



Value addition to Tea with Micronutrients, Flavors and Herbs

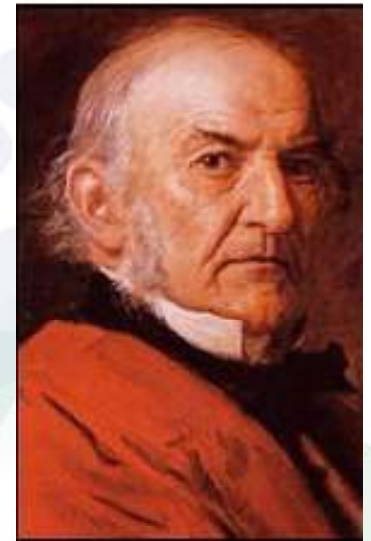
Dr Gautam Banerjee
Expertise Area Director-Nutrition and Health
Unilever R & D,
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ILSI 2011

History Tells Us About The Health Benefits Of Tea

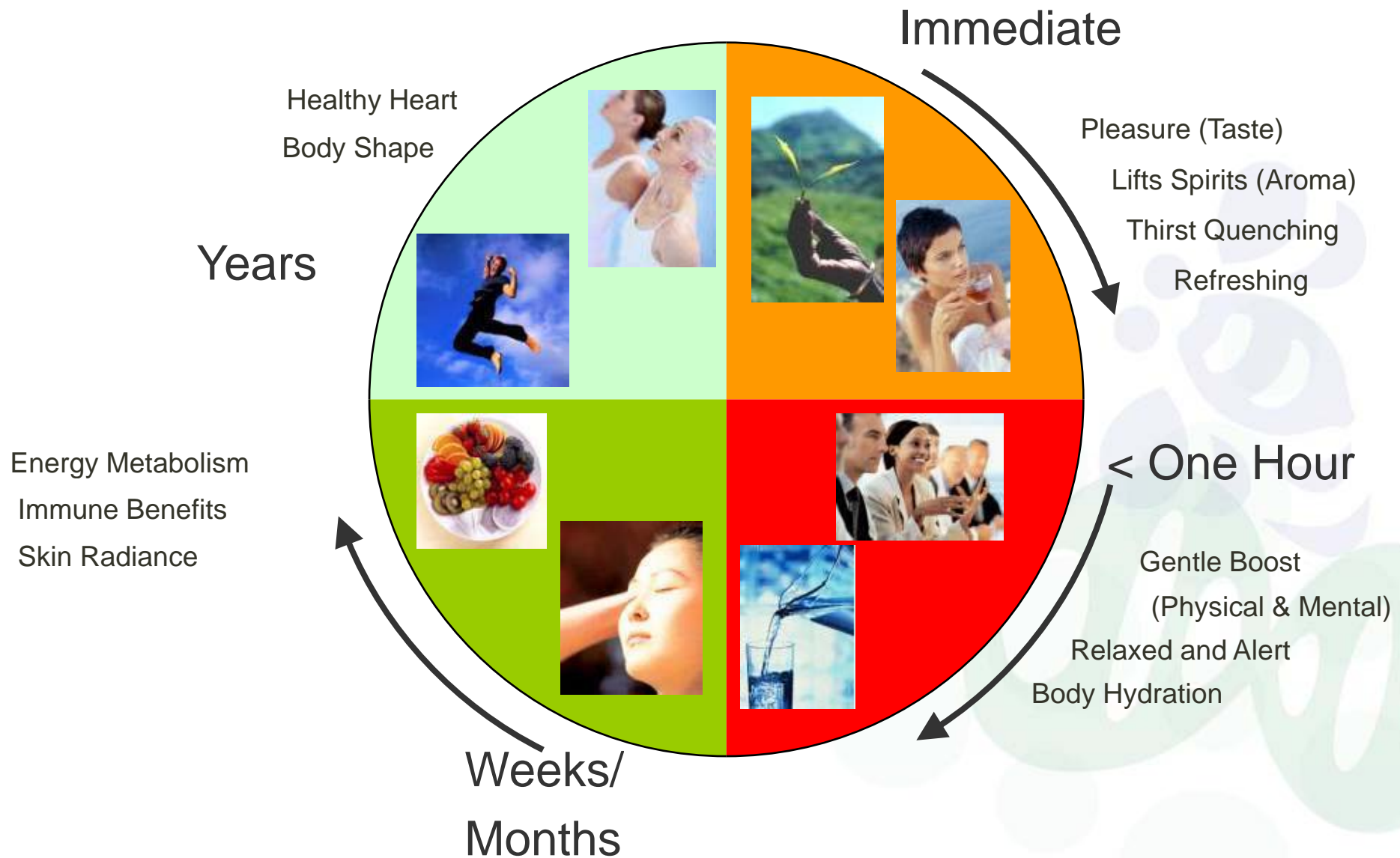
One of England's greatest PM William Gladstone:

"If you are cold, tea will warm you.
If you are hot, it will cool you.
If you are depressed, it will cheer you.
If you are excited, it will calm you."



The Benefits of Tea

Feeling Good Now, Tomorrow and Beyond





Tea as Carrier of Goodies



Why Fortify tea ?



