

INSTITUTE FOR COFFEE STUDIES



Vanderbilt University



Vanderbilt
University









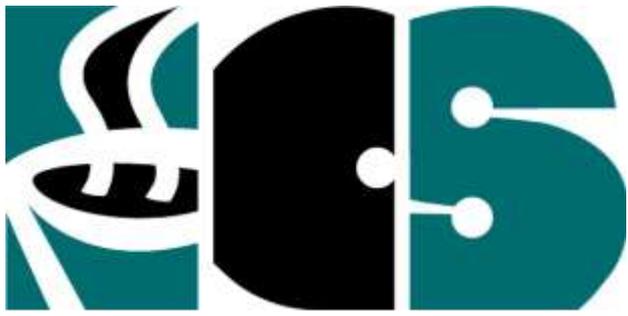
Strategic Planning Committee

- David Nahum Neto (Brazil), Chairman
- Carlos Brando (Brazil)
- Stuardo Coto (Guatemala)
- Professor Darcy Lima (Brazil)
- Professor Peter Martin
- Robert Nelson (NCA)
- Nestor Osorio (ICO)
- Diego Pizano-Salazar (Colombia)
- Senator Jose Carlos Silva (Brazil)



International Advisory Board

- His Excellency Rubens Barbosa
Ambassador of Brazil
- Dr. Jorge Cardenas
General Manager
Federacion Nacional de Cafeteros de Colombia
- Dr. Ernesto Illy
Presidente, Illy Cafe
Cavaliere del Lavoro



Mission

- To systematically investigate the *pharmacological actions* of the various compounds found in coffee
- To identify potential *health benefits and/or therapeutic uses* of coffee based on a fundamental understanding of its constituents
- To *disseminate results* and promote *educational exchange* with partner nations



Rationale for establishment of ICS

- No compelling evidence that coffee consumption in moderation is detrimental to health
- Epidemiological evidence suggests potential health benefits of coffee (suicide, cirrhosis, cancer, heart disease, Parkinson's disease)
- *ICS investigations are intended to elucidate fundamental mechanisms of health benefits of coffee consumption rather than to disprove adverse health effects*



New institute to probe
coffee's chemical nature
VUMC Reporter
January 22, 1999





Milestones and accomplishments

- 1999** – After formal discussions at VUMC with representatives from Brazil, Colombia, Guatamala, and NCA, a letter of agreement (ACPC/NCA/Vanderbilt) to establish ICS was signed [Jan 19th]
- 1999** – ICS established in space (5,000 sq. ft.) provided by VUMC [July 1] – extensive lay press coverage, as well as mention in first rank scientific publications, e.g., *Nature Medicine* and *Science*



Milestones and accomplishments

1999 – Receipt [Sep] of initial ACPC funding

2000 – Three Pilot and Feasibility Grants awarded

2000 – External scientific review [Feb] by SAG (NCA, Orlando)

2000 – First invited presentations to ICO

2001 – Receipt [March] of major donation from Kraft Foods (USA)

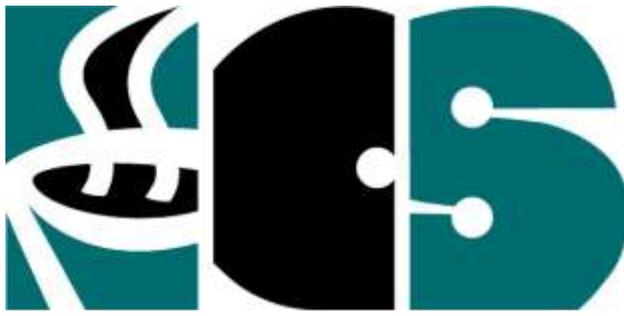


Milestones and accomplishments

2001– First ICS publication [May] in *Coffee Futures*

2001– First presentations of ICS scientific findings [May] at ASIC (Trieste), World Coffee Congress (London), and ICO campaign, “...*positively coffee*”

2001 – Junjun Huang, M.D., Ph.D. appointed [Sept] first Nestle International Scholar



Milestones and accomplishments

2001 – Formal external scientific review [Nov] by SAG (NCA, Vanderbilt)

