



Can herbal flavonoids reduce inflammation?

How does Arctigenin Isolated from *Arctium lappa* L. Inhibit IgE production?

***Renna Bushko
Neuroscience, Smith College
Renna@7SL.com***

Based on Research Poster by Changda Liu, Kamal D. Srivastava, Nan Yang, Madisyn Primas, Renna Bushko, Kyle Chin, Matthew Batnick and Xiu-Min Li Department of Pediatrics, Icahn School of Medicine at Mount Sinai, New York, NY, USA

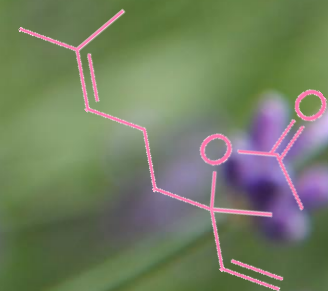
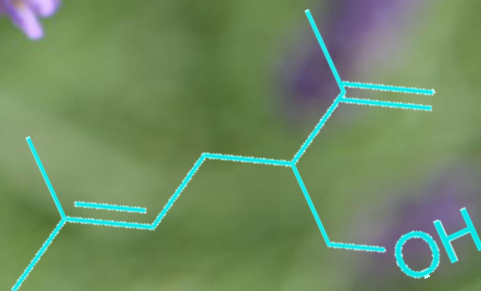
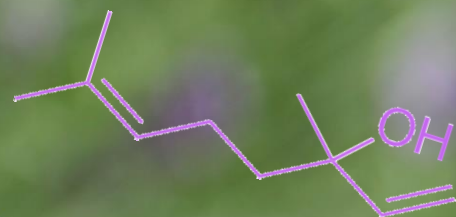
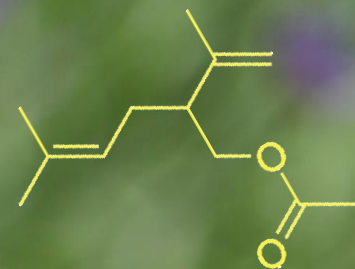
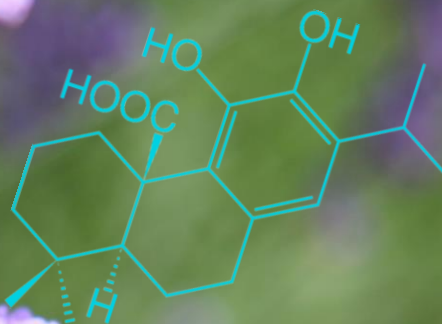
*20th Future of Health Technology Summit
MIT
May 2, 2016*