- **Consumed by large section of population**
 - **96% penetration of beverage among adults**
 - **88% penetration among children above 5 years of age**
- **Affordable to the target population**
- **Does not involve any change in lifestyle**
 - **Tea is a part of everyday life in most part of the Globe.**
 - **2-3 cups of tea consumed per day**



Trends: **Functional Tea**



Beauty benefit

Energizing & Relaxing

Digestive

Immunity Boost

Improving Cardiovascular
Health

Low sugar



Tea : Fortified with Micronutrients



Why fortify with vitamins?

- Known deficiency/ intake gaps for vitamins in the population
- Technical feasibility of adding the vitamins
- Stability of vitamins in the food

Flavored Tea



Active Life Drinks : Health & Energy and
Youth & Vitality, with green tea, ginkgo
biloba, vitamin C and biotin.



Tea: Fortified with Herbs





CASE STUDY



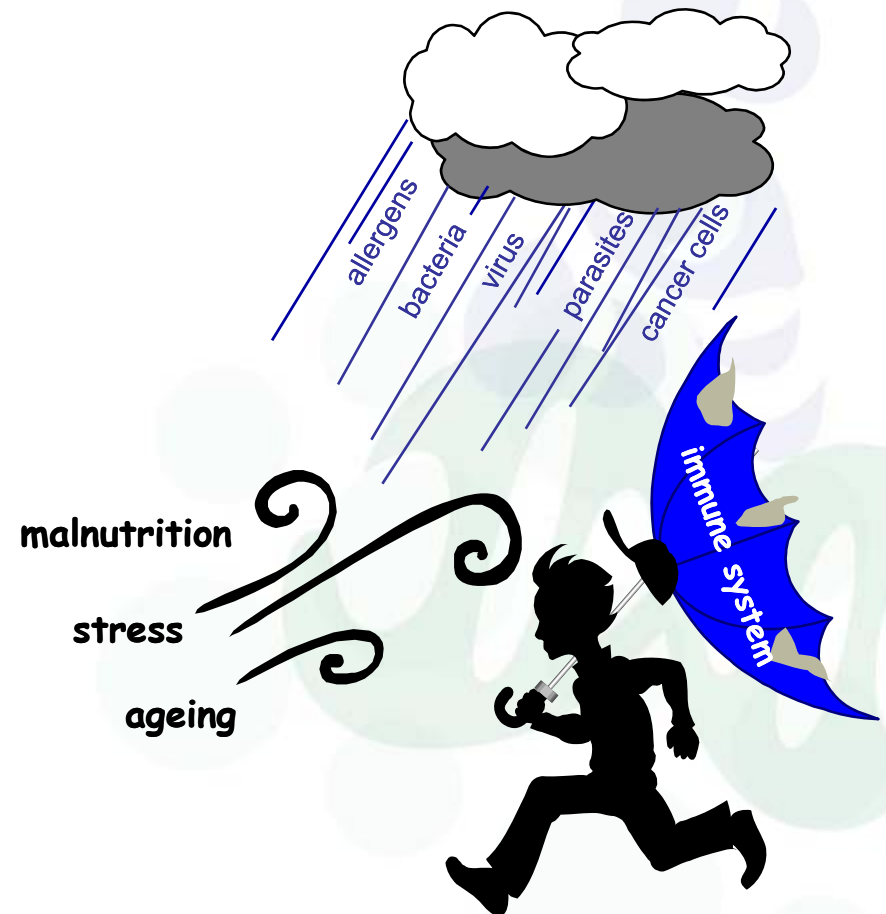
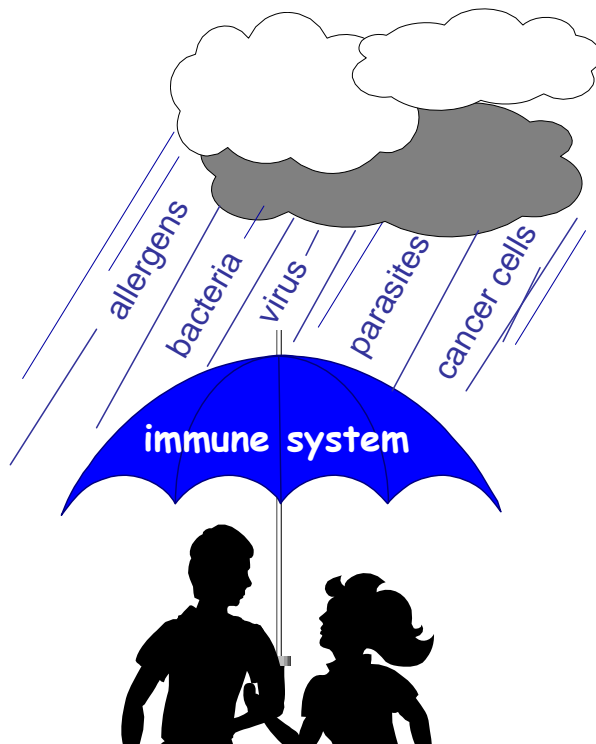


Immunity Benefit Through Tea Fortified with Herbs



The Paradigm

Immune function is key for resistance to infections,
but can be compromised by various factors



