Studies on the accumulation of radionuclides (^{90}Sr, ^{238}Pu, $^{239+240}$Pu) emitted from Fukushima No.1 Nuclear Power Plant accident into human milk teeth

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Abstract

【Purpose】 We collected milk teeth from all over Japan in order to investigate the transition of radionuclide in human body released to the environment by nuclear test and TEPCO Fukushima Daiichi Nuclear Power Plant accident. Radioactive nuclides (^{90}Sr, ^{238}Pu, $^{239+240}$Pu), and compare it with past data. We will also verify the impact of TEPCO Fukushima Daiichi Nuclear Power Plant accident and clarify the trends before and after nuclear accident.

【Material and method】 We are distributing document and collecting bottles to dental clinics where approval for this research was obtained, collecting milk teeth by year of birth and region from nation (1898 numbers, birth year 1999 ~ 2009, at present Sept. 30, 2017).

At this time we investigated 8 sample of milk teeth accumulated radionuclide {Saitama (2003 birth year, 35 numbers), Tokyo (2003, 57), Ehime prefecture Niihama-shi (2003, 45), Ehime prefecture Yawatahama- shi (2003, 29), Ehime Yawatahama-shi (2004, 18), Ehime Prefecture (2004, 24), Saitama prefecture (2004, 34), Tokyo (2004, 54)} and 1 sample of adult third molar (1980, 13, Saitama prefecture) .

^{90}Sr, ^{238}Pu, $^{239+240}$Pu measurements were carried out by Radioactivity Measurement Series of Ministry of Education, Culture, Sports Science and Technology .

【Results】 ^{238}Pu, $^{239+240}$Pu: It was below detection limit in all samples. ^{90} Sr: ^{90} Sr of 9.6 ± 2.2 mBq / g · Ca was detected from the third molar of adults. In the milk teeth group, ^{90} Sr of 6.8 ± 2.1 m Bq / g · Ca was detected only in Tokyo sample of 2004 birth year (the counting error in April, 2016 conversion is also

shown). Table 3 shows comparison between PIXE analysis and chemical analysis (sample of undetermined age of deciduous teeth). A simple and small analysis accuracy of PIXE analysis was confirmed.

【Discussion】 Although ^{90}Sr is detected from several samples, milk teeth and the third molar were collected before the Fukushima Daiichi nuclear accident and is assumed to be derived from nuclear test. Radionuclide accumulation of the deciduous teeth takes place from the fetal stage to the post-natal crown formation stage. This was an accumulation as background, and data before the accident was obtained (JSPS KAKENHI JSPS KAKENHI Grant Number 15 K11435).