

# OS DERIVADOS DA UVA E SEUS BENEFÍCIOS PARA A SAÚDE

Dra. Caroline Dani



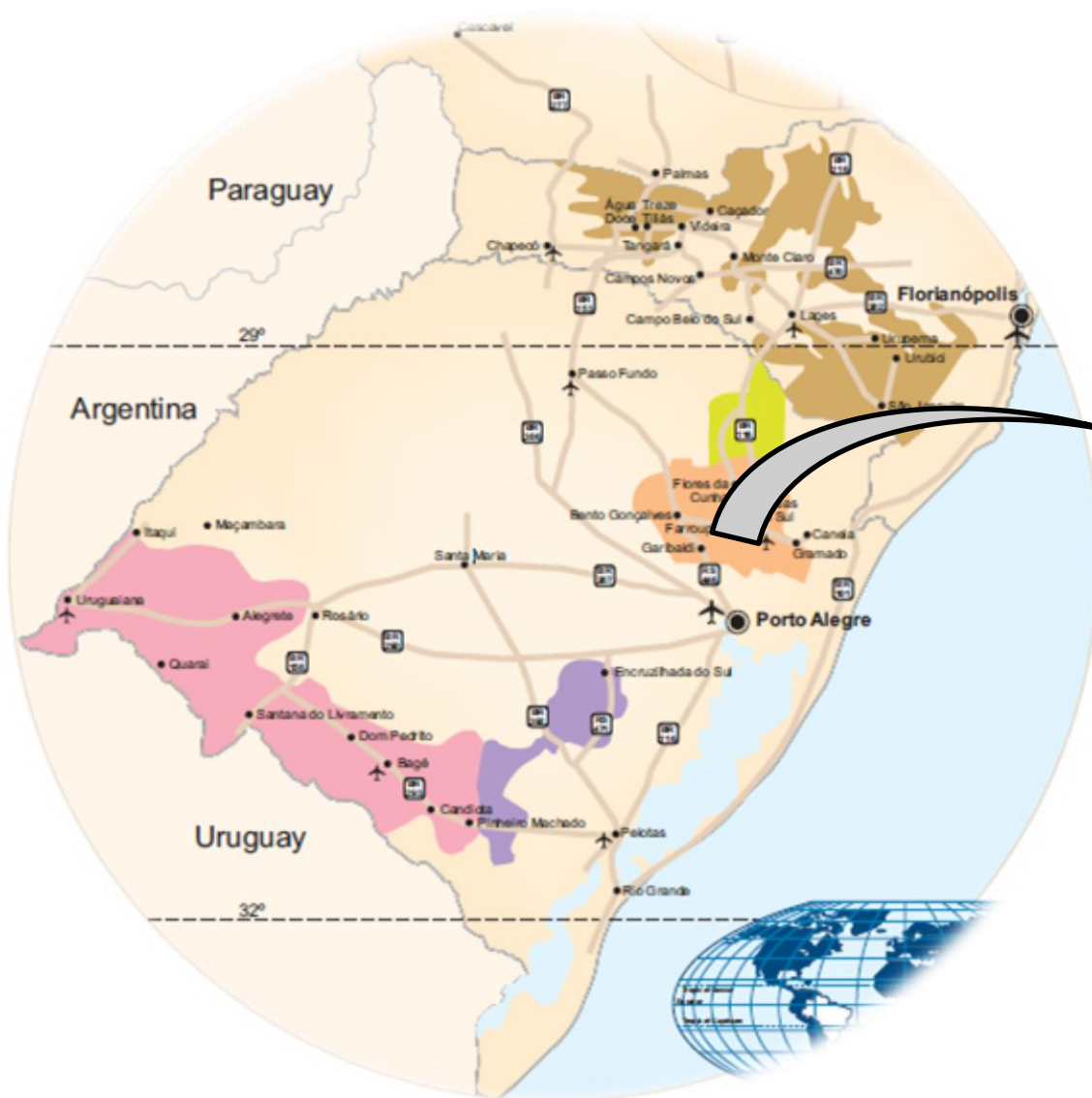
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DIA DO VINHO

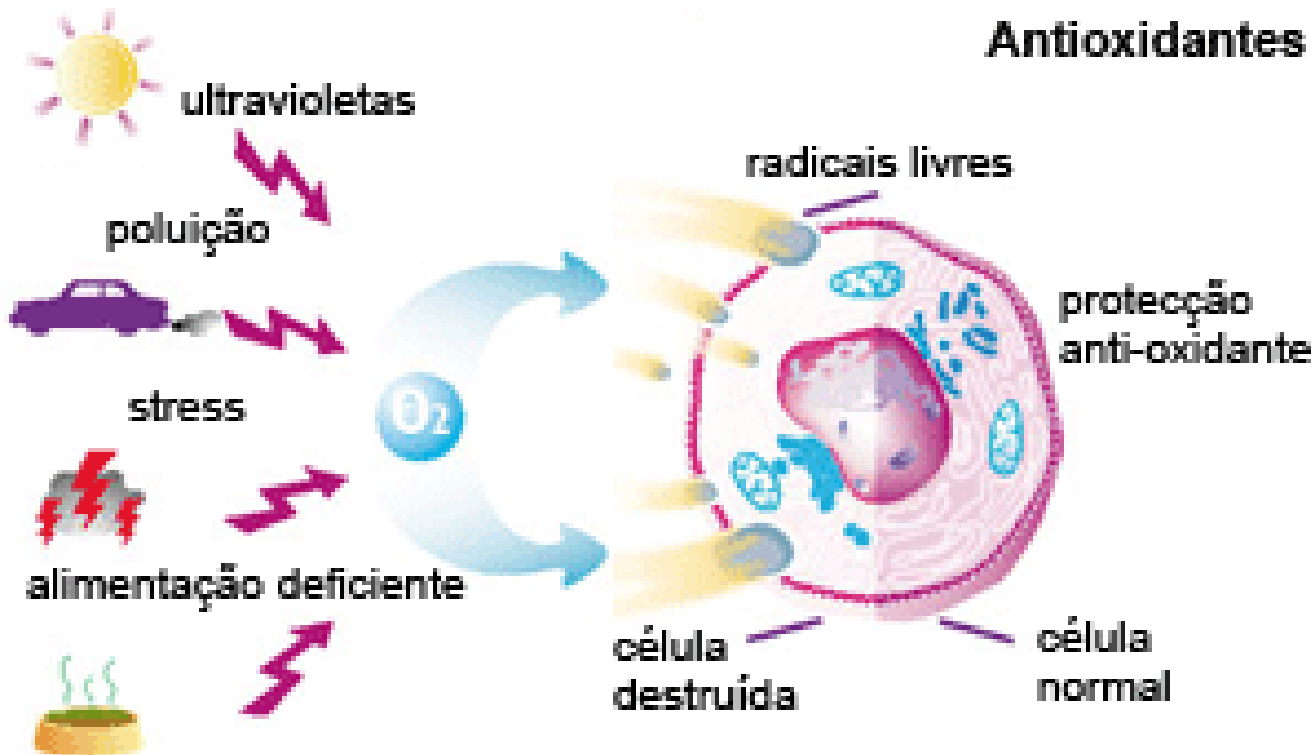
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**18 a 20 mil  
famílias**



