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Zemel et al.

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(54) **COMPOSITIONS, METHODS AND KITS FOR REDUCING LIPID LEVELS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 166 days.

This patent is subject to a terminal disclaimer.

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(51) **Int. Cl.**

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A61K 47/18	(2006.01)
A61K 31/706	(2006.01)
A61K 45/06	(2006.01)

(Continued)

(52) **U.S. Cl.**

CPC ***A61K 31/435*** (2013.01); ***A23L 1/302*** (2013.01); ***A23L 1/3051*** (2013.01); ***A61K 31/05*** (2013.01); ***A61K 31/198*** (2013.01); ***A61K 31/455*** (2013.01); ***A61K 31/706*** (2013.01); ***A61K 45/06*** (2013.01); ***A61K 47/183*** (2013.01); *A23V 2002/00* (2013.01)

(58) **Field of Classification Search**

CPC . A61K 31/435; A61K 47/183; A61K 31/706; A61K 45/06; A61K 31/198; A61K 31/05; A61K 31/455; A23L 1/302; A23L 1/3051; A23V 2002/00

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,606,909	A	8/1986	Bechgaard et al.
4,769,027	A	9/1988	Baker et al.

(Continued)

FOREIGN PATENT DOCUMENTS

EP	2308493	A1	4/2011
WO	WO 2013/028547	A1	2/2013

OTHER PUBLICATIONS

Carlson, LA. Nicotinic acid: the broad-spectrum lipid drug. A 50th anniversary review. J Intern Med. Aug. 2005;258(2):94-114.

(Continued)

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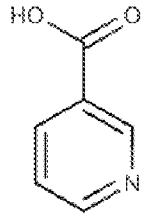
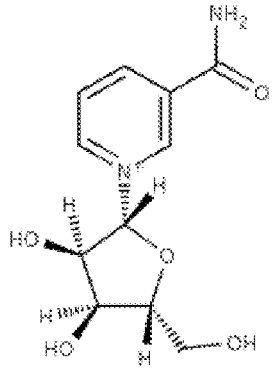
(57) **ABSTRACT**

Compositions, methods, and kits useful for treating hyperlipidemic conditions are provided herein. Such compositions can contain synergizing amounts of nicotinic acid, nicotinamide riboside and/or nicotinic acid metabolites in combination with leucine and/or a leucine metabolite, with or without resveratrol.

22 Claims, 15 Drawing Sheets
(2 of 15 Drawing Sheet(s) Filed in Color)



Nicotinic Acid



Nicotinamide Riboside