The Approach

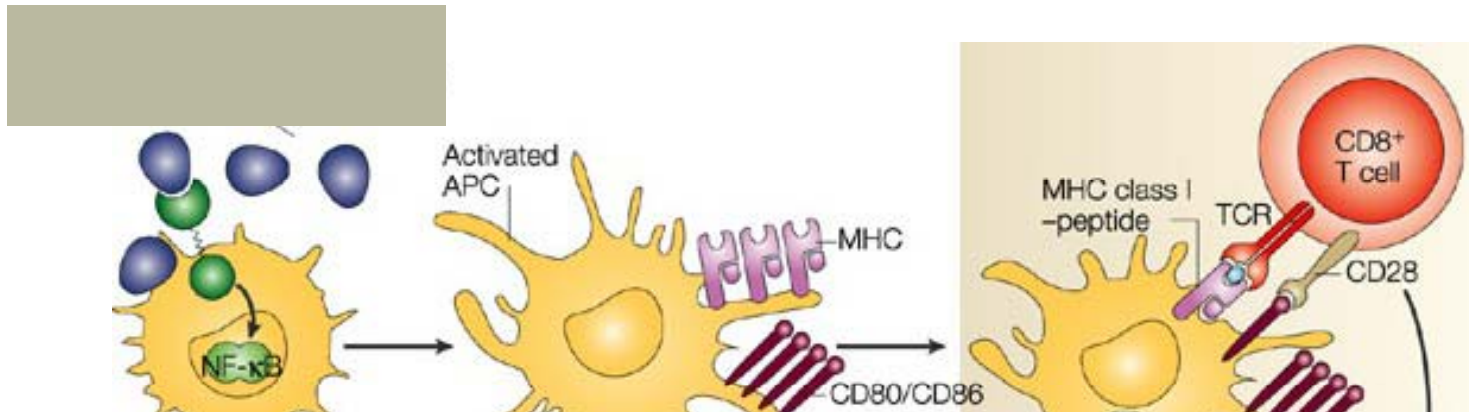


Leads from 'Ayurveda'

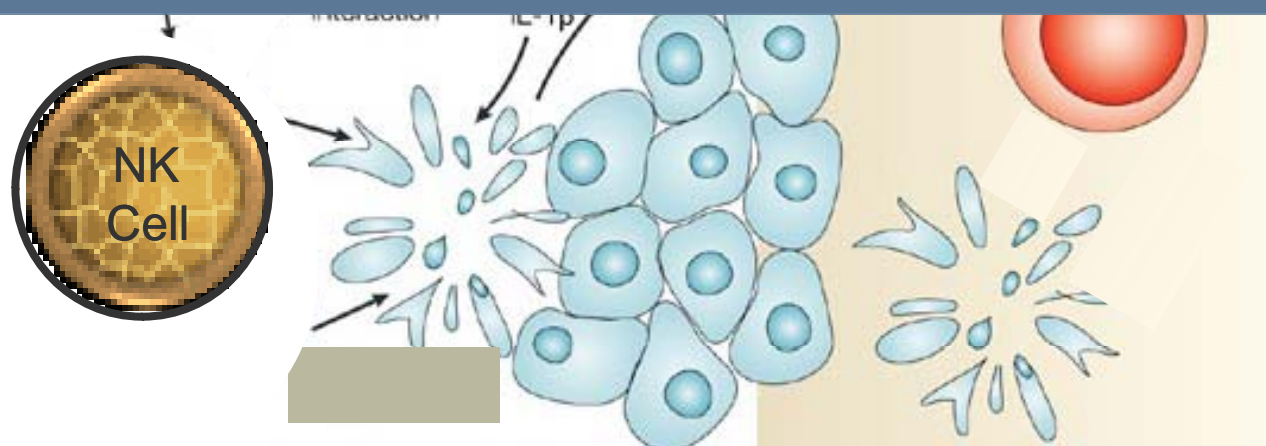
- Traditional Indian System of Medicine.
- Provides Good to excellent leads for various health benefit.
- Retains the health of healthy & prevents disease.
- Improves the health of unhealthy.

“Boosting of Natural Immunity”

Human Innate Immune System



NK cell is a validated marker for
“Natural Immunity”





Melissa B Lodoen and Lewis L Lanier

Division of Haematology, Third Department of Internal Medicine and *Department of Bioregulation, Institute of Gerontology, Nippon Medical School, Tokyo, Japan

Nippon Medical School, Tokyo, Japan

Systemic Immunity-Enhancing Effects in Healthy Subjects Following Dietary Consumption of the Lactic Acid Bacterium *Lactobacillus rhamnosus* HN001

Microthlas rhombosus HENRI

REVIEW

Activation of Natural Killer Cells: Underlying Molecular Mechanisms Revealed

E. Backström*†, K. Kristensson* & H.-G. Ljunggren†

Human Peripheral Blood Mononuclear Cells by *Salmonella* Bacteria *In Vitro*: Evidence of MHC Cells as Primary Targets