↑ Espécies reativas

↓ Antioxidante



=

**ESTRESSE  
OXIDATIVO**

**Doenças  
cardiovasculares**

**Envelhecimento  
Acúmulo**

**Doenças  
neurodegenerativas**

<http://www.lef.org/magazine/graphics/freerad.jpg>

# VINHO

## PARADOXO FRANCES (Renaud e colaboradores, 1992)

### THE FRENCH PARADOX: LESSONS FOR OTHER COUNTRIES

Coronary disease

Jean Ferrières 107

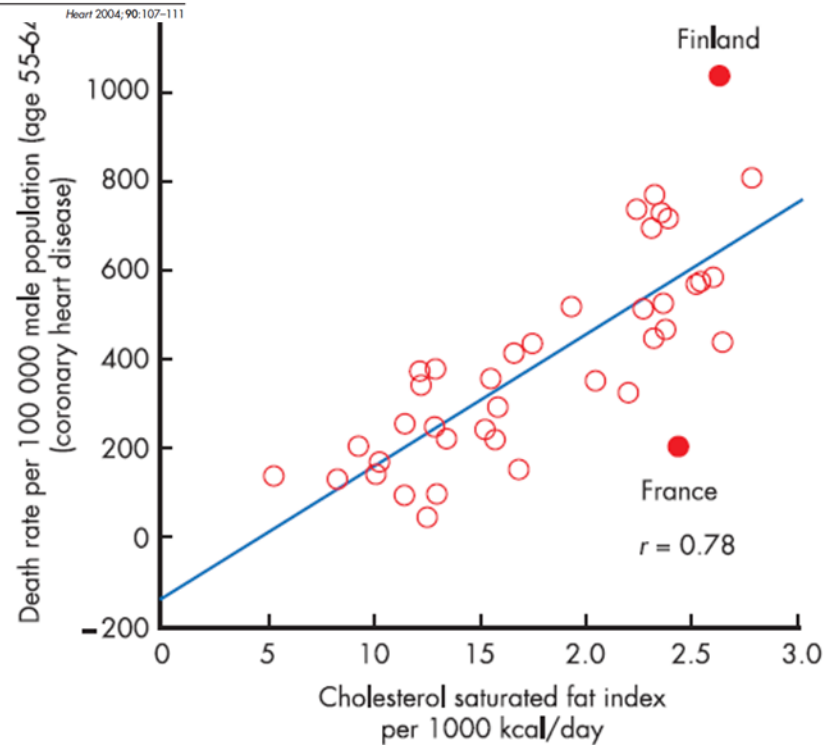
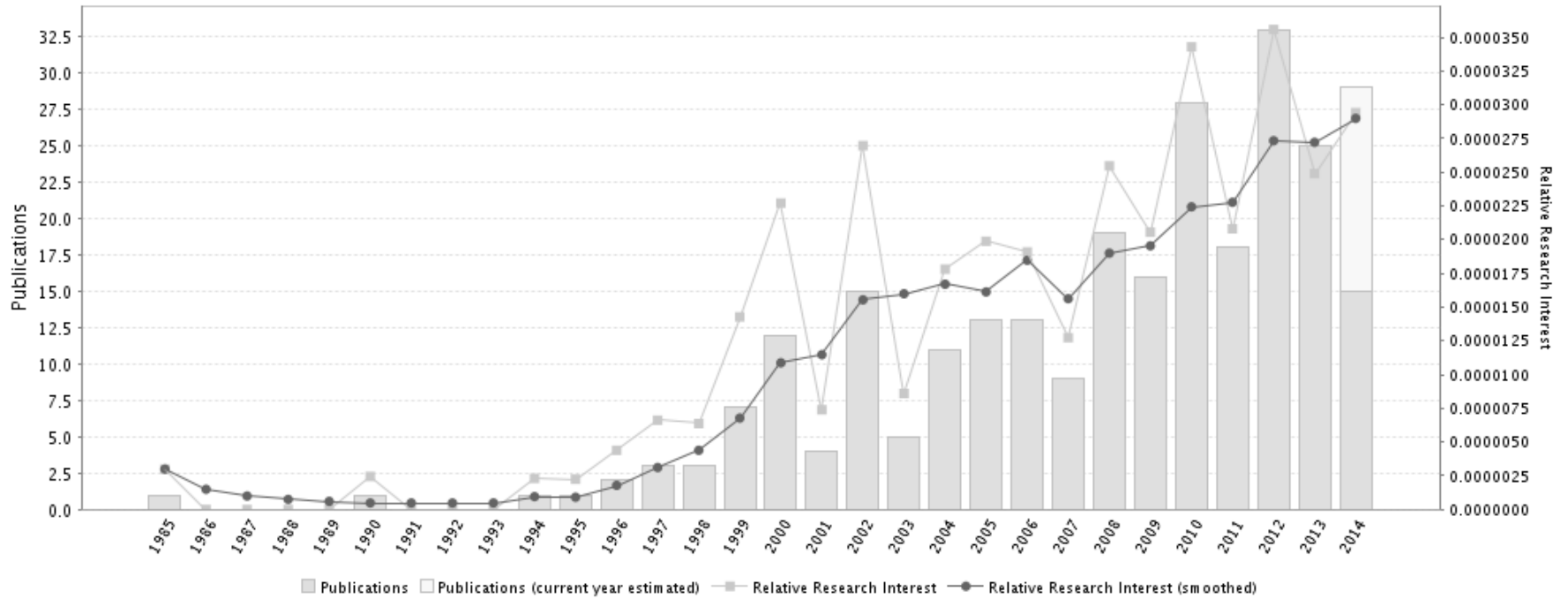


Figure 1 Plot of death rate from coronary heart disease (1977) correlated with daily dietary intake (from 1976 to 1978) of cholesterol and saturated fat as expressed by the cholesterol fat index (CSI) per 1000 kcal. Reproduced from Artaud-Wild *et al.*,<sup>2</sup> with permission.