2001 – One Pilot and Feasibility Grant awarded

2002 – First peer reviewed publication [Jan] in *Molecular and Cellular Biochemistry*

2002 – “Coffee and Health News” section of ICS Website established [Jan]

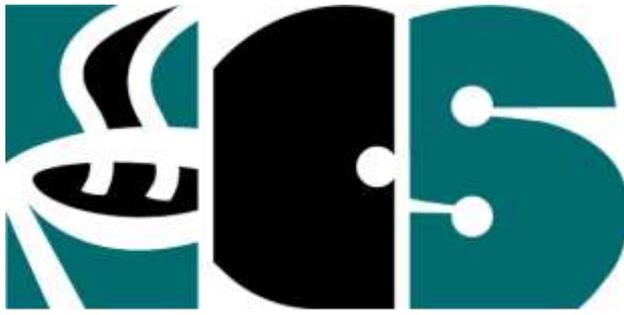


Milestones to come....

2002 – Three Pilot and Feasibility Grants
planned

2002 – Vanderbilt Chancellor Gee to meet
Mr. Osorio in London [June]

2002 – Adriana Farah, doctoral student at the
Federal University of Rio de Janeiro, to
begin [Sept] training at Vanderbilt as ICS
International Scholar



Milestones to come....

2002 – Three Pilot and Feasibility Grants planned

2002 – Visit [fall] of Brazilian Ambassador, International Advisory Board, and other coffee world dignitaries to Vanderbilt and Nashville business community (to be confirmed)

2002 – Chancellor Gee's visit to Brazil [Nov] to strengthen academic and corporate ties



Coffee constituents

Compound	Green beans	Roasting	Metabolism
Total CGA	8%	5%	0%
5-CAQA	5%	2%	0%
CAQ	0%	2%	0%
CA	0%	1%	1%
DCA	0%	0%	4%
Caffeine	2%	2%	2%

CGA = chlorogenic acids
5-CAQA = caffeoylquinic acid
CA = caffeic acid

CAQ = caffeoylquinides
QA = quinic acids
DCA = dihydrocaffeic acid



Study of coffee constituents may help us better
**understand, prevent, and
treat common diseases**

- Depression/anxiety (suicide)* *
- Atherosclerosis (cardiovascular deaths)* *
- Degenerative brain disorders (Parkinson's and Alzheimer's diseases)* *
- Cancer*
- Alcohol/drug addiction* * (cirrhosis)*

