Echinacea & Healthy Immune System Function

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Echinacea History

- Information about the therapeutic value of Echinacea first came from Native American tribes.
- Their use of Echinacea was then adopted by the Eclectic physicians.
- By 1921 Echinacea (specifically the root of *E. angustifolia*) was by far the most popular treatment prescribed by Eclectic physicians.

Wagner H. Z Phytother 1996; 17(2): 79-95
Concerning Echinacea
1885 to 1921

Originally employed by the Indians and Pioneers.
1885—Announced by an itinerant physician (Dr. Meyer.)
1887—Introduced to the profession by Dr. John King.
1890—A tincture was prepared for the use of investigating physicians, but not advertised, (Lloyd Brothers.)
1894—Label prepared by Dr. Felter giving therapeutic uses.
1899—First advertisement in Medical Journal, (Lloyd Brothers.)
1917—First historically descriptive pamphlet, (Lloyd Brothers’ Drug Treatise No. XXX.)
1920—Heads the list of plant preparations, Lloyd Brothers Laboratory, (See Table.)

Summary
Ten years’ use of Echinacea passed without descriptive label or circular. Its use constantly increased. Twenty-five years passed before appeared the first advertisement. Echinacea had become an important remedy. Thirty years passed, then, in response to professional requests, a descriptive pamphlet was prepared. (Drug Treatise No. XXX). In less than forty years, (see position in table) Echinacea heads the list of our plant preparations.

Lloyd Brothers, Cincinnati, Ohio
January, 1921

All Our Laboratory Products are Prescribed by Physicians

Echinacea History

- The Eclectics were responsible for Echinacea’s reputation as an immune system herb and they used the root extracted in a high percentage of alcohol (lipophilic extracts or tinctures).

- The tingling on the tongue (due to alkylamides) was the indicator of good quality.

Modern Echinacea

- Does it reflect traditional knowledge?
- Is it standardized to alkylamides?
- Confusion about how best to use it
- Myths
Early Echinacea Research

- Phagocytosis
- Immune system modulation
- Immune system surveillance

Pharmacokinetics

The only compounds identified in human plasma were alkylamides at approx. the same ratio as in tablets

- No alkylamide degradation products
- No caffeic acid conjugates
- No caffeic acid conjugate degradation products
- No polysaccharides
- 4 Echinacea root tablets as a single dose

What Do Echinacea Alkylamides Do?

- Some bind strongly to cannabinoid receptors causing subtle modulation of immune system function
- Others may inhibit breakdown of endogenous cannabinoids
- Possibly support dendritic cell maturation

What Do Echinacea Alkylamides Do?

- Possibly responsible for positive effects on natural killer (NK) cell function and numbers and supported white cell phagocytic activity seen in several *in vivo* studies

- Possibly responsible for effects on heat shock proteins seen in human studies of Echinacea root

Cannabinoid Receptors

- CB1 receptors are highly localized in the central nervous system (CNS) and are believed to primarily modulate behavior.

- CB2 receptors predominate in immune tissues outside the CNS, especially the spleen, and are believed to modulate immune function.

- Echinacea alkylamides mainly bind to the CB2 receptor.

Anandamide: an endogenous cannabinoid

Z,Z tetraene alkylamide from Echinacea
Endocannabinoids, Not Just the Immune System!

- Also HPA axis regulation and mood
- CB2 receptors recently found in the brain
- Endocannabinoids are involved in HPA axis regulation via a fast feedback loop

Echinacea Root and HSPs

- Open-label pilot trial
- 11 healthy volunteers
- 2 Echinacea root tablets/day for 14 days (standardized to 4.4 mg alkylamides/tablet)
- Evaluated at day 1 and on day 15

Echinacea Root and HSPs

- Echinacea root supported the expression of hsp70 in white cells (~50%) after mild heat shock (p=0.029)
- White cell counts mildly supported (p=0.043)
- Supported red blood cell health (p=0.006)

Echinacea Root and HSPs

- A follow-up open-label trial in 24 healthy volunteers\(^1\)

- Echinacea root dose was 2 tablets twice daily

1 Agnew L et al. *Planta Med* 2010; 76(12): P629, 1354
Echinacea Root and HSPs

- Echinacea significantly supported CD4, CD8 and NK cell heat stress-induced hsp70 expression
- No significant support basal hsp70 expression in lymphocytes
- Effect was most marked in NK cells (p<0.05)

Echinacea Root and HSPs

- Echinacea root may play a role in supporting immune system cells via HSPs when the body encounters a challenge.
Echinacea Supports Aging of Innate Immune System Response

- NK cells decline in number and function with age and this is thought to be one factor behind the increase of various age related challenges

- Experiments in healthy, elderly mice found that 2 weeks of oral doses of Echinacea root supported NK cell numbers and function to levels in young adults\(^1\)

1 Currier NL, Miller SC. *Exp Gerontol* 2000; **35**: 627-639
Echinacea Supports Aging of Innate Immune System Response

- In addition, for mice fed *Echinacea purpurea* root from 7 weeks of age to 13 months lifespan was significantly extended compared to controls\(^1\)

1 Brousseau M, Miller SC. *Biogerontology* 2005; 6: 157-163
Good Preparation is Better Than Intervention

- In a study presented by the late Dr Anna Macintosh at the 1999 Convention of the American Association of Naturopathic Physicians, an Echinacea root formulation was compared against an herbal adaptogenic formulation and a placebo in over a 90-day period\(^1\)

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1. McIntosh A et al. AANP Convention, Coeur d’ Arlene, 1999.
Good Preparation is Better Than Intervention

- The trial recruited 260 medical students who were under stress from their studies

- The placebo group averaged 10%, whereas this dropped to as low as 2% by day 70 ($p=0.013$) in the Echinacea group
Echinacea and Long-haul Flights

- A randomized, double blind, placebo-controlled clinical trial was undertaken with 175 participants traveling return from Australia to North America, Europe or Africa for 1 to 5 weeks.

- Active tablets each contained extract from 1.275 g Echinacea root (4.4 mg alkylamides)

Tiralongo E et al. *Evid Based Complement Alternat Med* 2012; 2012: 417267
Echinacea and Long-haul Flights

- Priming dose was 2/day
- Travel dose was 4/day
- Dose when challenged was 6/day

- The placebo group exhibited significantly higher average score (around double) compared with the Echinacea group ($p<0.05$) after return from travel
Echinacea Root and Air Travelers

Echinacea Premium®
M1240
Herbal Supplement
Suggested Use: 1 tablet 2-3 times daily, or as directed.
40 Tablets
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Immune System Support

- Echinacea Premium: 1 tablet 2 to 4 times daily

Combine with

- Immuplex®: 2 capsules three times daily

These statements have not been evaluated by the Food & Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.
Winter Support

- Andrographis Complex
  - 1 tablet 2 – 4 times daily, long term
  - 2 tablets 3 – 4 times daily, short term

- Broncafect®
  - 2 tablets 2 – 4 times daily

- Euphrasia Complex
  - 1 tablet 3 – 4 times daily, long term
  - 2 tablets 3 – 4 times daily, short term

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Questions