Synthesis and bioactivity evaluation of catechin and flavonoid

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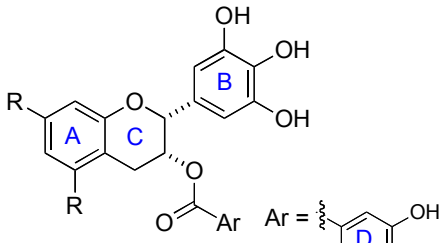
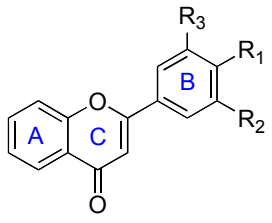
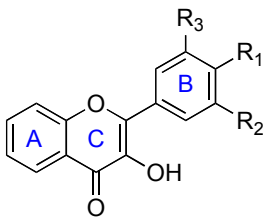
(–)-Epigallocatechin gallate (EGCG) (**1**) is a major constituent of green tea extract, which has various bioactivities such as cancer prevention and antiviral or antimicrobial activity. Since these unique bioactivities are expected to be candidates for drug development, the detailed structure-activity relationship (SAR) study has been a significant work. However, investigations of such bioactivities have been limited to natural products and/or their derivatives. Thus, developing an efficient and flexible synthetic method has strongly been desired. During the course of our synthetic investigation on the gallocatechins, we have found that synthetic 5,7-dideoxy-epigallocatechin gallate (DO-EGCG) (**2**) possesses more potent anti-influenza activities than natural EGCG (**1**).[1)2)] Inspired by this finding, we have launched an investigation into the synthesis of deoxy-flavonoids. Recently, we accomplished an efficient total synthesis of flavone *C*-glycoside, chafuroside A and B.[3)] The application of its novel construction method for flavone skeletone, synthesis of deoxy-flavone derivatives (**3**) and deoxy-flavonol derivatives (**4**) were achieved in efficiently. Inhibitory activities of sialyltransferase and β-amyloid fibril formation were investigated with the synthetic unnatural flavonoids (**3** and **4**). These SAR results would be also discussed in the lecture.



EGCG (**1**): R = OH
DOEGCG (**2**): R = H



(**3a**: R_1 = OH, R_2 = R_3 = H)
(**3b**: R_1 = R_2 = OH, R_3 = H)
(**3c**: R_1 = R_2 = R_3 = OH)



(**4a**: R_1 = OH, R_2 = R_3 = H)
(**4b**: R_1 = R_2 = OH, R_3 = H)
(**4c**: R_1 = R_2 = R_3 = OH)

1) T. Furuta, Y. Hirooka, A. Abe, Y. Sugata, M. Ueda, K. Murakami, T. Suzuki, K. Tanaka, T. Kan, *Bioorg. Med. Chem. Lett.*, **17**, 3095-3098 (2007).
2) Y. Hirooka, M. Nitta, T. Furuta, T. Kan *Synlett*, 3234-3238 (2008)
3) T. Furuta, M. Nakayama, H. Suzuki, H. Tajimi, M. Inai, H. Nukaya, T. Wakimoto, T. Kan, *Org. Lett.*, **11**. 2233-2236 (2009).