** Antioxidant mechanisms implicated*

** Opioid mechanisms implicated*

** Adenosine mechanisms implicated*

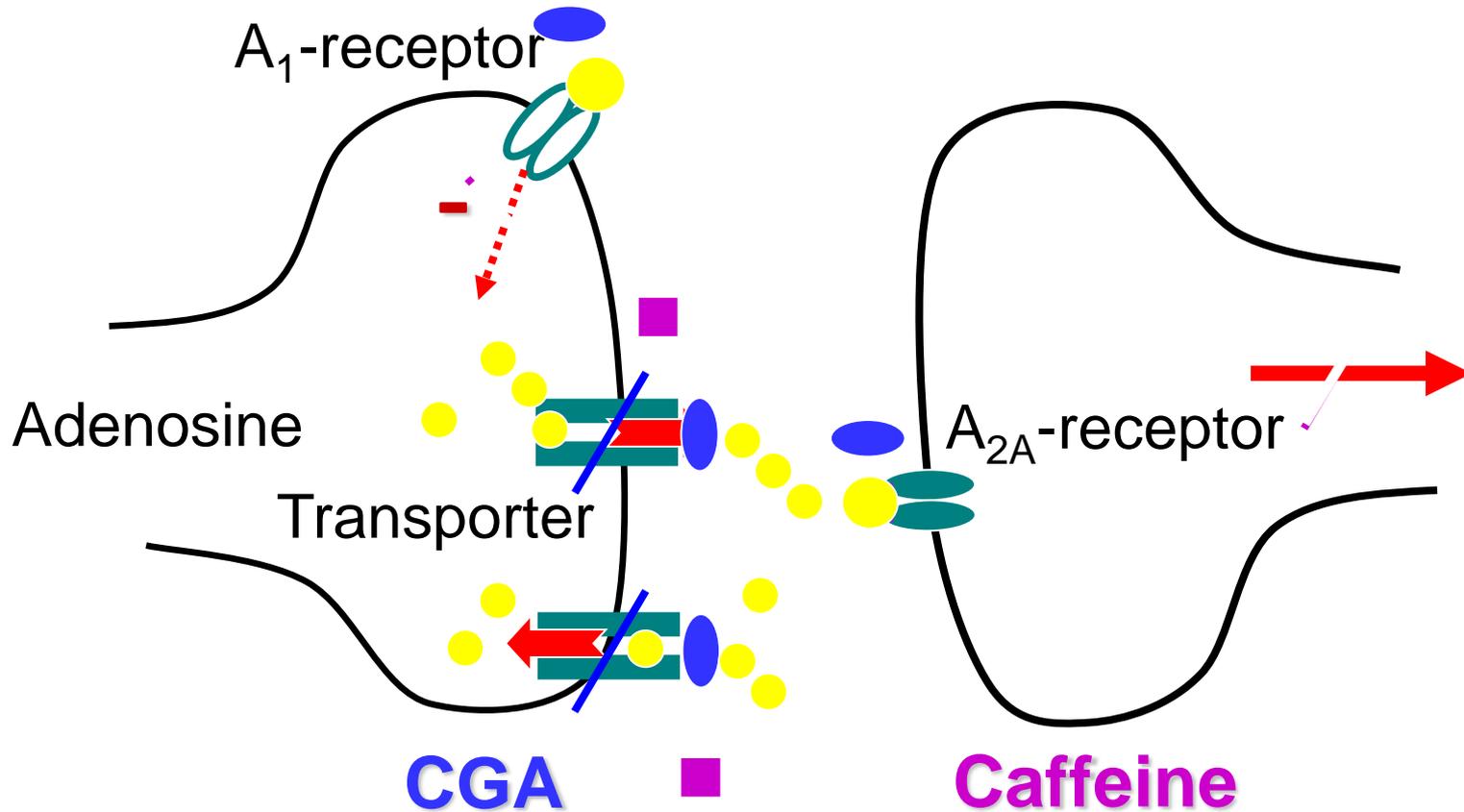


Adenosine

- Inhibits release of several neurotransmitters
- Increases regional blood perfusion
- Stabilizes membrane potentials and decreases heart and brain tissue excitability
- Prevents cellular damage during various tissue insults (e.g., oxidant stress, excitotoxicity)
- Caffeine is a recognized adenosine antagonist
- ***Do CGAs contribute to coffee effects on the adenosine system?***

