

MOLECULAR BRAIN IMAGING OF PERSONALITY TRAITS IN COMMON MARMOSETS

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The availability of positron emission tomography (PET) for human and nonhuman primates has enabled examination of the in vivo functions of specific neurotransmitter systems underlying behavior. We established a PET imaging method for conscious common marmosets (*Callithrix jacchus*), a small primate species noted for its high social tolerance and cooperative sociality. We used this method to examine the dopaminergic and serotonergic systems in the brain using [¹¹C]DASB and [¹¹C]PE2I, which are highly selective to serotonin transporter (SERT) and dopamine transporter (DAT), respectively. Furthermore, we have identified personality dimensions, labeled 'sociability', 'aggressiveness', and 'social anxiety', in common marmosets by examining behavioral responses in encounter trials. Parametric images of [¹¹C]DASB and [¹¹C]PE2I binding potential (BP) values have been generated and processed on the statistical mapping to identify brain areas of which BP values of SERT and DAT are tightly associated with behavioral factor scores. SERT BP values were positively correlated with 'sociability' and negatively correlated with 'social anxiety' in the hippocampus, caudate nucleus, and some other brain regions. DAT BP value in the substantia nigra was negatively correlated with 'social anxiety'. These results demonstrate that molecular imaging of the brain combined with quantitative behavioral analysis can provide valuable information for understanding the neural bases of personality in nonhuman primates. This type of studies will also be useful in highlighting how genes and the environment influence personality. All procedures of this study were approved by the Animal Care and Use Committee of Kobe Institute in Riken (MAH18-03-6).

Keywords: PET, personality, common marmoset, serotonin