style (ex.: used projector, conducted experiments)
(講義方法 (例: プロジェクター使用による講義、実験・実習の有無など))
Online by zoom
- Lecture summary (講義概要): Please summarize your lecture within 200-500 words.

Although Vietnam's massive herbicide exposure in 1960s and 1970s was clearly injurious to health, not all causal relationships have been clarified. We therefore explored associations among dioxins, steroid hormones, age and prostate cancer risk in men. We compared serum levels of dioxin, steroid hormones and prostate specific antigen (PSA) in men aged 56-81 years from herbicide-exposed hotspots (n=50) with those from non-sprayed regions (n=48). Mean serum levels of dioxin congeners in the hotspot group were 1.5-11.3 times higher than the non-sprayed group depending on specific compound. Levels of testosterone, estradiol and 3 β -hydroxysteroid dehydrogenase (3 β -HSD) activity in the hotspot group were also significantly higher than in non-sprayed group. Estradiol levels were significantly related to levels of several specific dioxin derivatives in both groups. Significant positive correlations were also found between DHT and 1234678-HpCDD or 1234678-HpCDF; and between 3 β -HSD activity and 123678-HxCDD, 123478-HxCDF, 123678-HxCDF. After adjusting for age, body mass index, and tobacco use, multiple linear regressions showed levels of dihydrotestosterone (DHT), estradiol, testosterone and 3 β -HSD activity were not associated with dioxins in the two groups; however, levels of DHT,

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testosterone and 3 β -HSD activity increased significantly with age in the hotspot group. The hotspot and non-sprayed groups did not significantly differ in PSA levels. But six of the hotspot subjects had PSA levels >3ng/mL, 3 of whom were suspected to have prostate cancer (PC) after digital rectal examination. Our findings suggest that dioxin exposure can lead to increased levels of several sex steroid hormones with age. The correlation of dioxin with steroid hormone levels and prostate cancer risk should be studied further.

Perinatal exposure to dioxins affects steroid hormone synthesis. The purpose of the present study was to evaluate the associations between perinatal exposure to dioxins and serum steroid hormone levels in preschool-aged children from an e-waste recycling region in China. In the present study, we enrolled 50 pairs of mothers and infants from the Taizhou, Luqiao region in 2015. Of the 50 pairs of mothers and infants, 42 pairs participated in this study when the children were 4 years old. We measured breast milk dioxin concentrations using high-resolution gas chromatography/mass spectrometry. Additionally, we used liquid chromatography-tandem mass spectrometry to measure the concentrations of progesterone, testosterone, androstenedione (A-dione), and dehydroepiandrosterone (DHEA) in serum samples from the 4-year-old children. We used multivariate linear regressions to assess the associations between dioxin congeners and steroid hormones. Results were reported as beta estimates and 95% confidence intervals by bootstrapping. We observed sex-related differences between breast milk dioxins and serum steroid hormone levels in 4-year-old children. An increase in breast milk dioxins was associated with a decrease in testosterone in serum samples from boys. Similarly, an increase in breast milk dioxins was associated with a decrease in progesterone levels in serum samples from girls. However, dioxins were not associated with changes in the levels of testosterone, DHEA, or A-dione in girls. Based on these results, we conclude that perinatal exposure to dioxins modifies steroidogenesis in preschool-aged children. However, the long-term impact of dioxins requires further large-scale studies to assess these effects in school-going children and adolescents.

◆Other noteworthy information (その他特筆すべき事項):

- Impressions and comments from the accompanying person (講義補助者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。):