### Topic: wine health benefits



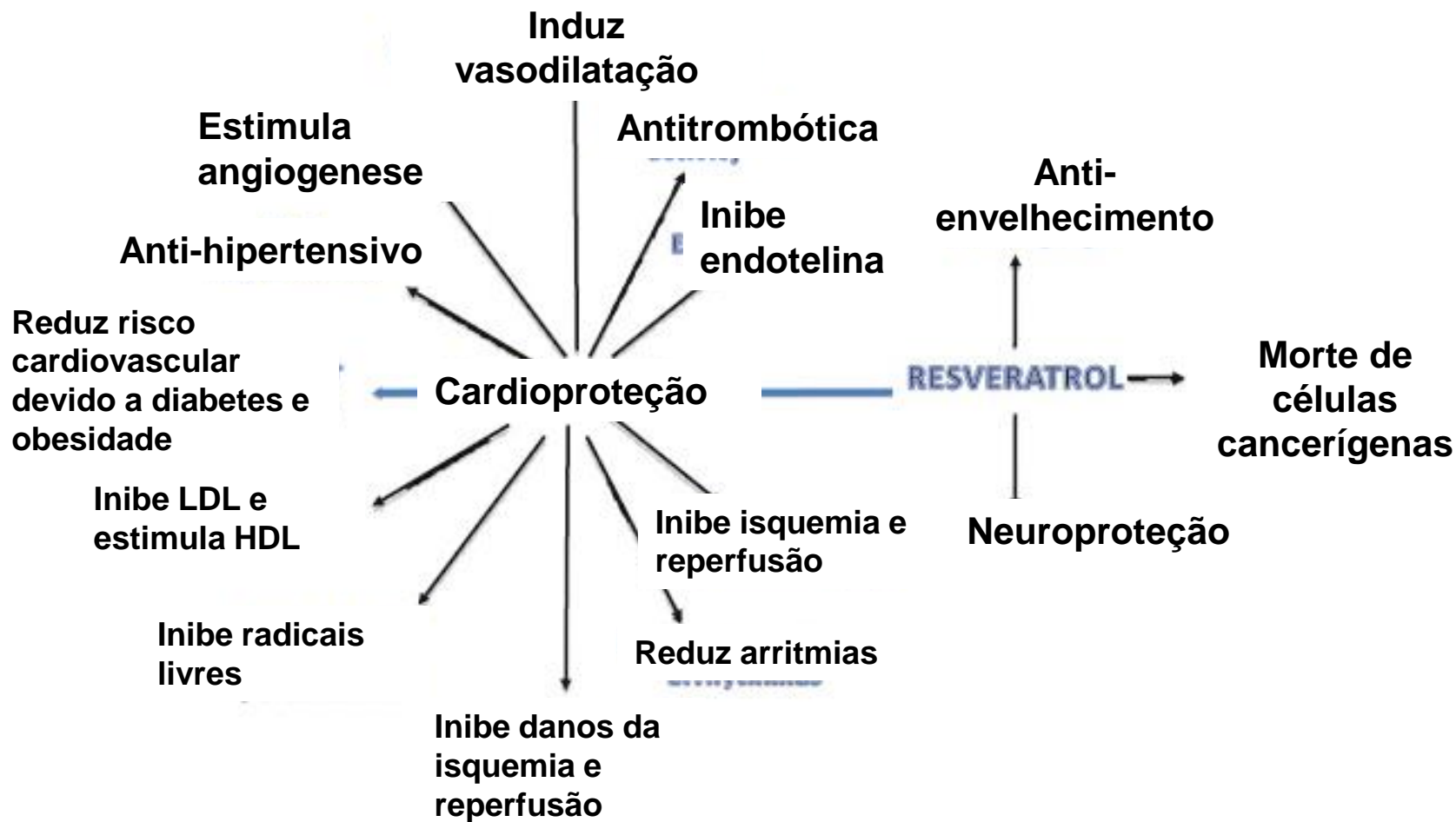
## Review Article

# Polifenóis no vinho: Agentes potenciais na neuroproteção

Abdelkader Basli,<sup>1,2</sup> Stéphanie Soulet,<sup>3</sup> Nassima Chaher,<sup>4</sup> Jean-Michel Mérillon,<sup>1</sup>  
Mohamed Chibane,<sup>5</sup> Jean-Pierre Monti,<sup>1</sup> and Tristan Richard<sup>1</sup>

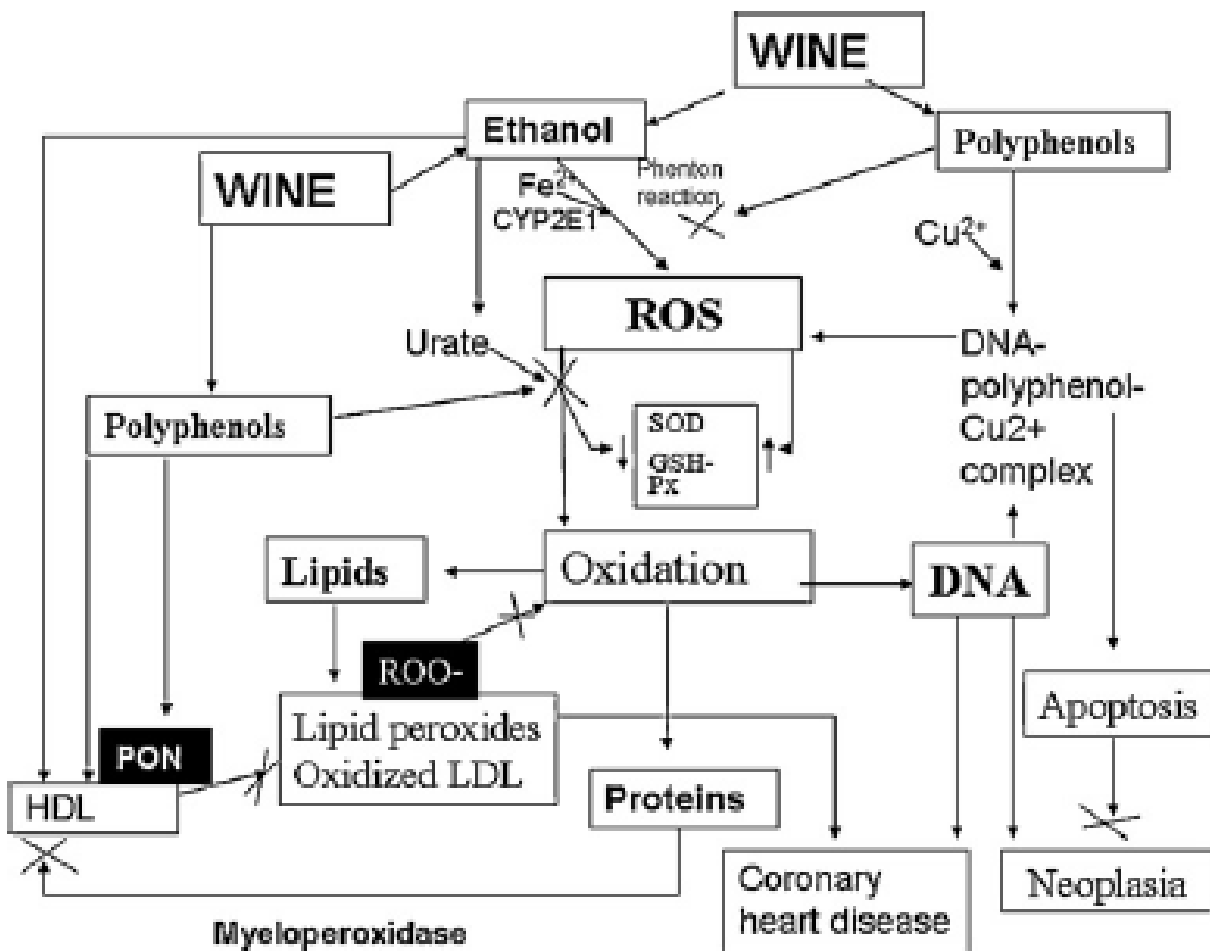
TABLE 1: The levels of principal phenolic classes (mg/L) in red and white table wine [15].

