

Exhibit 6



US006630507B1

(12) **United States Patent**
Hampson et al.(10) **Patent No.:** **US 6,630,507 B1**
(45) **Date of Patent:** **Oct. 7, 2003**(54) **CANNABINOID AS ANTIOXIDANTS AND NEUROPROTECTANTS**(75) Inventors: **Aidan J. Hampson**, Irvine, CA (US);
Julius Axelrod, Rockville, MD (US);
Maurizio Grimaldi, Bethesda, MD (US)(73) Assignee: **The United States of America as represented by the Department of Health and Human Services**, Washington, DC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/674,028**(22) PCT Filed: **Apr. 21, 1999**(86) PCT No.: **PCT/US99/08769**§ 371 (c)(1),
(2), (4) Date: **Feb. 2, 2001**(87) PCT Pub. No.: **WO99/53917**PCT Pub. Date: **Oct. 28, 1999****Related U.S. Application Data**

(60) Provisional application No. 60/082,589, filed on Apr. 21, 1998, and provisional application No. 60/095,993, filed on Aug. 10, 1998.

(51) **Int. Cl.**⁷ **A61K 31/35**(52) **U.S. Cl.** **514/454**(58) **Field of Search** **514/454**(56) **References Cited****U.S. PATENT DOCUMENTS**

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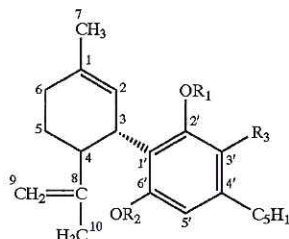
Primary Examiner—Kevin E. Weddington(74) *Attorney, Agent, or Firm*—Klarquist Sparkman, LLP

(57)

ABSTRACT

Cannabinoids have been found to have antioxidant properties, unrelated to NMDA receptor antagonism. This new found property makes cannabinoids useful in the treatment and prophylaxis of wide variety of oxidation associated diseases, such as ischemic, age-related, inflammatory and autoimmune diseases. The cannabinoids are found to have particular application as neuroprotectants, for example in limiting neurological damage following ischemic insults, such as stroke and trauma, or in the treatment of neurodegenerative diseases, such as Alzheimer's disease, Parkinson's disease and HIV dementia. Nonpsychoactive cannabinoids, such as cannabidoil, are particularly advantageous to use because they avoid toxicity that is encountered with psychoactive cannabinoids at high doses useful in the method of the present invention. A particular disclosed class of cannabinoids useful as neuroprotective antioxidants is formula (I) wherein the R group is independently selected from the group consisting of H, CH₃, and COCH₃.

(I)