Value of Medicinal Herbs



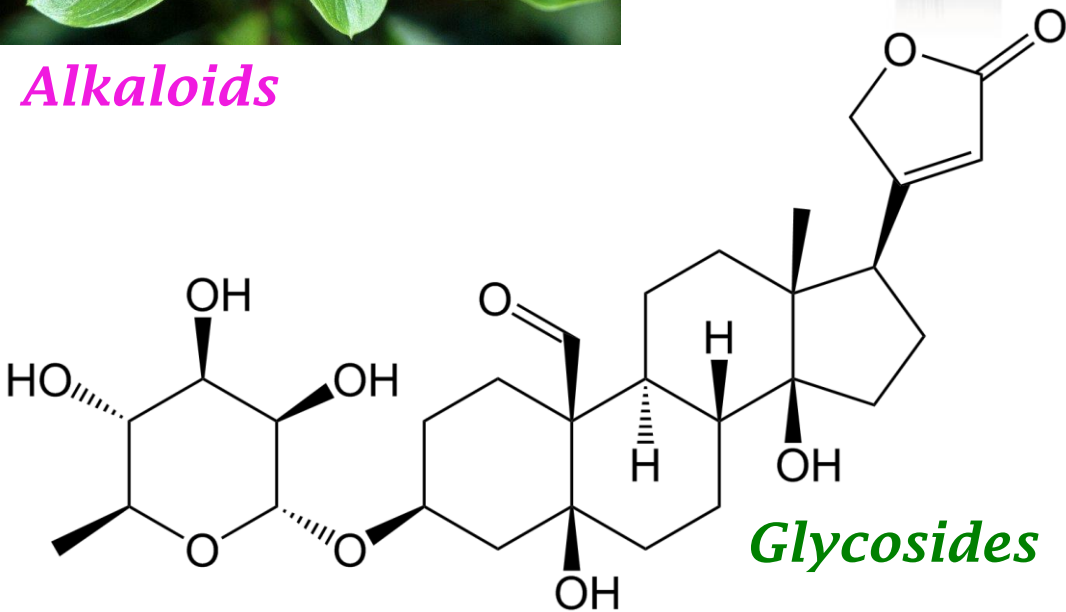
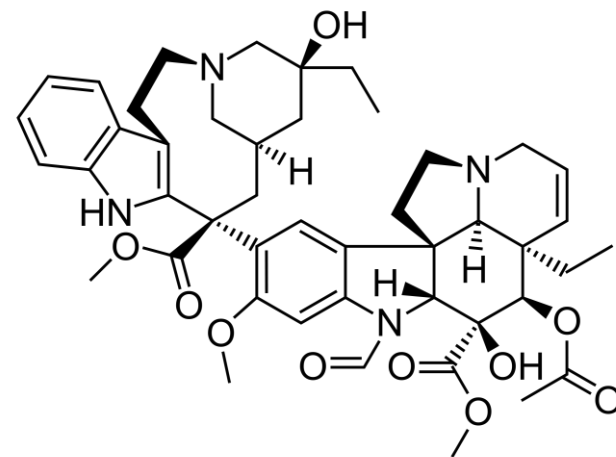
- Recently, medicinal herbs have become popular in drug development
- Medicinal herbs provide relief to those suffering from inflammation
- Inflammation is the cause of symptoms visible in over thirty known illnesses including Alzheimer's, Lupus, Asthma and Autism.

Secondary Metabolites are everywhere!





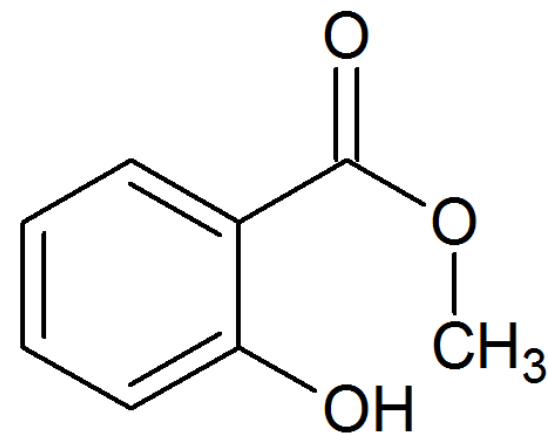
Alkaloids



Glycosides



Phenols



Artium lappa. L and Inflammation



Artium lappa. L , also known as Burdock has been used to reduce inflammation for centuries.

Inflammation is associated with elevated IgE

The purpose of studying Artium lappa is to determine what bioactive compounds can inhibit IgE production and thus reduce inflammation

Why is Inflammation bad for you?



Neuroinflammation:

