老化におけるベンゾジアゼピンレセプターの PETによる研究および新トレーサ^{11}C-α-Methyl N-Methyl Benzyl Amine の臨床応用

山崎統四郎*、井上修*、篠遠仁*、伊藤高司*、
伊鍜雅臣*、舘野之男*、鈴木和年*、
樫田義彦*、橋本謙二、田所裕之*

"*Liver and Aging*–1986, *Liver and Brain*" edited by K.Kitani, Elsevier Science Publshers. PP 265–277, (1986)

Benzodiazepine Receptor Study in the Elderry Using Pet and Clinical Application of a New Tracer, C-11-α-Methyl N-Methyl Benzyl Amine

Toshiro YAMASAKI*, Osamu INOUE*, Hitoshi SHINOTOH*, Takashi ITOH*
Masaomi IYO*, Yukio TATENO*, Kazuthosi SUZUKI*, Yoshihiko KASHIDA*,
Kenji HASHIMOTO* and Hiroyuki TADOKORO*

ABSTRACT: Biodistributions of the central type benzodiazepine antagonist, Ro15–1788 labelled C–11 in the brain of normal male volunteers containing elderly individuals and cases with Alzheimer's disease were measured. And a newly designed radiotracer, C–11– α–methyl N–methyl benzyl amine (C–11–MMBA) have been applied to the study of aging.

The brain kinetics of C–11–Ro15–1788 in the healthy volunteer showed a high uptake of the tracer by the brain, the maximum of which was within 20 minutes. The early distribution of the tracer after injection showed the regional distribution similar to that of the perfusion tracer. Distribution of the tracer at 20 minutes post–injection was approximately parallel to the known distribution of benzodiazepine receptors (B max) in human by in–vitro study. Concerning the data of healthy individuals, age related-decline in Frontal cortex / Blood ratio of C–11 radioactivity at 20 minutes post–injection, was shown.

In studies of Alzheimer's patients, benzodiazepine receptor density in the cerebral cortex was depressed globally: in one case, diffuse and severe decrease of

radioactivity was seen in the cerebral cortex except for the primary visual cortex, and in another case with moderate dementia, receptor density was depressed in the posterior parieto-temporal cortex.

Nine healthy male individuals studied with C–11–MMBA were divided into two groups, according to their age. In a third of cases in the younger group, the disappearance rate of the tracer from the frontal cortex is higher compared to remaining cases in the same group and it is more remarkable in comparison with cases in the older group. Especially, in an aged individual (70 years old), no decrease of radioactivity in the frontal cortex was seen during 90 minutes post the tracer injection.

In this study using PET, decrease was shown in the brain benzodiazepine receptor density in the elderly and cases with Alzheimer's disease, and the significant different time course of cerebral activity was observed after the injection of C–11–MMBA in the elderly compared to some of young individuals.

抄録　中枢性ベンゾジアゼピンレセプターのアンタゴニスト^{11}C-Ro 15-1788の脳内分布を,PETを用いて、正常人及びアルツハイマー病患者について測定した。また、新しいラジオトレーサーである^{11}C-MMBAを老化の研究に応用した。

正常人（老人）及びアルツハイマー病患者における脳内ベンゾジアゼピンレセプター密度が減少している事が判った。また、老人における11C-MMBAの脳内動態が若い人と比べて著しく異なっている事が判った。

* National Institute of Radiological Sciences　(放射線医学総合研究所)