**26 Claims, 7 Drawing Sheets**

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FIG. 1

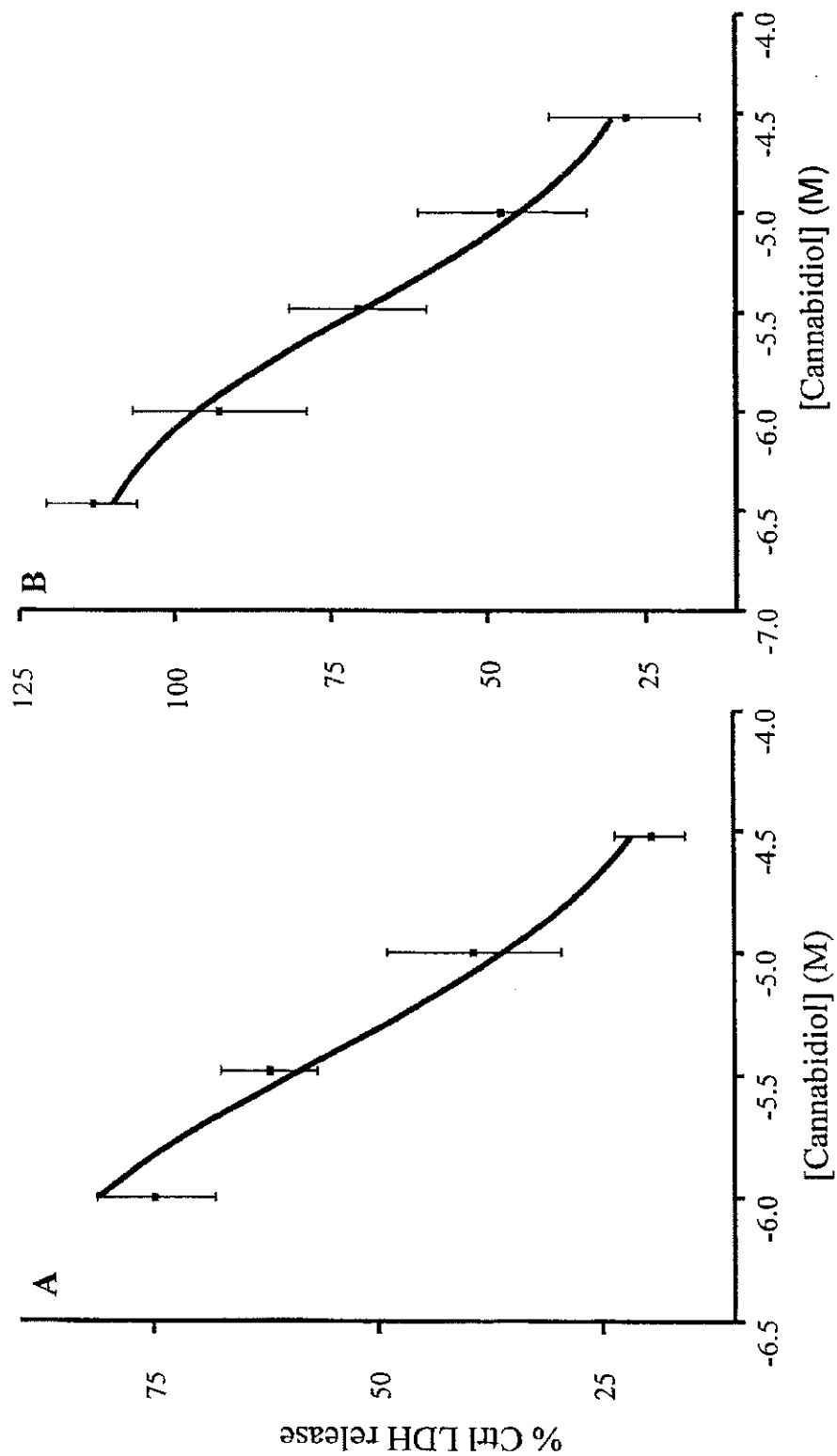


FIG. 2

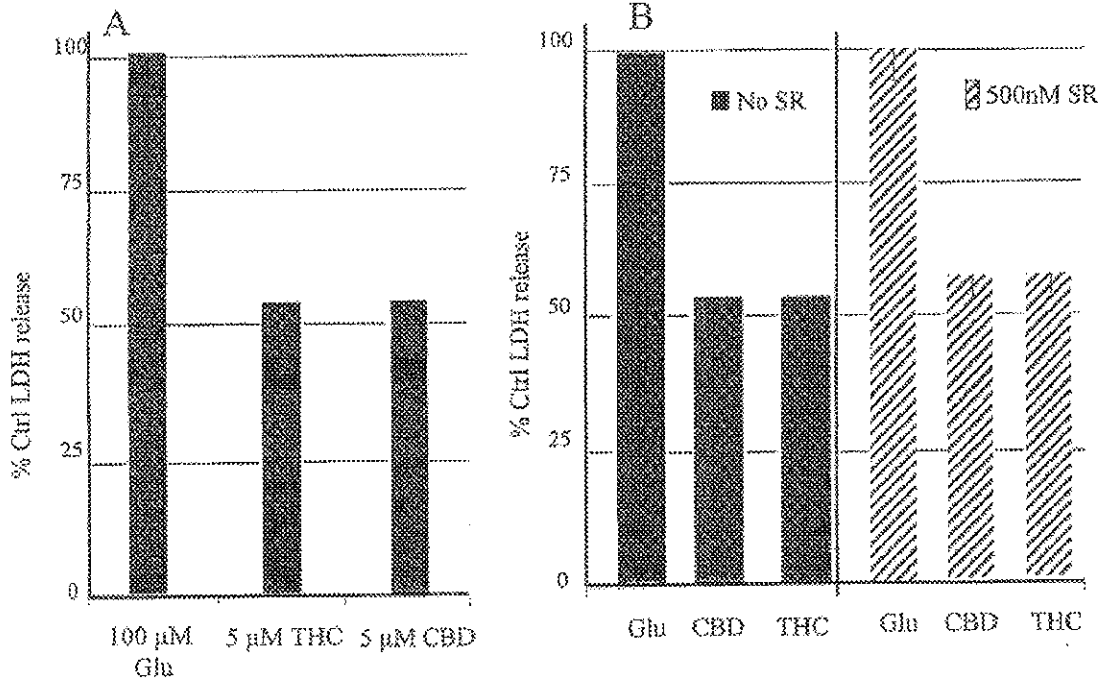