Human Peripheral Blood and Bacteria in Vitro: Evidence Primary Targets

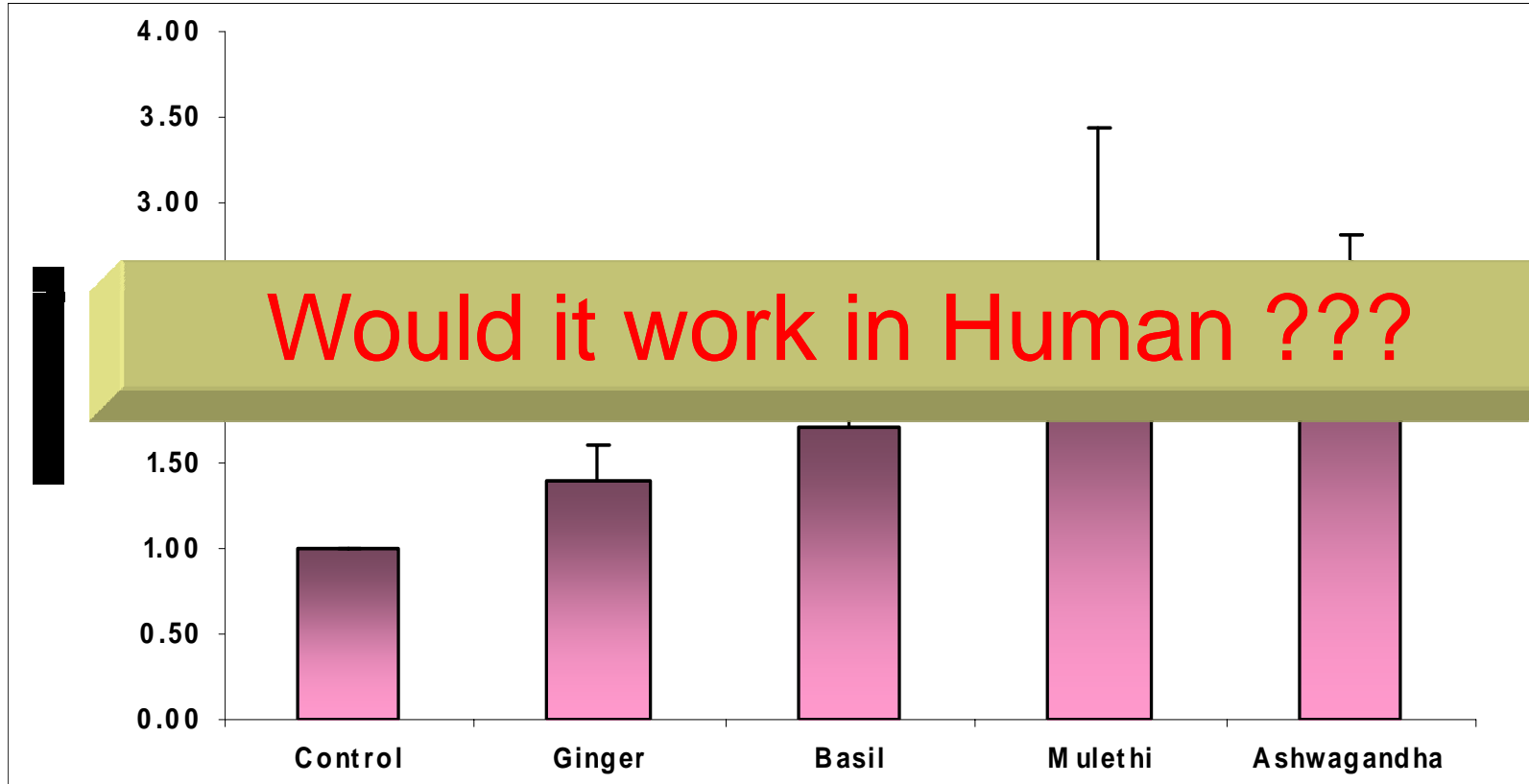
ARTICLE

Regulation of natural killer cell activity
Sheryl E Kirwan and Deborah N Burshtyn

Cell Culture Based Bio-Assays



Natural Killer Cell Assay



Natural Killer cell activity enhanced by herbs *in vitro*.

The Herbs



Liquorice



Glycyrrhiza glabra

Ashwagandha



Withania somnifera

Holy Basil



*Ocimum
sanctum*

Ginger



Zingiber officinale

Herb Specific Markers

Herbs

Ocimum sanctum.....

Withania somnifera.....

Glycyrrhiza glabra.....

Zingiber officinale.....

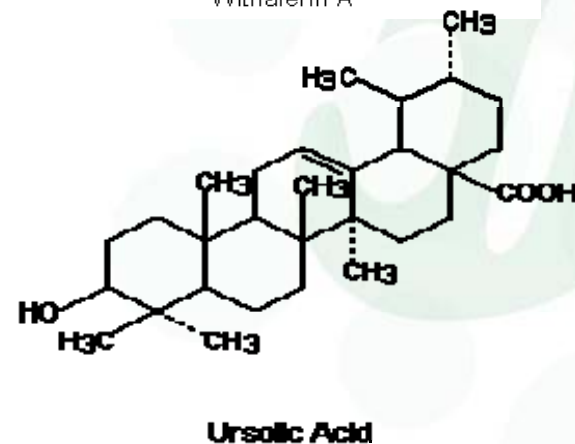
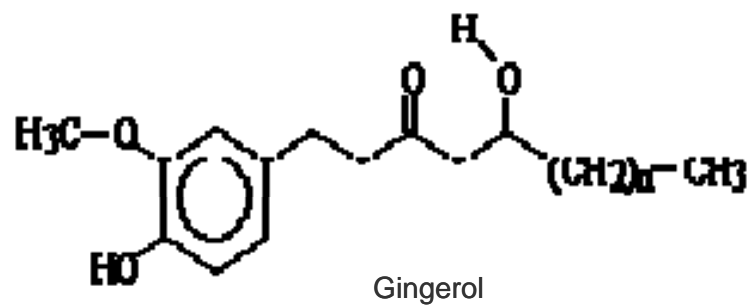
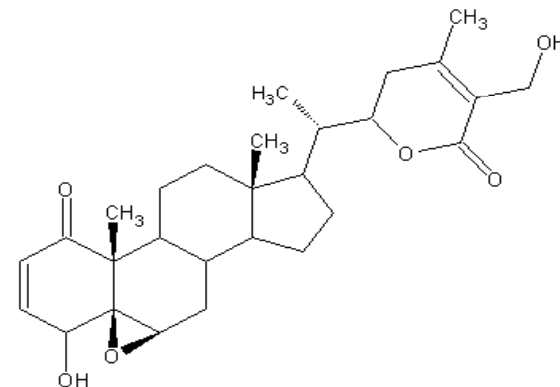
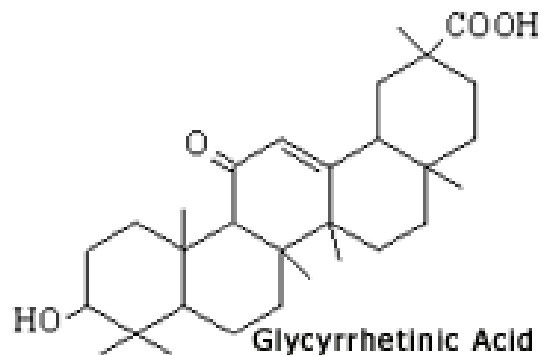
Marker molecule