Mediator of cognitive impairments in various neurological conditions

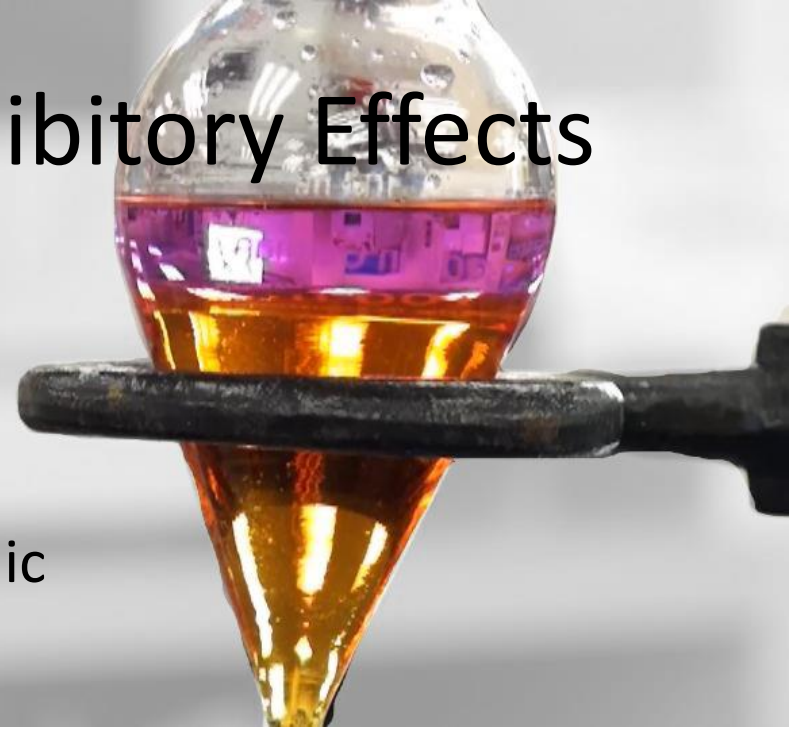
Increased inflammation alters synaptic condition and damages cognition.

Can result in other fatal disorders such as allergies

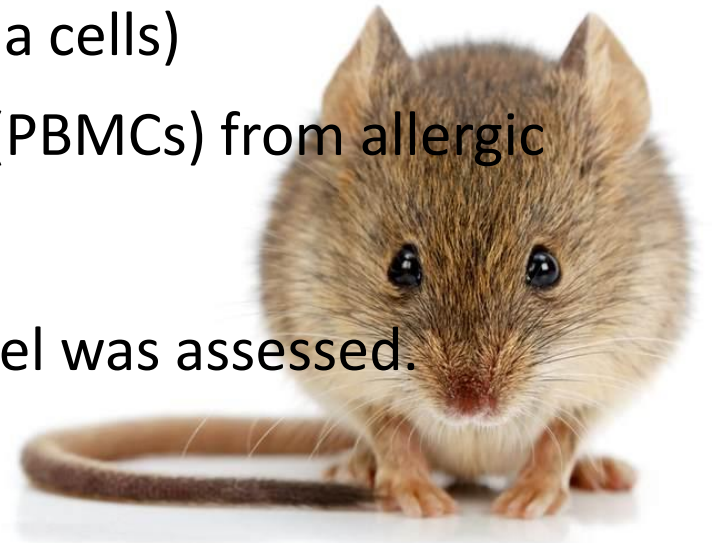
Nearly 200 people die from anaphylaxis yearly