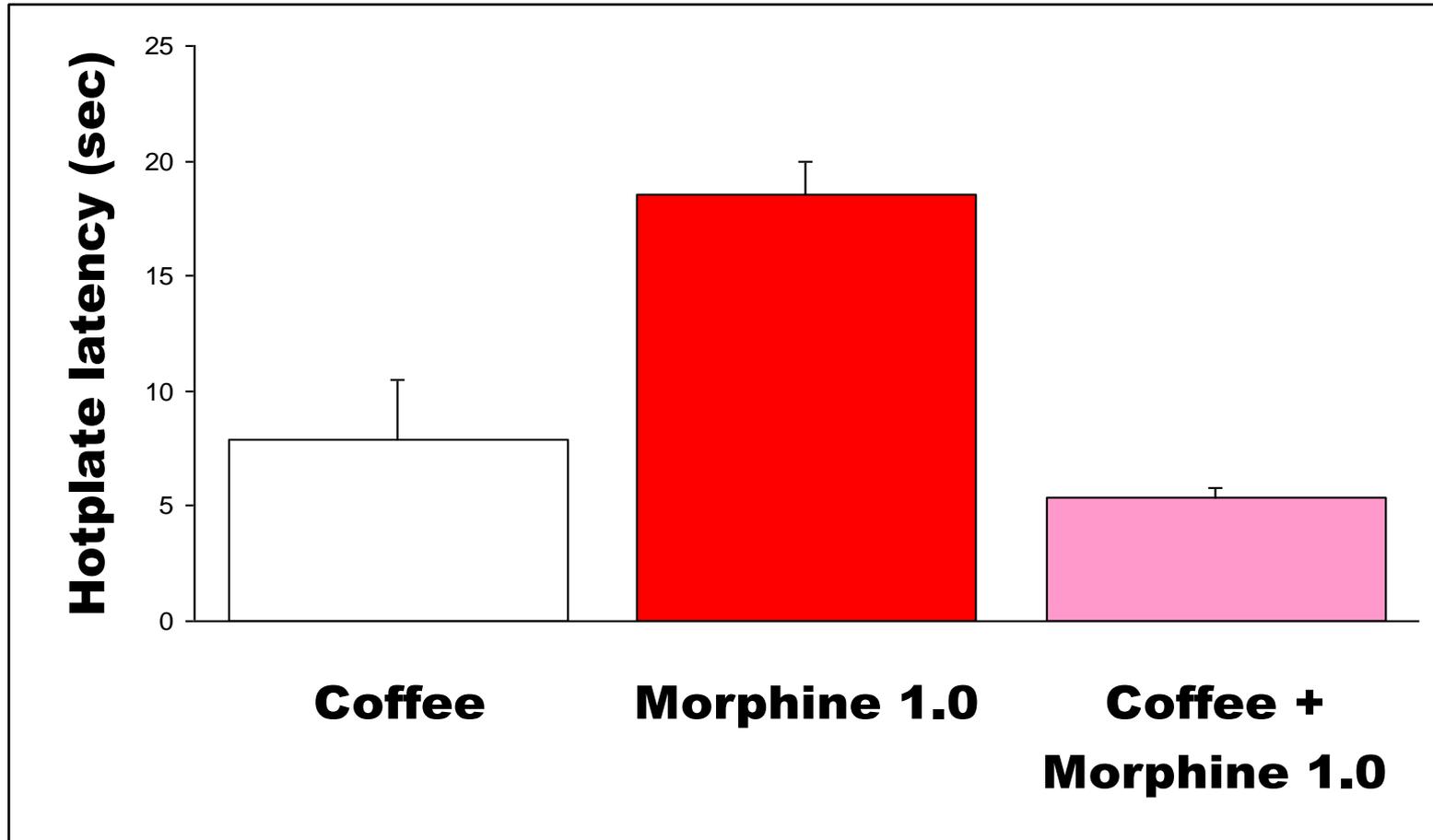


Adenosine neurotransmission: Caffeine and CGA effects





Coffee extract antagonizes morphine-induced analgesia

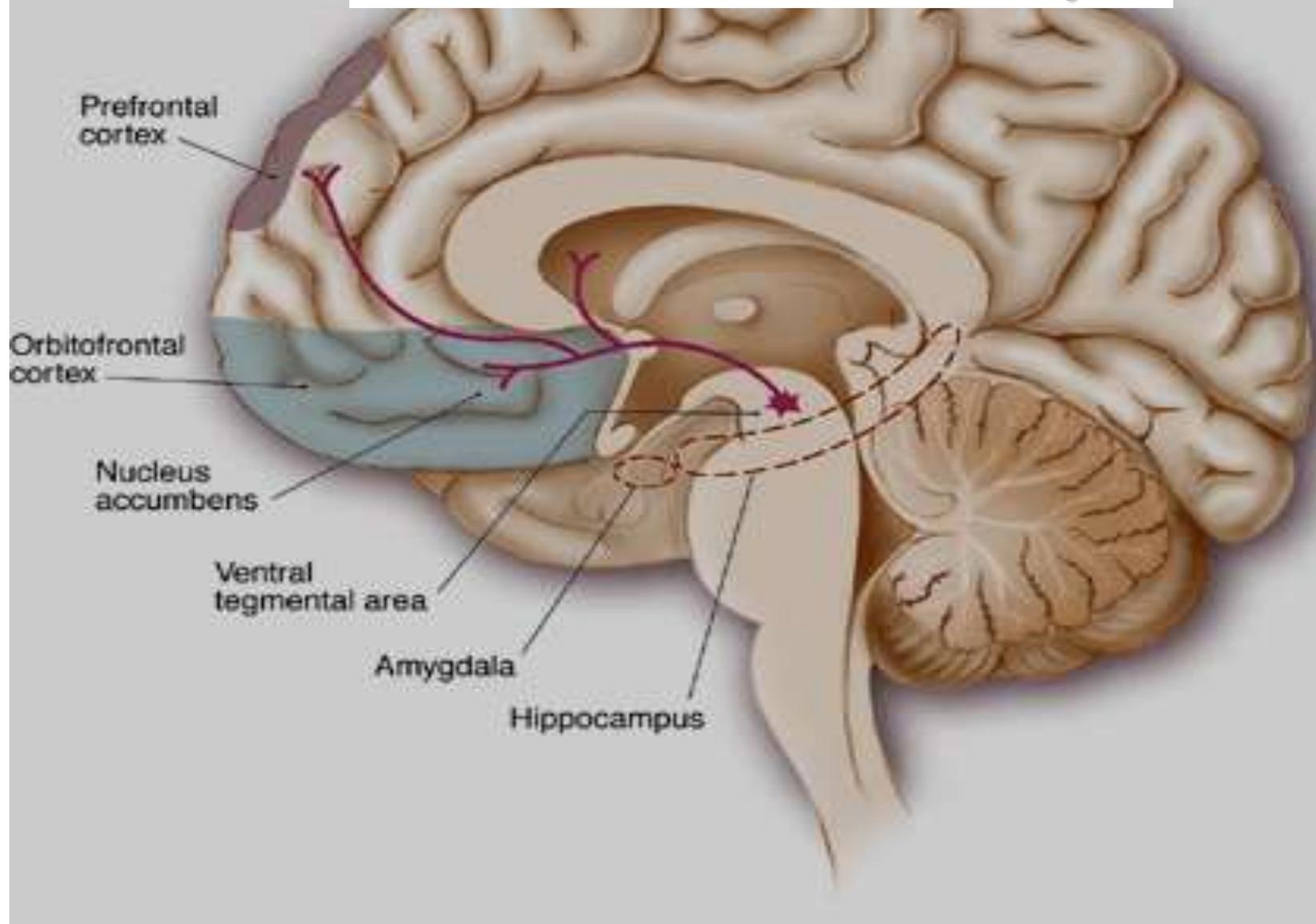




Opioids

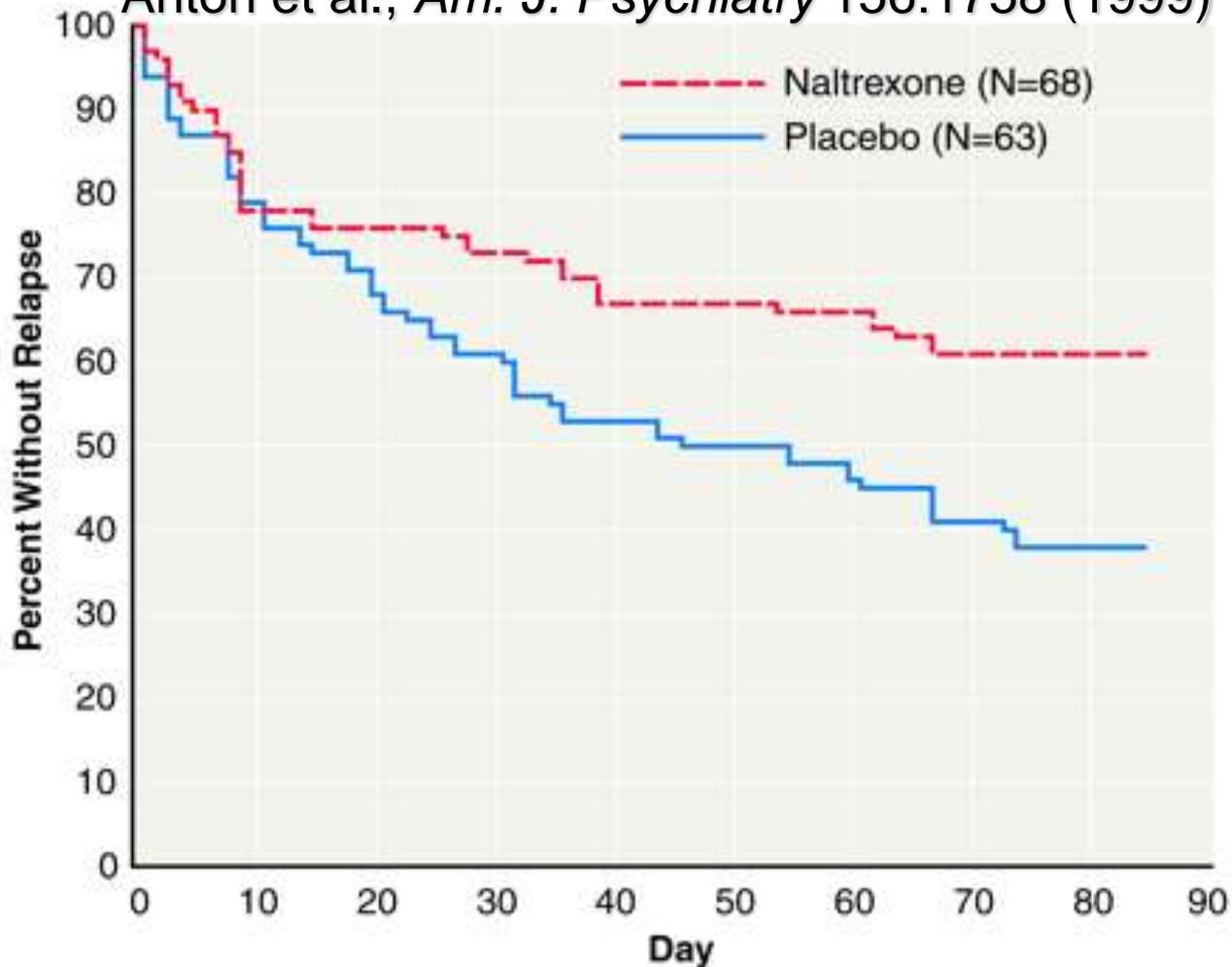
- Endogenous opioids affect ***'pleasure', pain, and 'drive' centers*** in the brain much as does morphine