Ursolic acid

Withaferin A

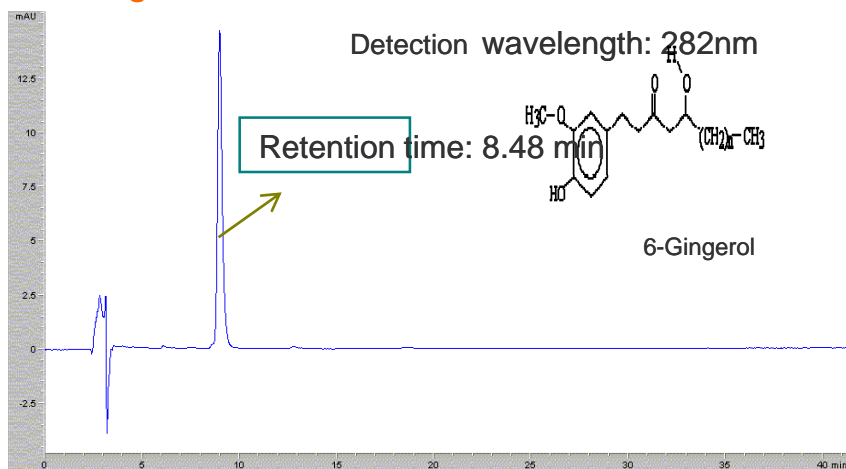
Glycyrrhetic acid

6-Gingerol

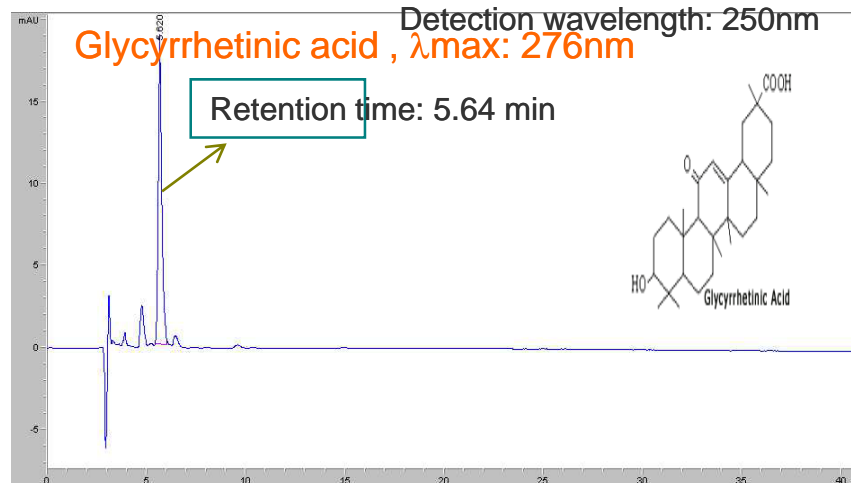


Extract

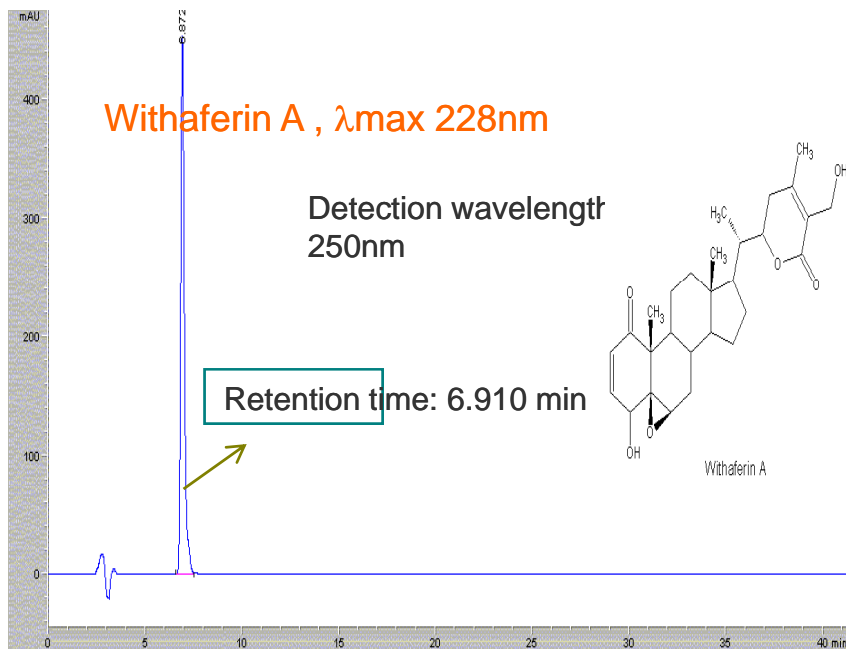
Gingerol, λ_{max} :320nm, λ_{max} :355nm



