Evaluation of the role of mixture of fish and corn oils in repression of induced Ulcerative colitis in rats

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تقييم دور خليط كل من زيت السمك وزيت الذرة في تثبيط التهاب القولون التقرحي المستحث في الجرذان

رسالة مقدمة للحصول على درجة الماجيستير في العلوم كجزء مكمل

لمتطلبات رسالة الماجيستير بكلية العلوم

قسم الكيمياء الحيوية

دينا السعيد عبد الحليم الشاذلي

تحت اشراف

الدكتورة: إيمان ابراهيم قنديل

أستاذ مساعد الكيمياء الحيوية

كلية العلوم.
جامعة عين شمس.

الأستاذ الدكتورة: نشوة كامل إبراهيم

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الدكتورة / فاطمة سيد معوض

مدرس الكيمياء الحيوية

المركز القومى لبحوث وتكنولوجيا الإشعاع

هيئة الطاقة الذرية.


بسم الله الرحمن الرحيم

الإهداء

الحمد لله حمدا كثيرا طيبا مبارك فيه سبحانك لا نحصي ثناءا عليك انت كما اثنيت على نفسك فلا حصر لنعمك ولا حدود لفضلك.

"سبحانك لا علم لنا الا ما علمتنا"

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الى ابنائي نعمة ربي وسر سعادتي.

Declaration

I declare that this thesis has been composed by me and it has not been submitted for a degree at this or any other university.

Dina El Said El Shazly

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Dina El Said El Shazly

Contents

Abstract

Excessive use of n-6 polyunsaturated fatty acids (PUFA) and inadequate n-3 PUFA in diet have been associated with enhancing risk for developing ulcerative colitis (UC). In rat models in different studies, n-3 PUFAs have been shown to attenuate colitis. However, little information is available concerning the in *vivo* effects of these fatty acids on different inflammatory mediators. The aim of this study was to examine the effect of fish and corn oils mixture (FO/CO) on dextran sodium sulfate (DSS)-induced colitis in rats. Anti-inflammatory activity was assessed by colonic myeloperoxidase (MPO) and serum alkaline phosphatase (ALP) activities. Expression of inflammatory related mediators including, inducible nitric oxide synthase (iNOS), nuclear factor kappa B (NF-κB) and signal transducer and activator of transcription (STAT-3) were also assessed. In addition, cytokines including, tumor necrosis factor alpha (TNF-α) and interleukin-10 (IL-10) were evaluated. Our results demonstrated that administration of FO/CO mixture by ratio (2.5:1) for four weeks resulted in reduced TNF-α, ALP, iNOS, and MPO activities accompanied with an increase of IL-10 level. In addition, FO/CO mixture proved anti-inflammatory properties by reducing the expression levels of transcription factors; NF-κB and STAT-3. Histopathological findings reinforced the obtained biochemical data.

List of abbreviations

AA	Arachidonic acid
ALA	Alpha-linolenic acid
ALP	Alkaline phosphatase
ANOVA	Analyzed Using One way analysis of Variance
APC	Antigen presenting cells
CD	Crohn's disease
CO	Corn oil
CLA	Conjugated Linoleic acid
COX	Cyclooxygenase
CRC	colorectal cancer
DC	Dendritic cells
DHA	Docosahexanoic acid
DNA	Deoxyribonucleic acid
DSS	Dextran sodium sulfate
ELIZA	Enzyme-linked immunosorbent assay
EPA	Eicosapentanoic acid
FO	Fish oil
GLA	γ -linolenic acid
IBD	Inflammatory Bowel Diseases
IL-10	Interleukin-10
iNOS	inducible nitric oxide synthase
JAK	Janus activated kinase
LA	Linoleic acid

LTB4	Leukotriene B4
LSD	Least significant difference
MCFA	Medium chain fatty acid
MPO	Myeloperoxidase
NF-κB	Nuclear factor-kappa B
NO	Nitric oxide
ω-3	Omega 3
ω-6	Omega 6
PCR	Polymerase chain reaction
PGE2	Prostaglandin E2
PUFA	Polyunsaturated fatty acids
r.p.m	Rounds per minute
ROS	Reactive oxygen species
RT-PCR	Reverse transcriptase real time polymerase chain reaction
STAT	Signal transducer and activator of transcription
TNF-α	Tumor necrosis factor alpha
TXA2	Thromboxane A2
UC	Ulcerative colitis

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