Methods to Test IgE Inhibitory Effects

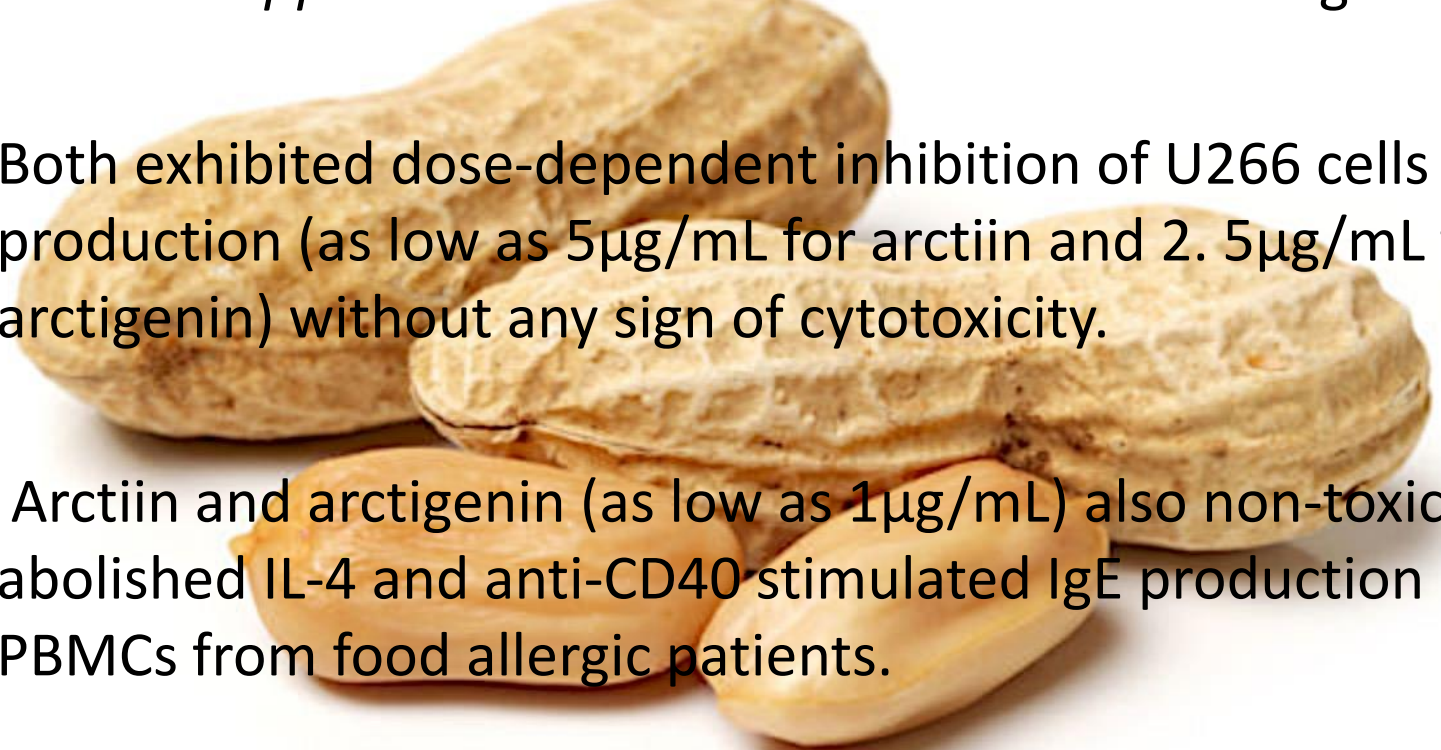
- Methods for isolation of compounds:
Liquid-liquid extraction, silica gel, and
Sephadex LH20 column chromatographic



- Cells used:
 - * human B cells (U266 human myeloma cells)
 - * peripheral blood mononuclear cells (PBMCs) from allergic patients
- Peanut sensitized murine asthma model was assessed.



Results

- The compounds isolated and purified (purity is >95%) from *Arctium lappa* L. were identified as arctiin and arctigenin
 - Both exhibited dose-dependent inhibition of U266 cells IgE production (as low as 5 µg/mL for arctiin and 2.5 µg/mL for arctigenin) without any sign of cytotoxicity.
 - Arctiin and arctigenin (as low as 1 µg/mL) also non-toxically abolished IL-4 and anti-CD40 stimulated IgE production by PBMCs from food allergic patients.
 - Arctigenin (20mg/kg) decreased score of anaphylactic reactions, blocked body temperature decrease, and reduced peanut-specific IgE levels on peanut allergic mouse models.
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Conclusion

- Arctiin and Arctigenin inhibited IgE production in human B cell line
- They also inhibited IgE in food allergic patient PBMCs.
- Arctigenin blocked anaphylactic reactions in a murine model of peanut allergy



Thank you to my research team
at Department of Pediatrics,
Icahn School of Medicine at Mount Sinai