- Opioid antagonist (e.g., naltrexone) can prevent relapse in alcoholism
- CGA quinides inhibit mu-opioid receptors
- ***Are quinides in coffee useful for treatment of alcoholism or other addictions?***

Brain Reinforcement Pathways



Survival Curve of Time to First Relapse for Subjects Treated with CBT and Naltrexone or Placebo

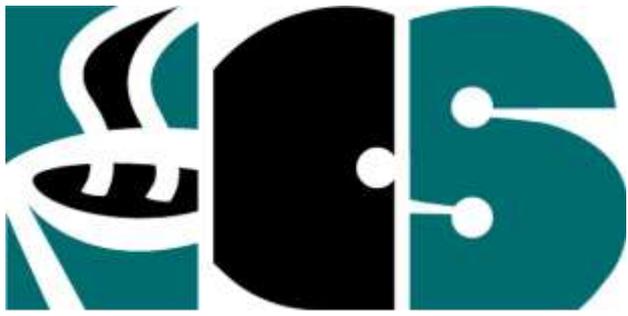
Anton et al., *Am. J. Psychiatry* 156:1758 (1999)





Diseases with endothelial dysfunction:

- Chronic and acute smoking
- Hypertension
- Hypercholesterolemia
- Diabetes
- Congestive heart failure
- Unstable angina
- Atherosclerotic coronary vascular disease

