Cannabinoids as Therapeutics
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Cannabidiol as a potential medicine

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Introduction

Cannabidiol (CBD) is one of more than 60 oxygen-containing hydrocarbon constituents of cannabis that are collectively known as plant cannabinoids or phytocannabinoids [1, 2]. It was first isolated in 1940, by Roger Adams from Mexican marijuana and by Alexander Todd from Indian charas [3]. However, the correct structure of CBD was not determined until 1963 and its absolute stereochemistry until 1967 [4]. The CBD molecule is chiral and it is only the 3*R*,4*R*-(–)-enantiomer of this molecule that is found in cannabis. This enantiomer is referred to throughout this review as CBD. The chemical nomenclature of CBD differs from that of 6a*R*,10a*R*-(–)-Δ^9-tetrahydrocannabinol (Δ^9-THC), the main psychoactive constituent of cannabis. Thus, as shown in Figure 1, whereas Δ^9-THC has a pyran ring which determines its numbering, CBD has no heterocyclic ring and its numbering is based on that of the terpene ring. Much of the Δ^9-THC and CBD that is extracted from harvested cannabis derives from the C-2 and C-4 carboxylic acids of Δ^9-THC or the C-3'/C-5' carboxylic acid of CBD (Fig. 1), all of which undergo decarboxylation when the plant material is stored or heated [1, 5]. The pharmacology of Δ^9-THC has been intensively investigated and it is now generally accept-

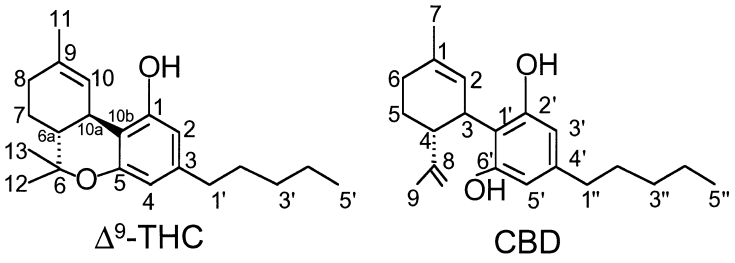

Figure 1. The structures of the phytocannabinoids (–)-Δ^9-tetrahydrocannabinol (Δ^9-THC) and (–)-cannabidiol (CBD)