Phenol class	White wine		Red wine	
	Young	Aged	Young	Aged
nonflavonoids				
hydroxycinnamates	154	130	165	60
benzoic acids	10	15	60	60
hydrolyzable tannins	0	100	0	250
stilbenes (resveratrol)	0.5	0.5	7	7
Total mg/L	164.5	245.5	232	377
flavonoids				
flavanol monomers	25	15	200	100
Condensed tannins	20	25	750	1000
flavonols	—	—	100	100
anthocyanins	—	—	400	90
Total mg/L	45	40	1450	1285



# Estudos cont

Reference	Study
Duthie et al. [40]	Cross
Cacceta et al. [42]	Cross
Arendt et al. [39]	Paral
Ziegler et al. [43]	Cross
Greenrod et al. [44]	Cross
Modun et al. [17]	Cross
Kiviniemi et al. [41]	Cross



# s saudáveis

Effects
Increase after RW and malt whisky
No changes
Increase except after water
No change
Increase in RW, DRW Reduced after DRW
No changes
Increase after ethanol
No changes after RW
Decrease after DRW
Increase after RW or phenol-stripped RW
Increase after RW

RW, red wine; DRW, de-alcoholized red wine; WW, white wine; TAC, total antioxidant capacity of plasma or serum (TAS; ORAC; FRAP; SAOC; etc.); *ex vivo* LDL oxidation, lag time of conjugated dienes formation after isolated LDL oxidation with Cu<sup>2+</sup>; TBARS, serum thiobarbituric acid reactive substances.

\* Smoking status non-described.

Quem é o responsável?



( ) Álcool

( ) Outros compostos



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*Atherosclerosis* 156 (2001) 67–72

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ATHEROSCLEROSIS

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[www.elsevier.com/locate/atherosclerosis](http://www.elsevier.com/locate/atherosclerosis)

Red wine, dealcoholized red wine, and especially grape juice,  
inhibit atherosclerosis in a hamster model

Joe A. Vinson \*, Karolyn Teufel, Nancy Wu

*Department of Chemistry, University of Scranton, Linden and Monroe Streets, Scranton, PA 18510-4626, USA*

Received 13 January 2000; received in revised form 31 July 2000; accepted 11 August 2000

Table 1  
 Mean value for lipids, atherosclerosis, lipid peroxides and lower density lipoproteins oxidizability

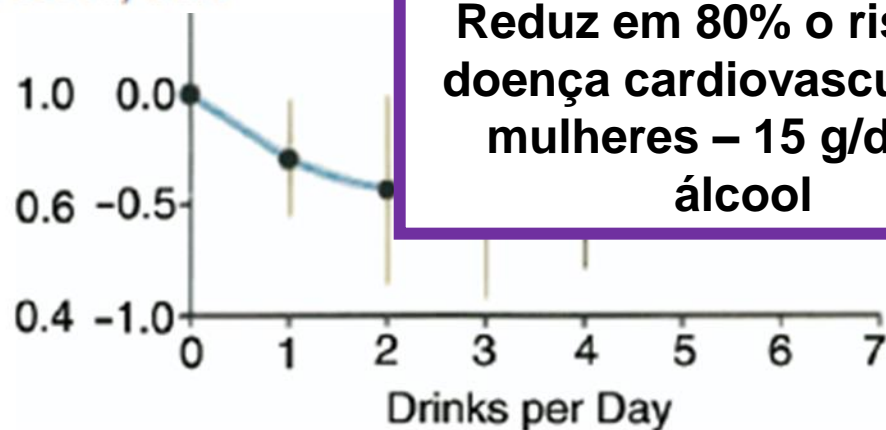
Measurement	Group data and % change relative to the water control group <sup>a</sup>				
	Water control	6.75% Ethanol	Dealcoholized red wine $\frac{1}{2}$ strength	Red wine 6.75% ethanol $\frac{1}{2}$ strength	Concord grape juice $\frac{1}{2}$ strength
Weight at end of study	163 ± 31	136 ± 16	148 ± 16	148 ± 17	149 ± 17
Food consumption (g/day)	60 ± 8	46 ± 9	51 ± 7	49 ± 9	49 ± 8
Fluid consumption (ml/day)	9 ± 2 <sup>a</sup>	17 ± 2 <sup>b</sup>	12 ± 4 <sup>c</sup>	21 ± 4 <sup>d</sup>	9 ± 3 <sup>a</sup>
Plasma cholesterol (mg/dl)	417 ± 86 <sup>a</sup>	369 ± 114 <sup>a</sup>	319 ± 116 <sup>b</sup>	252 ± 59 <sup>b</sup>	305 ± 101 <sup>b</sup>
Plasma HDL (mg/dl)	77 ± 14 <sup>a</sup>	64 ± 9 <sup>a</sup>	42 ± 10 <sup>b</sup>	48 ± 8 <sup>b</sup>	72 ± 14 <sup>a</sup>
Plasma LDL (mg/dl)	250 ± 72 <sup>a</sup>	241 ± 107 <sup>a</sup>	217 ± 96 <sup>b</sup>	134 ± 48 <sup>c</sup>	158 ± 81 <sup>bc</sup>
Plasma triglycerides (mg/dl)	356 ± 193 <sup>a</sup>	305 ± 127 <sup>a</sup>	275 ± 122 <sup>a</sup>	275 ± 82 <sup>a</sup>	330 ± 121 <sup>a</sup>
Plasma lipid peroxides (μM)	5.87 ± 0.77 <sup>a</sup>	4.1 ± 0.54 <sup>b</sup>	4.1 ± 0.78 <sup>b</sup>	3.0 ± 0.39 <sup>c</sup>	5.0 ± 1.09 <sup>b</sup>
% Atherosclerosis	10.1 ± 1.8 <sup>a</sup>	8.3 ± 1.4 <sup>b</sup>	5.3 ± 1.6 <sup>c</sup>	4.8 ± 1.2 <sup>c</sup>	7.4 ± 1.8 <sup>b</sup>
Pooled lag time (min)	79	18,3%	45,2%	52,9%	27,6%
		+24.1%	+44.3%	+81.0%	+82.3%

<sup>a</sup> Group data is mean ± S.D. Groups having a different superscript are significantly different, *P* < 0.05.

# Balancing the Risks and Benefits of Moderate Drinking

R. CURTIS ELLISON

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Boston, Massachusetts 02118, USA*

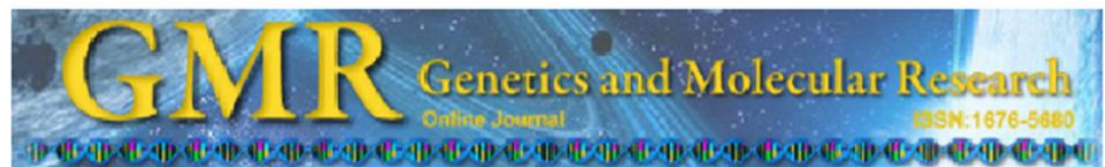


**Figure 3** Alcohol and Stroke Risk

Relationship between daily alcohol and ischemic stroke. This was fully adjusted for the usual stroke factors. OR = odds ratio. Reproduced with permission from Sacco et al. (12).