Dr. Xiu-Min Li

Dr. Changda Liu

Dr. Kamal D. Srivastava

Dr. Nan Yang

Madisyn Primas

Kyle Chin

Matthew Batnick

Thank you to Professor Beth Powell at
Neuroscience Program at Smith College

Sources

- (1) Abstract AAAI – Poster Abstract March 7, 2016, *by* Changda Liu, Kamal D. Srivastava, Nan Yang, Madisyn Primas, Renna Bushko, Kyle Chin, Matthew Batnick and Xiu-Min Li Department of Pediatrics, Icahn School of Medicine at Mount Sinai, New York, NY, USA
- (2) Yang N, Wang J, Liu C, Song Y, Zhang S, Zi J, Zhan J, Masilamani M, Cox A, Nowak-Wegrzyn A, et al . Berberine and limonin suppress IgE production by human B cells and peripheral blood mononuclear cells from food-allergic patients. *Ann.Allergy Asthma Immunol.* 2014 Nov;113(5):556-64
- (3) Lopez-Exposito I, Castillo A, Yang N, Liang B, Li XM. Chinese herbal extracts of *Rubia cordifolia* and *Dianthus superbus* suppress IgE production and prevent peanut-induced anaphylaxis. *Chin Med.* 2011 Sep 30; 6:35.
- (4) Srivastava KD, Bardina L, Sampson HA, Li XM. Efficacy and immunological actions of FAHF-2 in a murine model of multiple food allergies. *Ann.Allergy Asthma Immunol.* 2012 May;108(5):351-8
- (5) Lindsay A. Osso, Jonah R. Chan, Astrocytes Underline Neuroinflammatory Memory Impairment, *Cell Vol 163, Issue 7, pp 1574-1576*
- (6) [Molodecky NA¹](#), [Soon IS](#), [Rabi DM](#), [Ghali WA](#), [Ferris M](#), [Chernoff G](#), [Benchimol EI](#), [Panaccione R](#), [Ghosh S](#), [Barkema HW](#), [Kaplan GG](#). ***Gastroenterology***. 2012 Jan;142(1):46-54.e42; quiz e30. doi: 10.1053/j.gastro.2011.10.001. Epub 2011 Oct 14. Increasing incidence and prevalence of the inflammatory bowel diseases with time, based on systematic review.

Images

1) Arctium lappa L slide 1:

[http://2.bp.blogspot.com/-ldViageu9MA/VJmvlDK7dal/AAAAAAAA0Ts/nV_5V6koa64/s1600/Benefits%2BOf%2BBurdock%2B\(Arctium%2BLappa\)%2BFor%2BHealth%2B\(3\).jpg](http://2.bp.blogspot.com/-ldViageu9MA/VJmvlDK7dal/AAAAAAAA0Ts/nV_5V6koa64/s1600/Benefits%2BOf%2BBurdock%2B(Arctium%2BLappa)%2BFor%2BHealth%2B(3).jpg)

2) Medicinal herbs slide 2:

<http://www.manifestdaily.com/wp-content/uploads/2016/04/herbs.jpg>

(3) Madagascar Periwinkle slide 4:

https://upload.wikimedia.org/wikipedia/commons/6/6a/Catharanthus_roseus_6576.JPG

(4) Lily of the Valley slide 4:

<http://cdn2.stylecraze.com/wp-content/uploads/2014/05/10-Amazing-Health-Benefits-Of-Lily-Of-The-Valley.jp>

(5) Wintergreen slide 4:

<https://upload.wikimedia.org/wikipedia/commons/thumb/0/0b/FountainSpringsWintergreen.png/1280px-FountainSpringsWintergreen.png>

(6) Actium lappa closeup slide 5:

<http://image.shutterstock.com/z/stock-photo-close-up-view-to-blooming-burdock-arctium-lappa-on-white-background-not-isolated-studio-shot-33272827.jpg>

(7) Brain image slide 6:

http://science.dodlive.mil/files/2014/06/SUBNET_Final_1.jpg

(8) Colorful ELISA slide 7 :

http://www.generon.co.uk/upload/270812_102856_PEEL_Rnubbh.jpg

(9) Liquid-liquid extraction slide 7:

http://minisite.proj.hkedcity.net/chemtech/upload/9A_Liquid_liquid_Extraction.JPG

(10) Mouse slide 7:

http://media.safebee.com/assets/images/2015/7/tiny%20house%20mouse.jpg.838x0_q67_crop-smart.jpg

(11) Peanuts side 8:

https://i.kinja-img.com/gawker-media/image/upload/s--stzIDiYz--/c_fill,fl_progressive,g_north,h_358,q_80,w_636/19e5fpp0q26hsjpg.jpg

(12) Arctium lappa cartoon slide 9:

http://www.alvita.com/media/catalog/product/b/u/burdock_root_2.png