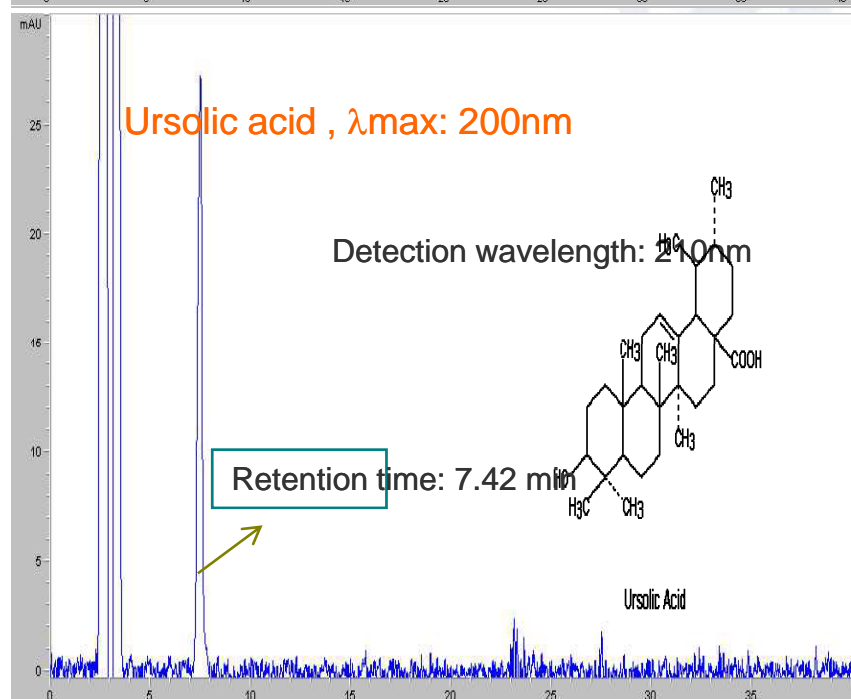
Glycyrrhetic acid, λ_{max} : 276nm



Withaferin A, λ_{max} 228nm



Ursolic acid , λ_{max} : 200nm



Proof of Efficacy



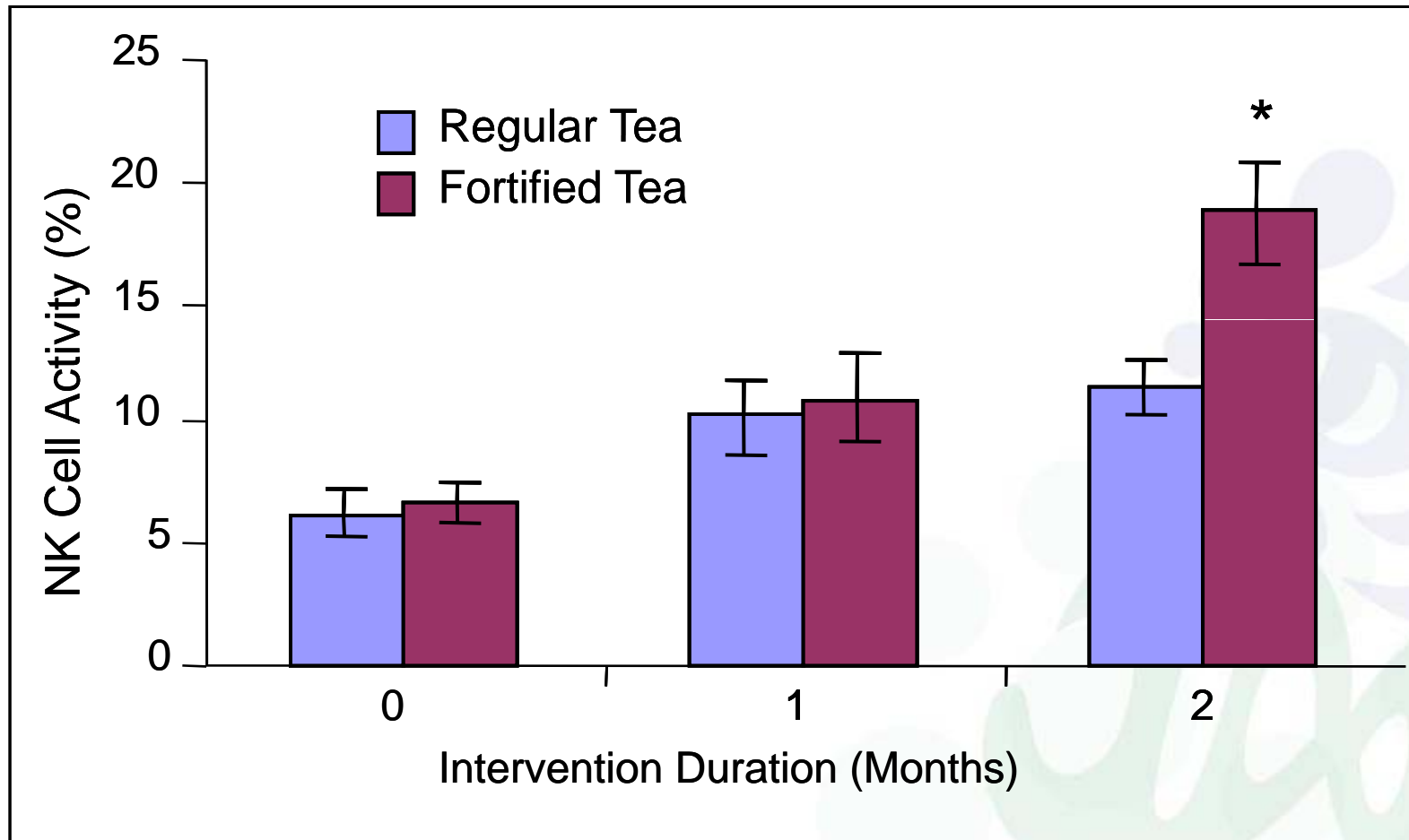
Human Efficacy Trials: (2 trials)