# Suco de uva

- Sais Minerais – Cu, Zn, Mn, Ca...
- Fibras
- Água
- Polifenóis



**Mineral content is related to antioxidant and antimutagenic properties of grape juice**

C. Dani<sup>1</sup>, L.S. Oliboni<sup>1</sup>, D. Pra<sup>2</sup>, D. Bonatto<sup>1</sup>, C.E.I. Santos<sup>3</sup>,  
M.L. Yoneama<sup>3</sup>, J.F. Dias<sup>3</sup>, M. Salvador<sup>1</sup> and J.A.P. Henriques<sup>1,4</sup>

## Phenolic content and antioxidant activities of white and purple juices manufactured with organically- or conventionally-produced grapes

C. Dani, L.S. Oliboni, R. Vanderlinde, D. Bonatto, M. Salvador, J.A.P. Henriques \*

*Instituto de Biotecnologia, Universidade de Caxias do Sul, Caxias do Sul (UCS), Rio Grande do Sul, Brazil*

Received 10 April 2006; accepted 18 June 2007

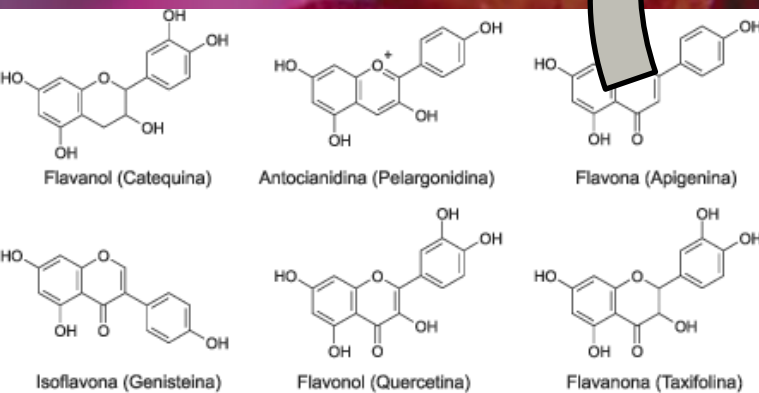
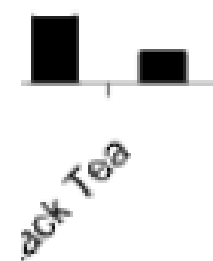
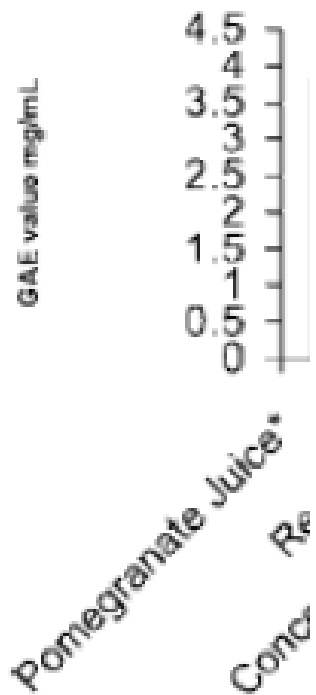


Figura 8. Estrutura das principais classes de flavonóides

**Table 1.** Phenolic levels in fruits and juices (NF, not found)

Phenolic	Apple	Purple grape	Apple juice	Purple grape juice
	[mg/100 g]		[mg/100 mL]	
Total phenols content <sup>a)</sup>	155	166	220	589
Total catechins <sup>b)</sup>	1.07	31.60	5.17	10.28
Catechin	NF	0.76	NF	2.58
Epicatechin	1.07	0.42	5.17	1.31
Dimer B1	NF	3.54	NF	0.74
Dimer B3	NF	23.16	NF	5.62
Dimer B4	NF	3.54	NF	NF
EGC	NF	0.03	NF	0.03
EGCG	NF	0.15	NF	NF
Caftaric acid	0.56	NF	1.83	NF
Caffeic acid	1.22	NF	3.99	NF
Gallic acid	0.04	NF	0.05	0.14
<i>p</i> -Coumaric acid	NF	NF	4.83	NF
Isoquercetin	NF	1.49	NF	1.11
Delphinidin	NF	9.30	NF	3.08
Cyanidin-3-glucoside	NF	1.43	NF	0.58
Peonidin-3-glucoside	NF	7.18	NF	2.29



Sucos tintos

Ascorbic acid (mg %)
$30.8 \pm 0.40^c$
$44.0 \pm 0.13^b$
$57.2 \pm 0.70^a$
$30.8 \pm 0.90^c$

Suco de laranja

37,33 mg %

Dani et al., 2007; César et al., 2010



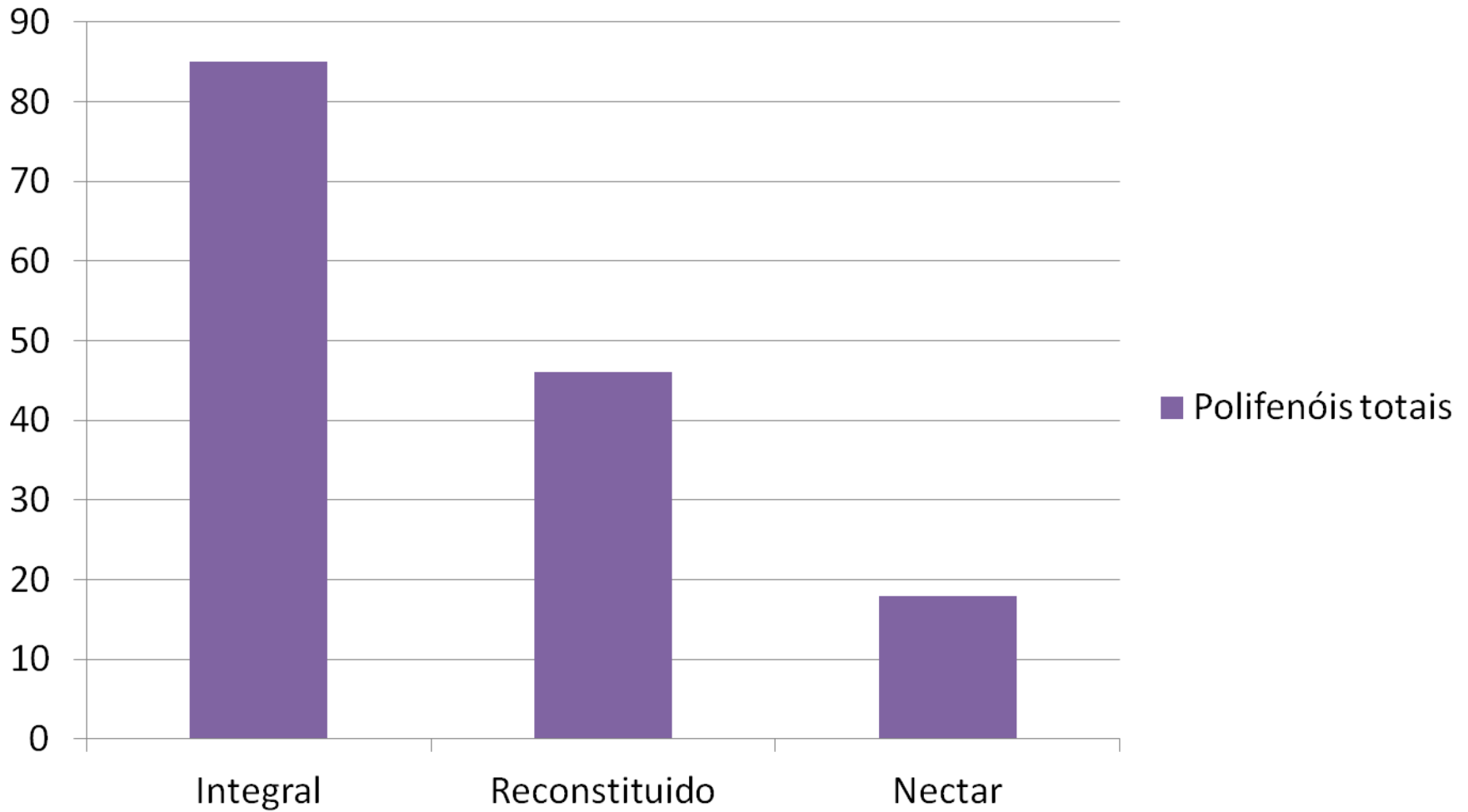
- Integral  
- Reconstituído  
- Adoçado