FIG. 4

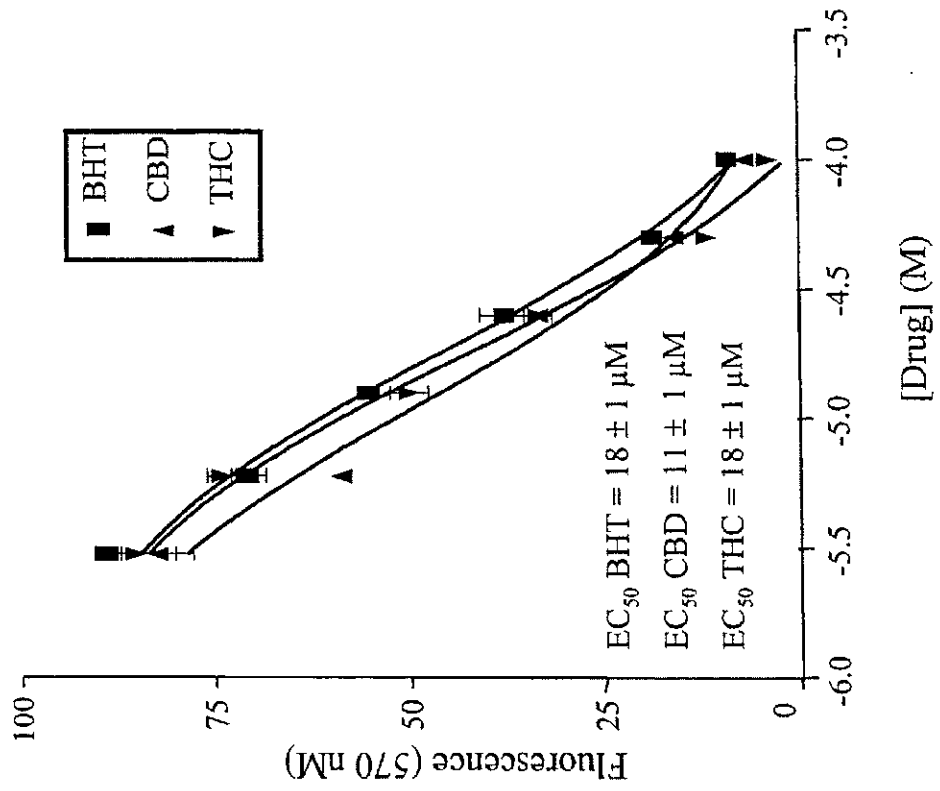


FIG. 3

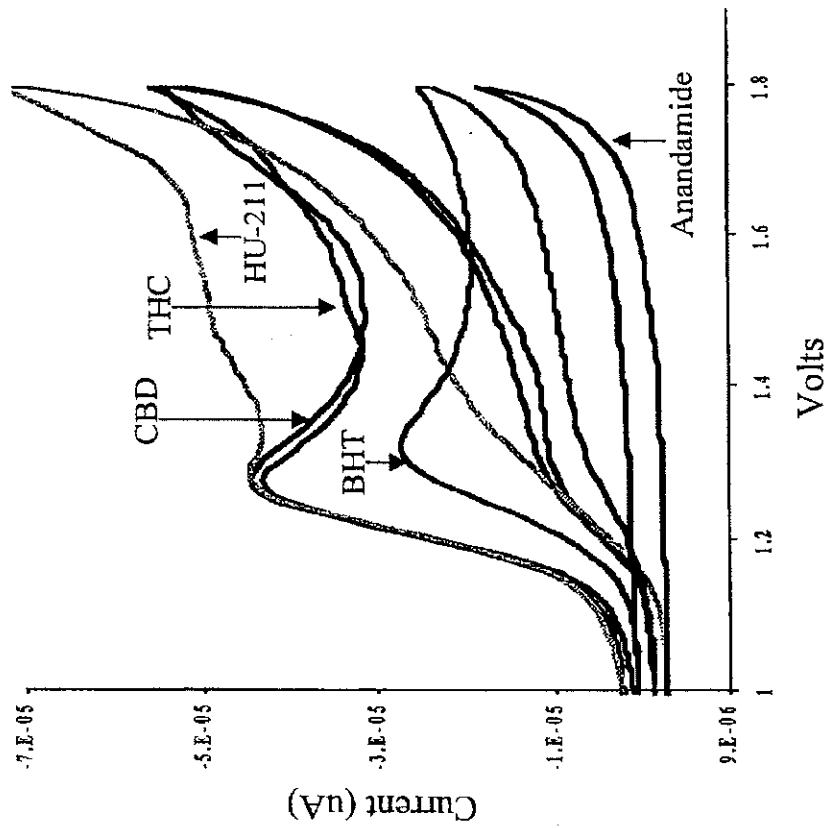