- First trial (n=32, 2 months, parallel)-
Mumbai (3 cups of tea per day).
- Second trial (n=100, 4.5 months, cross over)-
Bangalore (3 cups of tea per day).

Study End Points:

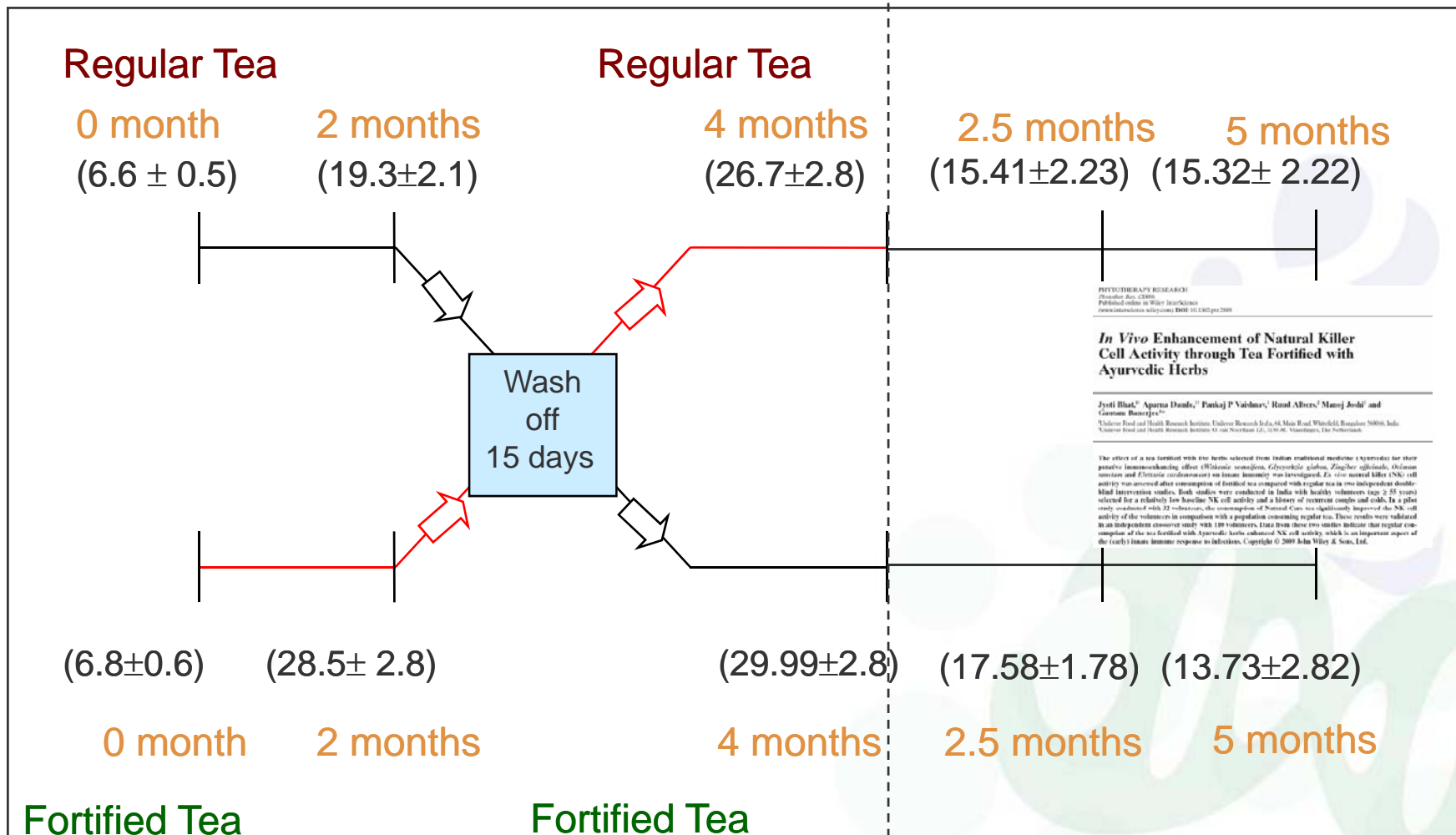
Natural killer cell (NK cell) activity

Result (Trial I)



Consumption of Fortified tea significantly improves NK cell activity.