} **SUCO**

- Néctar  
- Bebida  
- Refresco

- Em pó

## Polifenóis totais



**Tabela I** - Efeitos benéficos do suco de uva em seres humanos e modelos animais.

Referência	Composto utilizado	Administração do composto	Amostra empregada	Resultados
Schilachterman et al. [7]	Extrato contendo: resveratrol, quercetina e catequina	0,5; 5; 25 mg/kg de peso corporal, por gavagem 3 vezes por semana durante 118 dias	Camundongos	Combinação dos polifenóis contribuiu para prevenção da metástase e progressão do câncer de mama
Shuklitt-Hale et al. [8]	Suco de uva concord	Ingestão via oral ad libitum, durante 8 semanas	Ratos Fischer	A adição do suco de uva na dieta foi capaz de reverter o curso neural e envelhecimento comportamental
Park et al. [10]	Suco de uva tinto	480 mL, via oral, durante 8 semanas	Indivíduos saudáveis	Aumento da capacidade antioxidante, redução de danos ao DNA em linfócitos, redução de EROs no sangue periférico
Dani et al. [16]	Suco de uva (Vitis labrusca)	7 $\mu$ L/g de peso corporal, durante 30 dias, após administração de CCl4 como agente agressor	Ratos Wistar	Redução da peroxidação lipídica, do dano proteico e aumento da atividade de SOD e CAT
Miyagi et al. [40]	Suco de uva tinto	300 mL via oral, tratamento agudo (2h)	Indivíduos saudáveis	Inibição da redução colesterol LDL, in vitro
Stein et al. [41]	Suco de uva Concord	4 mL/kg de peso, via oral, duas vezes por dia durante 14 dias.	Indivíduos com DAC	Melhora da função endotelial; aumenta vasodilatação arterial e reduz a susceptibilidade à oxidação de colesterol LDL
Shanmuganayagam et al. [44]	Suco de uva Concord	225 mL/dia, via oral, durante 96 dias, concomitante a dieta hipercolesterolêmica	Coelhos	Redução da pressão arterial; redução do colesterol total, redução do desenvolvimento de ateroma e agregação plaquetária.
Chou et al. [54]	Suco de uva Concord	640 mL/dia, via oral, durante 56 dias	Indivíduos com DAC	Ingestão do suco de uva moderada e contínua melhora a função endotelial

DAC = Doença arterial coronariana; LDL = Lipoproteína de baixa densidade; DNA = ácido desoxirribonucleico; EROs = espécies reativas de oxigênio; CCL4 = tetracloreto de carbono; SOD = superóxido dismutase; CAT = catalase.

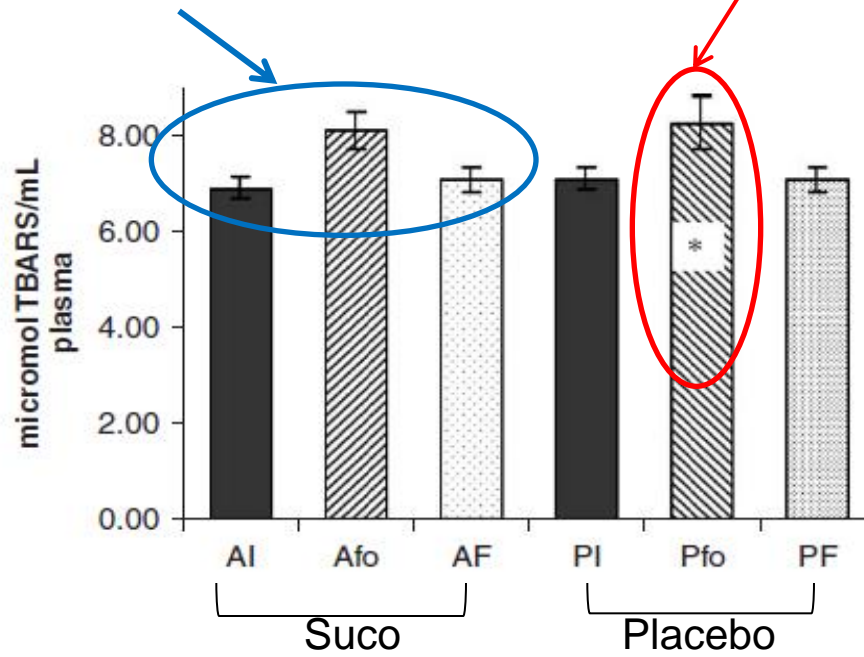
# Suco de uva para o atleta

Estudo:



O **SUCO** preveniu danos à lipídeo

O placebo não preveniu o dano



Dano à lipídeos →

# Suco de uva para o atleta

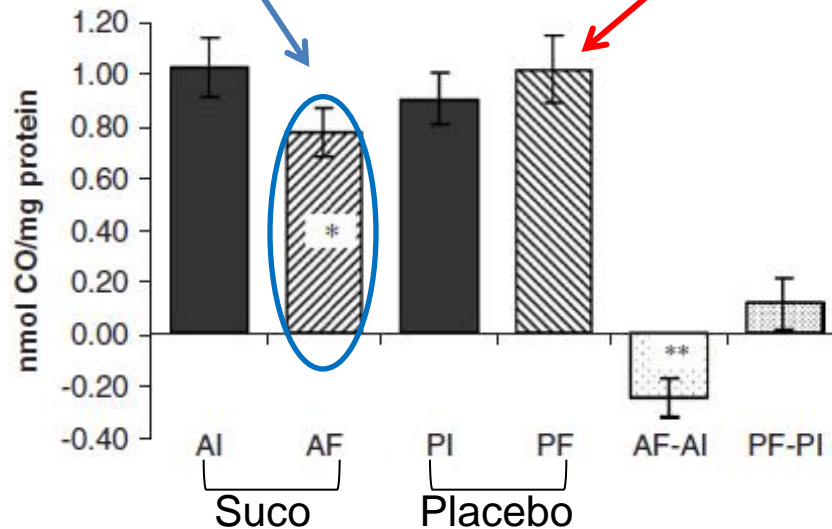
Mesmo Estudo:



A suplementação com o suco reduziu 23% de danos à proteínas

O placebo aumentou em 12% os danos causados

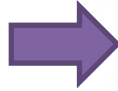
Dano à proteínas



(Morillas-Ruiz, et al, 2006)

