

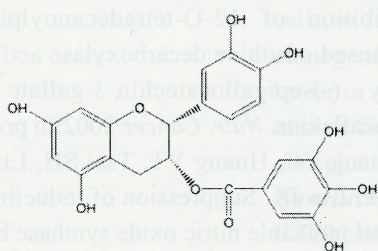
of ECG, EGCG, or TF-3 significantly inhibited NF κ B transcriptional activity induced by IL-1 β . Finally, we investigated whether these 3 polyphenols could inhibit IKK activity. Since activation of IKK can phosphorylate I κ B, therefore release NF κ B from I κ B and NF κ B complexes. As shown in Fig 4B, 10 μ M of ECG, EGCG, or TF-3 significantly inhibited the IKK activity induced by IL-1 β . These 3 polyphenols had no effect on the level of IKK protein (data not shown). These results suggest that inhibition of VCAM-1 by these 3 polyphenols occurs via suppression of IKK activity, resulting in prevention of NF κ B activity. In our previous reports^{19,20} and this study, we found that ECG, EGCG, and TF-3 exhibited significant biological activities of anti-proliferation and anti-inflammation. These 3 polyphenols share a similar structure and have the galloyl group in position 3 or 3'. EGCG has 1 more hydroxyl group than does ECG, and the structure of TF-3 is similar to the dimer form of EGCG (Fig. 5).

Black tea is one of the most popular beverages

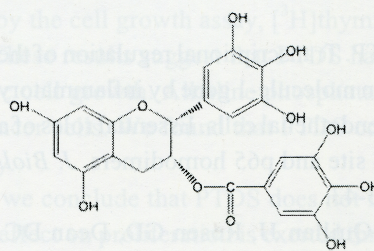
worldwide. Several reports have indicated that black tea can inhibit tumor cell proliferation in an animal model.^{13, 21} However, the active components in black tea and which of the theaflavins is responsible for this activity are not known. The present studies clearly demonstrate that TF-3 may be the major active component contributing to the anti-inflammatory activity in black tea. Moreover, TF-3 appears to be a better inhibitor of VCAM-1 and ICAM-1 than green tea polyphenol EGCG. In summary, we provide evidence for the mechanism of the anti-inflammation action by ECG, EGCG, and TF-3. The inhibition of adhesion molecules by ECG, EGCG, and TF-3 may be mediated through inhibition of IKK activity.

ACKNOWLEDGMENTS

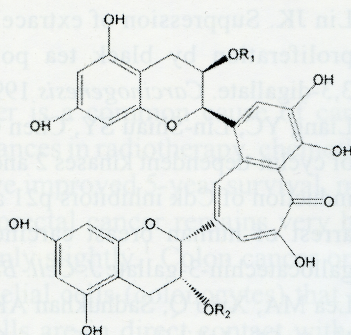
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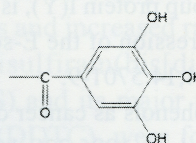
(-)-Epicatechin-3-gallate (ECG)



(-)-Epigallocatechin-3-gallate (EGCG)



Theaflavin-3,3'-digallate (TF-3)



R₁ = R₂ = Galloyl

Fig. 5. Structures of (-)-epicatechin-3-gallate, (-)-epigallocatechin-3-gallate, and theaflavin-3,3'-digallate.