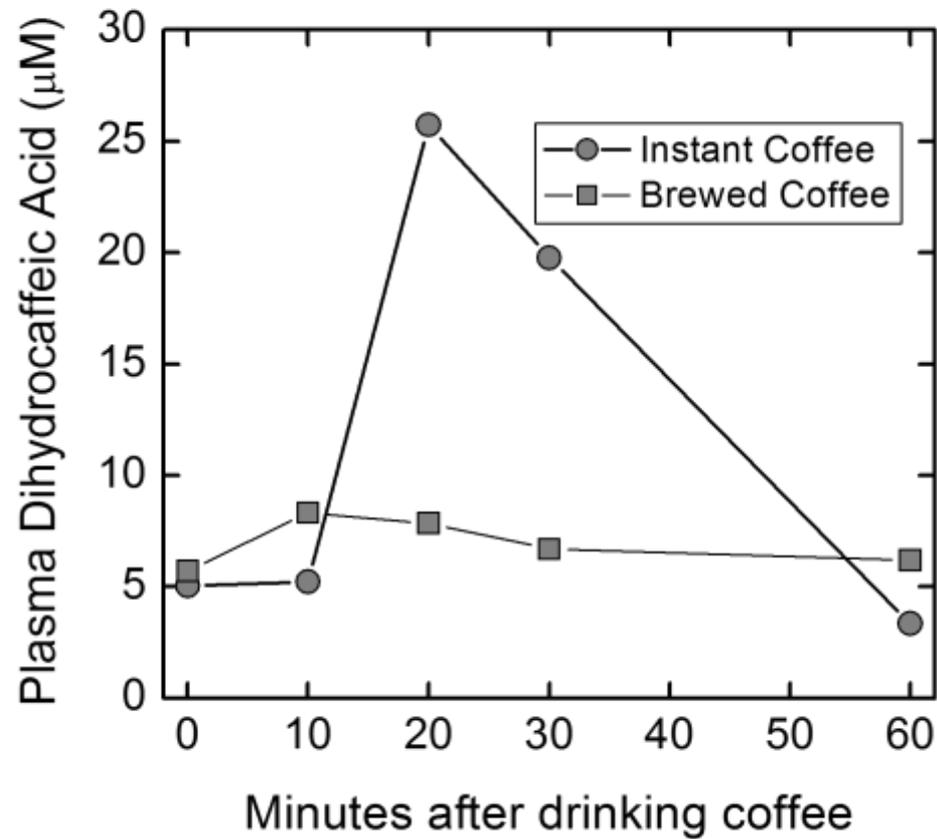


Coffee antioxidants

- Can natural constituents of coffee ***neutralize ROS*** and their adverse effects?
- Does coffee ***improve endothelial function*** and thereby have protective effects against atherosclerosis and other related diseases?
- Do antioxidants account for some of the ***health benefits of coffee***?



Coffee ingestion and plasma dihydrocaffeic acid





Future directions

- Pursue the latest biomedical research via Pilot and Feasibility Award Program
- Coffee Heart Study (ICO, WHF, and ICS)
- Recruit trainees from partner nations
- Facilitate international scholarly activities at Vanderbilt through ICS
- Continue dissemination of ICS findings



Possible future Pilot and Feasibility studies

- Interactions with caffeine
- Glucose metabolism (diabetes)
- Regulation of mood and sex drive (depression)
- Inhibition of HIV integrase (AIDS)
- Anti-inflammatory effects (COX-2)



Implications of ICS research

- Develop “different” medicinal coffees (mood, memory, antioxidant, etc.)
- Develop new medications from natural constituents of coffee (“nutriceutical”)



Acknowledgments

International Contributors

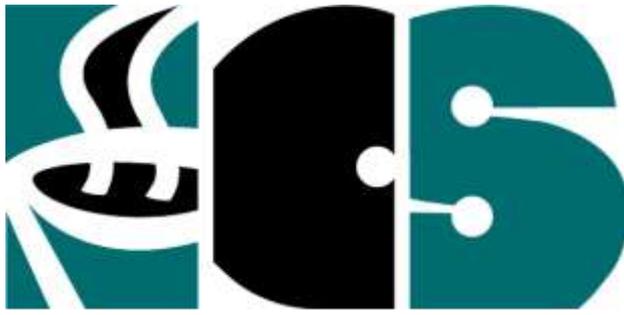
- Brazil
- Colombia
- Central America (Guatemala)
- Japan



Acknowledgments

USA Contributors

- National Coffee Association
- Kraft Foods
- Nestle
- Sara Lee
- Starbucks



ICS Website

<http://mc.vanderbilt.edu/coffee/>

coffee & health news

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