Além disso outro estudo:

Triatletas que ingeriram



Diariamente por 20 dias

	Baseline	After grape juice intake
Glucose (mg/dl)	89.4 ± 8.9	67.1 ± 11.2*
Insulin (μU/ml)	13.3 ± 2.7	16.9 ± 3.7*
HOMA2-IR	1.7 ± 0.1	1.9 ± 0.4
Uric acid (μmol/l)	0.3 ± 0.07	0.4 ± 0.06*
E-SOD (U/mg protein)	27.8 ± 6.3	24.3 ± 2.5*
Plasma polyphenols (mg of galic acid/ml)	0.2 ± 0.03	0.3 ± 0.04*

Redução de glicose  
Aumento de Insulina



Indica:

Melhora do transporte e utilização da glicose pelo organismo



**Melhora na performance do atleta durante a competição**

Aumento da capacidade antioxidante



Reduz a probabilidade de causar danos a biomoléculas

(Gonçalves et al, 2011)

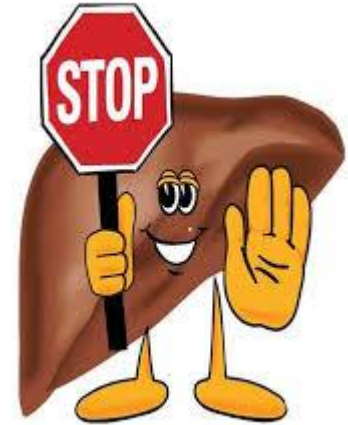
# Hepatoproteção

JOURNAL OF MEDICINAL FOOD

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DOI: 10.1089/jmf.2007.558



## Intake of Purple Grape Juice as a Hepatoprotective Agent in Wistar Rats

Caroline Dani,<sup>1</sup> Lívia S. Oliboni,<sup>1</sup> Matheus A.B. Pasquali,<sup>2</sup> Marcos R. Oliveira,<sup>2</sup>  
Fernanda M. Umezu,<sup>1</sup> Mirian Salvador,<sup>1</sup> José C.F. Moreira,<sup>2</sup> and João A.P. Henriques<sup>1</sup>

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and <sup>2</sup>  
Universid

NUTRITION RESEARCH 33 (2013) 120–125



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## Purple grape juices prevent pentylenetetrazol-induced oxidative damage in the liver and serum of Wistar rats

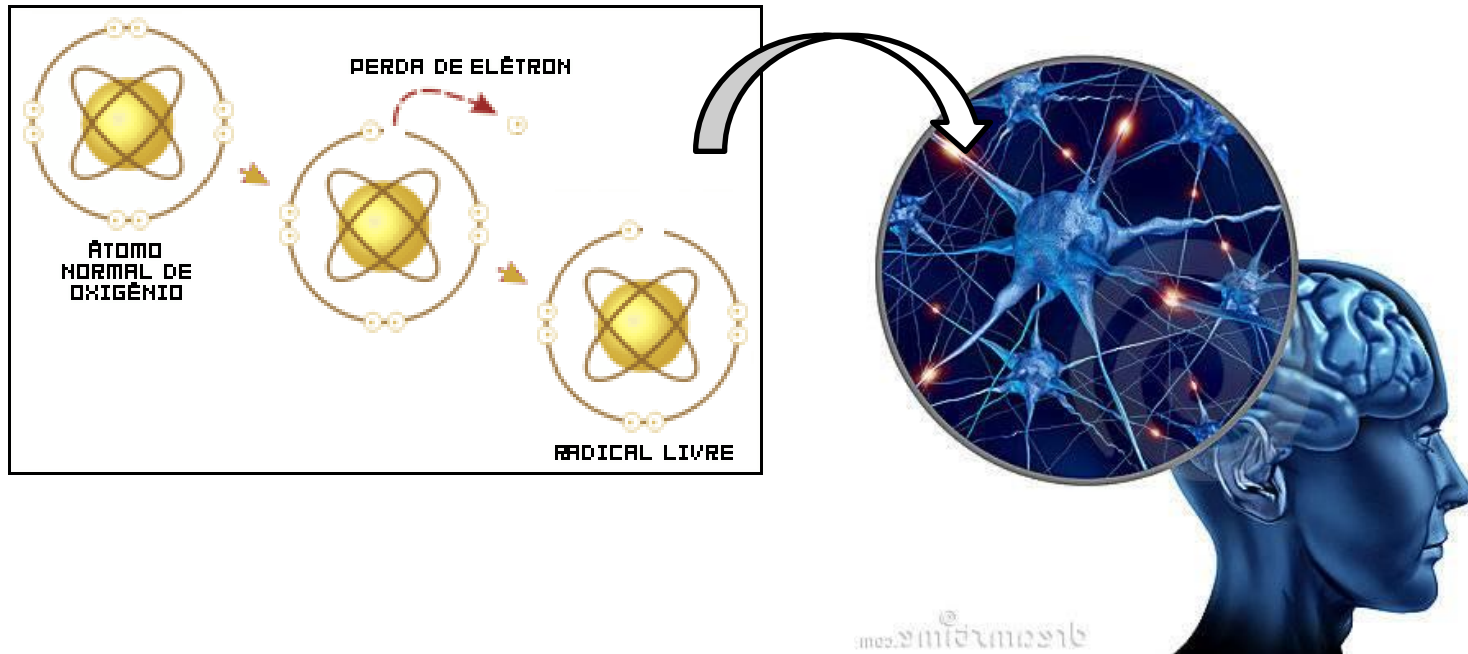
Adriana D. Rodrigues<sup>a</sup>, Thamiris B. Scheffel<sup>a</sup>, Gustavo Scola<sup>a</sup>, Maitê T. dos Santos<sup>b</sup>,  
Bruna Fank<sup>b</sup>, Caroline Dani<sup>b</sup>, Regina Vanderlinde<sup>a</sup>, João A.P. Henriques<sup>a</sup>,  
Adriana S. Coitinho<sup>c</sup>, Mirian Salvador<sup>a,\*</sup>

<sup>a</sup> Instituto de Biotecnologia, Universidade de Caxias do Sul (UCS), Caxias do Sul, 95070–560 Rio Grande do Sul, Brazil

<sup>b</sup> Centro Universitário Metodista do IPA, Porto Alegre, 90420–060 Rio Grande do Sul, Brazil