FIG. 5

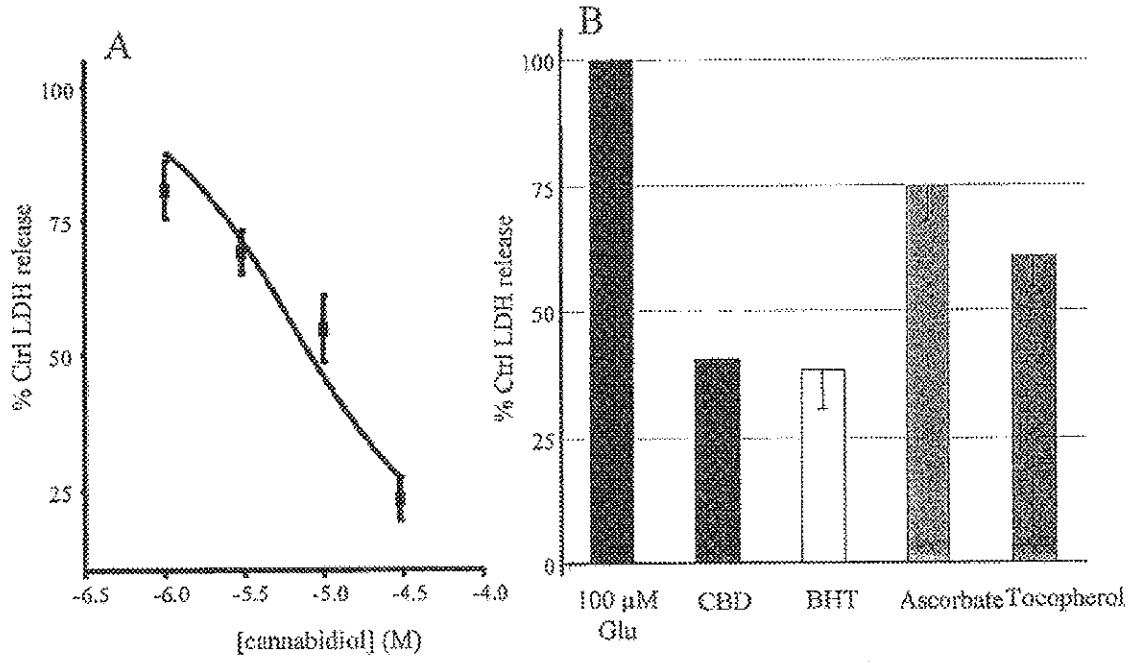


FIG. 6

