Indole-3-carbinol as a chemopreventive and anti-cancer agent

Jing-Ru Weng a, b, Chen-Hsun Tsai a, Samuel K. Kulp c and Ching-Shih Chen c

a Department of Biological Science and Technology, China Medical University, Taiwan
b Terry Fox Cancer Research Laboratory, China Medical University Hospital, Taichung 40402, Taiwan
c Division of Medicinal Chemistry, College of Pharmacy, Parks Hall, The Ohio State University, 500 West 12th Avenue, Columbus, OH 43210, USA

Received 8 December 2007; revised 17 January 2008; accepted 18 January 2008. Available online 7 March 2008.

Abstract

During the course of oncogenesis and tumor progression, cancer cells constitutively upregulate signaling pathways relevant to cell proliferation and survival as a strategy to overcome genomic instability and acquire resistance phenotype to chemotherapeutic agents. In light of this clinical and molecular heterogeneity of human cancers, it is desirable to concomitantly target these genetic instability and acquire resistance phenotype to chemotherapeutic agents. In light of this clinical and molecular heterogeneity of human cancers, it is desirable to concomitantly target these genetic

Keywords: Indole-3-carbinol; 3,3'-Diindoyl methane; Akt-NFκB signaling; Nuclear receptor signaling; Endoplasmic reticulum stress; BRCA gene expression

Article Outline

1. Introduction
2. Metabolic transformation of indole-3-carbinol and its pharmacological relevance
3. Pleiotropic effects of indole-3-carbinol on multiple signaling targets
   3.1. Apoptosis induction
   3.2. Cell-cycle arrest
   3.3. Modulation of the functional expression status of nuclear receptors
      3.3.1. Aryl hydrocarbon receptor (AHR)
      3.3.2. Estrogen receptor (ER)
   3.4. Endoplasmic reticulum stress
   3.5. Tumor invasion and angiogenesis
   3.6. Reversal of multiple-drug resistance (MDR)
4. Chem- and radio-sensitizing effects of indole-3-carbinol/DIM
5. Pharmacological exploitation of indole-3-carbinol and DIM to develop novel anti-tumor agents
   5.1. Ring-substituted DIMs
   5.2. SR13668, an Akt inhibitor
   5.3. 1-p-Substituted phenylDIMs (C-DIMs)
5.4. OSU-A9, a multi-targeted agent

Acknowledgements

References

Corresponding author. Tel.: +1 614 688 4008; fax: +1 614 688 8556.

Copyright © 2008 Elsevier Ireland Ltd All rights reserved.

Cancer Letters
Volume 262, Issue 2, 18 April 2008, Pages 153-163