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General Summary

Our major research projects in the 2012 academic year focused on: 1) analysis of oxidative DNA damage, 2) evaluation of mutagenic potential related to diabetes mellitus, 3) The method for analysis of 8-hydroxy-deoxyguanosine with matrix-assisted laser desorption ionization-time of flight mass spectrometry, 4) Evaluation of fatigue following compressed air work using human herpes virus (HHV) 6 in saliva, 5) evidence-based medicine (EBM), 6) a questionnaire survey on drug information, 7) prevalence of menopausal symptoms, 8) associations between body weight and cardiovascular risk factors, 9) ecological studies of suicide, 10) annual changes in the suicide mortality rate in Japan, 11) effects of L-carnosine and its zinc complex polaprezinc on the healing of pressure ulcers, 12) long-term follow-up study of patients with type 2 diabetes, and 13) mental health in the workplace.

Research Activities

Experimental Medicine

1. Effects of zinc-excess ingestion on blood coagulation in Sprague-Dawley rats

Humans are in a zinc-subdeficient state in Japan. Therefore, zinc supplements are commercially available. To date, there have been few reports of toxicity due zinc excess. In our previous studies, hemorrhagic tendency was observed in rats fed a high-zinc diet. Therefore, we focused on blood coagulation in rats fed a high-zinc diet.

2. Potential mechanisms responsible for tubulointerstitial nephropathy induced by fluoride in rats with unilateral ureteral obstruction

Fluoride, an environmental pollutant, is excreted from the kidney. In our previous animal experiments, ICR-derived glomerulonephritis mice, which have impaired renal function, were more severely affected by fluoride. In this study, we used rats with unilateral ureteral obstruction causing tubulointerstitial fibrosis. We examined whether fluoride exacerbates tubulointerstitial nephropathy in rats with unilateral ureteral obstruction.

3. A study of decompression stress in hyperbaric work

Decompression stress from hyperbaric work has been evaluated with the Doppler bubble detection technique. We attempted to evaluate decompression stress by means of HHV-6 in saliva along with the Doppler technique. The number of HHV-6 DNA in saliva was well correlated with the results of Doppler bubble detection. We were able to use HHV-6 in saliva as a marker to evaluate decompression stress.

Epidemiology, EBM, investigation, and medical informatics

1. Epidemiology, EBM, investigation, and medical informatics

A systematized body of epidemiologic principles with which studies can be designed and judged has been established only in the last 2 decades. These principles have evolved with an explosion of epidemiologic activity covering a wide range of health problems. Our greatest concern is to clarify risk factors for diseases in adults and for intractable diseases. We also studied the methods of medical informatics education and EBM.

2. A questionnaire survey on drug information

A self-administered questionnaire was distributed to approximately 2000 health examinees at a Japanese healthcare center to examine the association between health literacy and information-seeking behavior.

3. Menopause Week questionnaire surveys

Questionnaire surveys were conducted among women aged 45 to 59 years who were registered with an Internet survey company. We described ways of coping with menopausal symptoms. Moreover, we revealed the determinants of quality of life in Japanese middle-aged women.

4. Changes in the prevalence of cardiovascular risk factors in Japanese workers

Using annual health examination data from 2001 to 2011, we described the 10-year changes in the prevalence of cardiovascular risk factors in Japanese workers.

5. Ecological studies of suicide

Using the 2005 national census data, we described the associations between age-adjusted suicide rates and socioeconomic factors in the 47 prefectures of Japan and in 358 medical care zones.

6. Effects of L-carnosine and its zinc complex polaprezinc on the healing of pressure ulcers

We performed a nonrandomized controlled trial to determine the effects of L-carnosine and its zinc complex polaprezinc on the healing of pressure ulcers. The results suggested that L-carnosine and polaprezinc accelerate the healing of pressure ulcers to a similar degree over 4 weeks.

7. Mental health in the workplace

Mental health in the workplace is increasingly recognized as a serious problem. Several questionnaires have been used in attempts to prevent mental illness in Japan. The concrete questions in questionnaires are important for managing stress in the workplace. The purpose of this study was to investigate stress in the workplace using a new questionnaire.

8. Relationships of visit-to-visit variability and time-to-effect in systolic blood pressure to the risks of nephropathy and retinopathy in type 2 diabetes

We investigated whether systolic blood pressure variability can predict the progression of nephropathy and retinopathy in patients with type 2 diabetes and also evaluated the time-to-effect relationship between systolic blood pressure control and the risks of progression of nephropathy and retinopathy.

9. Analysis of local factors and changes in the suicide mortality rate in all prefectures

In 1998, the number of suicides in Japan increased sharply and has exceeded 30,000

for 13 consecutive years since. Regional differences in suicide rates have been reported. This study analyzed the relationship between local factors and the suicide mortality rate (in 1990, 1995, 2000, and 2005) classified by prefecture and sex.

Publications

Kasai M, Miyazaki T, Takenaka T, Yanagisawa H, Suzuki H. Excessive zinc intake increases systemic blood pressure and reduces renal blood flow via kidney angiotensin II in rats. *Biol Trace Elem Res.* 2012; **150**(1-3): 285-90.

Miyakoshi Y, Kajihara C, Shimizu H, Yanagisawa H. Tempol suppresses micronuclei formation in astrocytes of newborn rats exposed to 50-Hz, 10-mT electromagnetic fields under bleomycin administration. *Mutat Res.* 2012; **747:** 138-41.

Kido T, Tsunoda M, Sugaya C, Yanagisawa H, Aizawa Y. The determination of urine protein and creatinine concentrations in the urine of HIGA mice and BALB/c mice after subacute administration of fluoride via their drinking water. *Trace Nutrients Research.* 2012; **29:** 41-6.