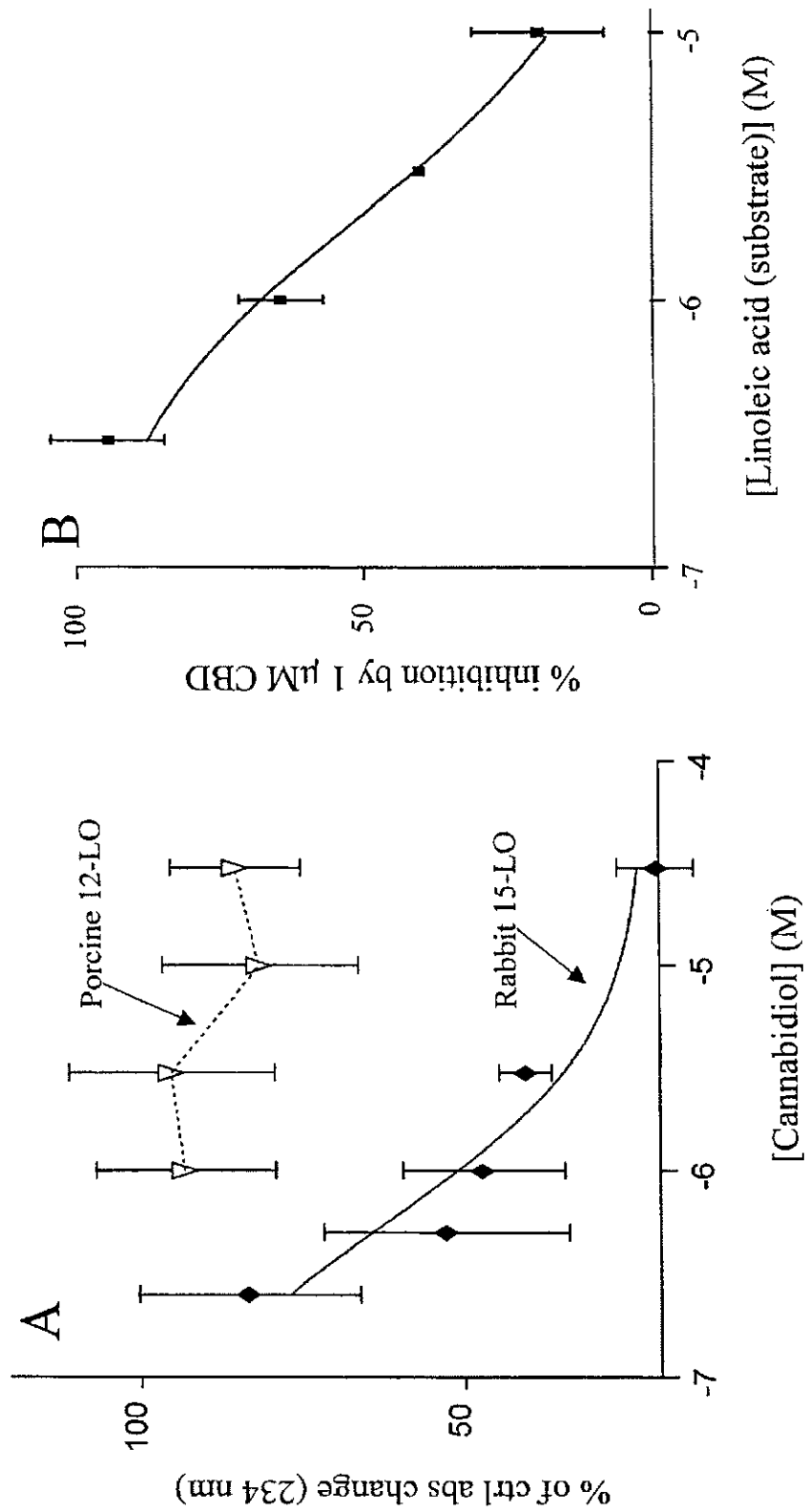


FIG. 7

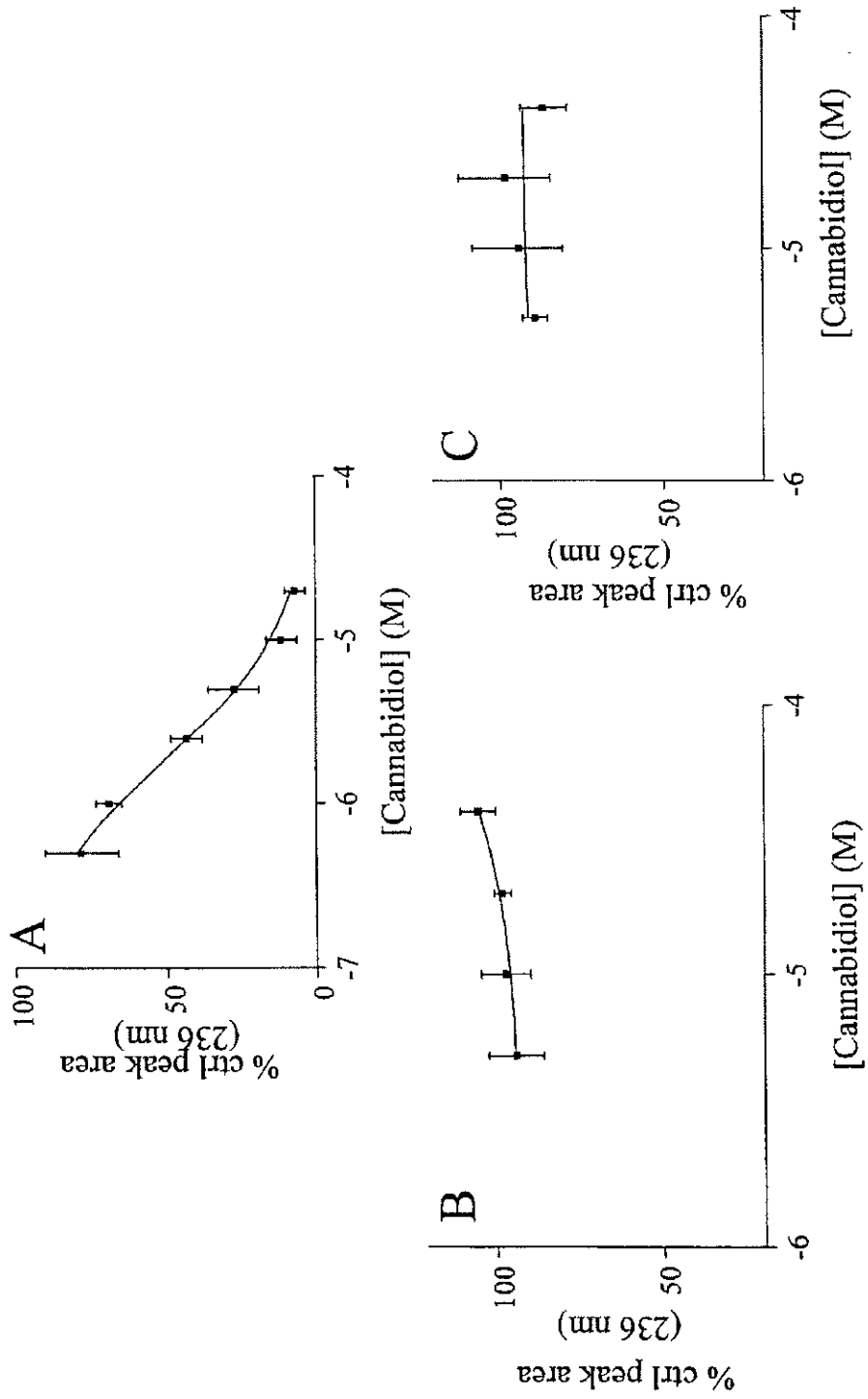