Result (Trial - II)



PHYTOTHERAPY RESEARCH
 December 2009, 23(12)
 Published online in Wiley InterScience
 (www.interscience.wiley.com) DOI: 10.1002/ptr.3288

In Vivo Enhancement of Natural Killer Cell Activity through Tea Fortified with Ayurvedic Herbs

Jyoti Bhat,¹ Aparna Dandekar,² Pankaj P. Vaidya,¹ Rami Akter,² Manoj Joshi¹ and Ganesha Banerjee^{2*}

¹Unilever Food and Health Research Institute, Unilever Research India, 64, Main Road, Whitefield, Bangalore 560066, India
²Unilever Food and Health Research Institute, 11, rue Noirestraat 12, 1105 AG, Amsterdam, The Netherlands

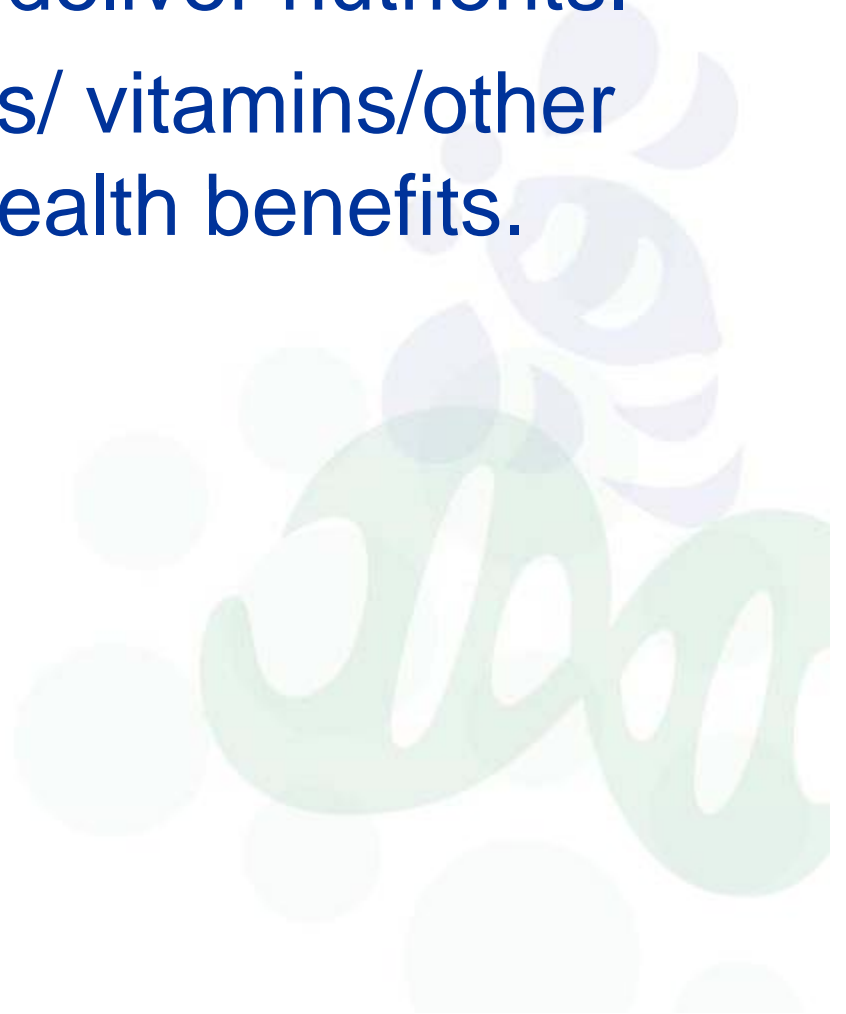
The effect of a tea fortified with two herbs selected from Indian traditional medicine (Ayurveda) for their putative immunomodulating effect (*Withania somnifera*, *Glycyrrhiza glabra*, *Zingiber officinale*, *Adiantum species* and *Centella asiatica*) on human immunity was investigated. *In vivo* natural killer (NK) cell activity was assessed after consumption of fortified tea compared with regular tea in two independent double-blind, intervention studies. Both studies were conducted in India with healthy volunteers (age 2–55 years) selected for a relatively low baseline NK cell activity and a history of recurrent colds and cough. In a pilot study conducted with 32 volunteers, the consumption of Natural Care tea significantly improved the NK cell activity of the volunteers in comparison with a population consuming regular tea. These results were validated in an independent crossover study with 100 volunteers. Data from these two studies indicate that regular consumption of the tea fortified with Ayurvedic herbs enhanced NK cell activity, which is an important aspect of the (early) innate immune response to infections. Copyright © 2009 John Wiley & Sons, Ltd.

Consumption of fortified tea significantly improves NK cell activity.

Summary



- Tea is a zero calorie healthy beverage.
- Successfully used to deliver nutrients.
- Good carrier for herbs/ vitamins/other goodies for various health benefits.





THANK YOU