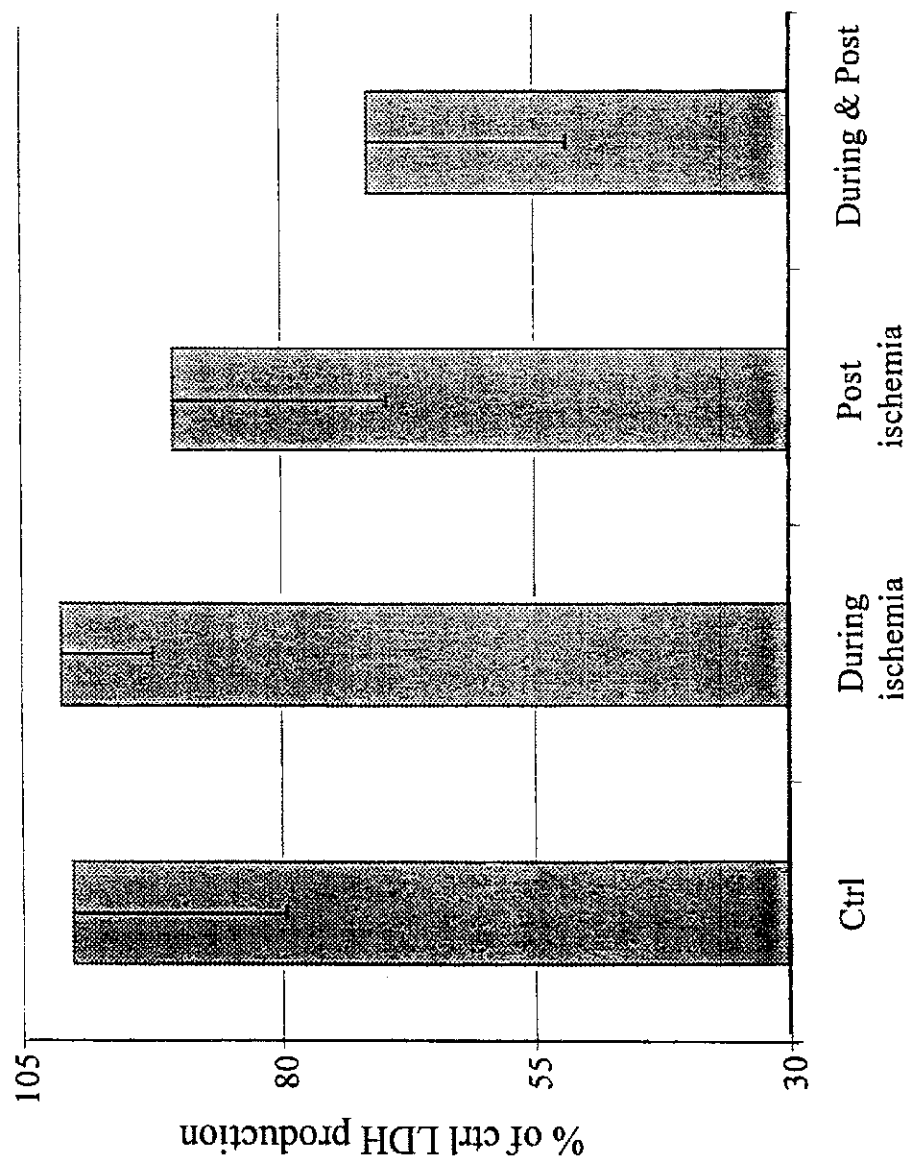


FIG. 8



Time of 12-HETE application (0.5 $\mu\text{g}/\text{ml}$)