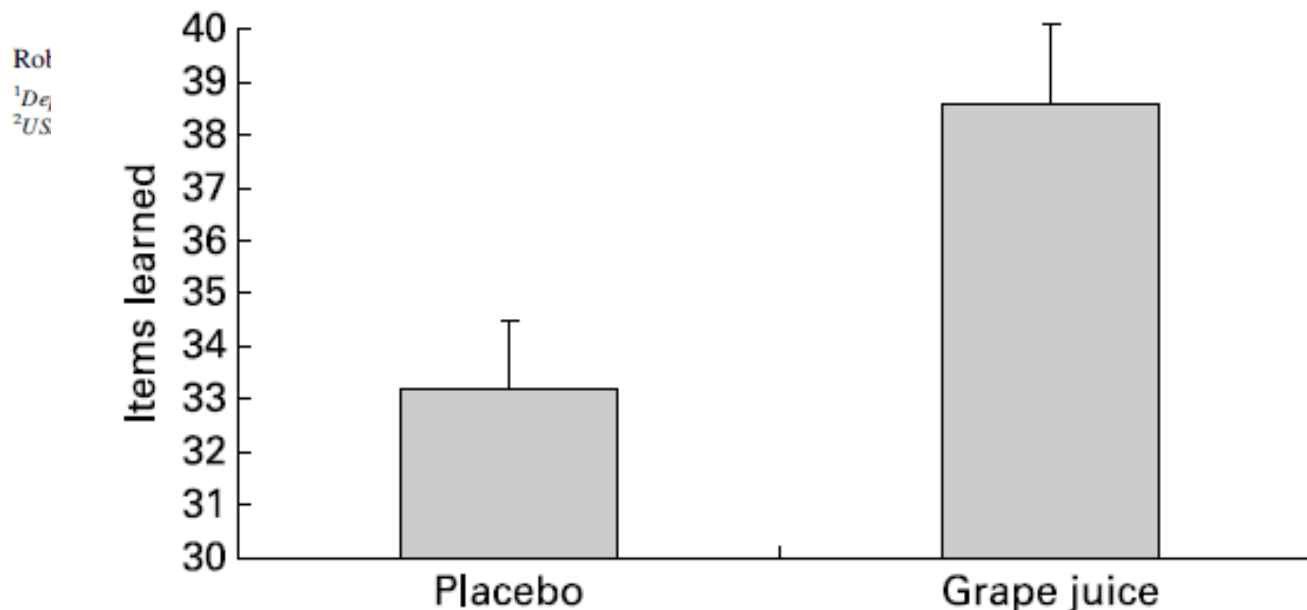
<sup>c</sup> Departamento de Microbiologia, Imunologia e Parasitologia. Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, 90040–060 Rio Grande do Sul, Brazil

# Neuroproteção e Melhora da memória



Parkinson, Alzheimer, Esclerose Lateral  
Amiotrófica e Demência Senil

## Concord grape juice supplementation improves memory function in older adults with mild cognitive impairment



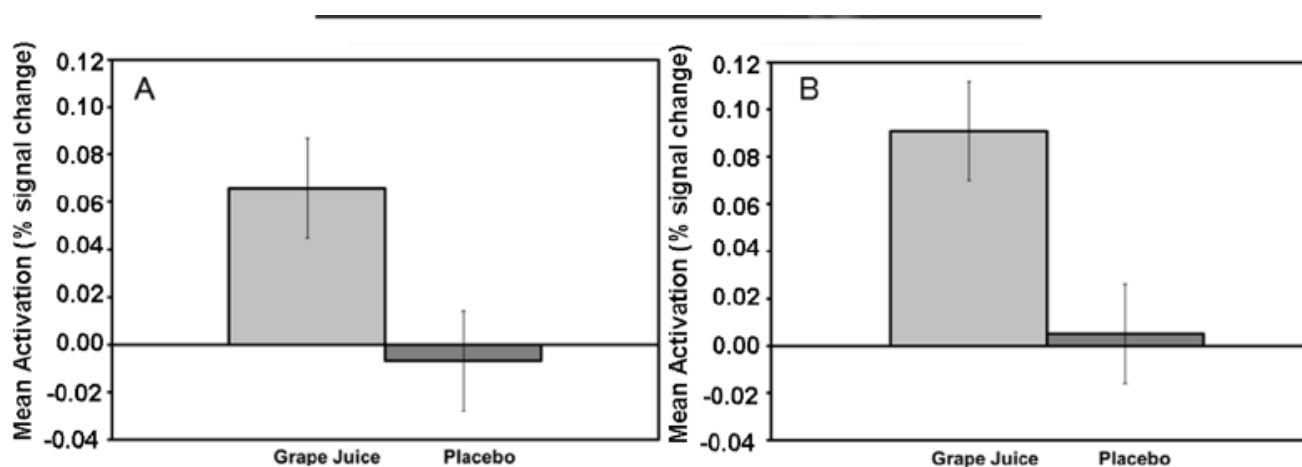
**Fig. 1.** List acquisition performance assessing verbal learning on the California Verbal Learning Test. Values are adjusted means, with standard errors represented by vertical bars. Subjects consuming Concord grape juice demonstrated significant improvement ( $F(1, 8) = 5.55$ ;  $P = 0.04$ ; Cohen's  $f = 0.28$ ).

## Concord Grape Juice Supplementation and Neurocognitive Function in Human Aging

Robert Krikorian,<sup>\*,†</sup> Erin L. Boespflug,<sup>†</sup> David E. Fleck,<sup>†</sup> Amanda L. Stein,<sup>†</sup> JoLynne D. Wightman,<sup>§</sup> Marcelle D. Shidler,<sup>†</sup> and Sara Sadat-Hossieny<sup>†</sup>

<sup>†</sup>Department of Psychiatry and Behavioral Neuroscience, University of Cincinnati Academic Health Center, P.O. Box 670559, Cincinnati, Ohio 45267-0559, United States

<sup>§</sup>Welch Foods, Inc., 575 Virginia Road, Concord, Massachusetts 01742, United States



**Figure 3.** (Top) Right middle prefrontal (A) and right superior parietal (B) cortical regions of interest (ROI) overlaid on a T1-weighted anatomic image. These regions were relatively more activated in subjects who consumed 100% Concord grape juice as compared with those who consumed the placebo beverage. The red color defines the anatomical location of each ROI. (Bottom) Mean MRI signal intensity as a function of treatment for the right middle prefrontal cortex ROI (A) and the right superior parietal cortex ROI (B) during the sequential letter working memory task. Error bars represent standard error.

ORIGINAL RESEARCH

## Effect of Chronic Treatment with Conventional and Organic Purple Grape Juices (*Vitis labrusca*) on Rats Fed with High-Fat Diet

Marcia Gilceane Cardozo • Niara Medeiros • Denise dos Santos Lacerda •  
Daniela Campos de Almeida • João Antônio Pegas Henriques •  
Caroline Dani • Cláudia Funchal

João Antonio Pegas Henriques<sup>a</sup>, Adriana Simon Coitinho<sup>c</sup>, Mirian Salvador<sup>a,\*</sup>

<sup>a</sup>Instituto de Biotecnologia, Universidade de Caxias do Sul (UCS), Caxias do Sul, Rio Grande do Sul, Brazil

<sup>b</sup>Centro Universitário Metodista – IPA, Porto Alegre, Rio Grande do Sul, Brazil

<sup>c</sup>Departamento de Microbiologia, Imunologia e Parasitologia, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Rio Grande do Sul, Brazil

### Juice—Organic and Conventional—in Adult Rats

Caroline Dani,<sup>1</sup> Lívia S. Oliboni,<sup>1</sup> Fernanda M. Umezu,<sup>1</sup> Matheus A.B. Pasquali,<sup>2</sup> Mirian Salvador,<sup>1</sup>  
José Cláudio Fonseca Moreira,<sup>2</sup> and João Antonio Pegas Henriques<sup>1</sup>

<sup>1</sup>Instituto de Biotecnologia, Universidade de Caxias do Sul, Caxias do Sul; and <sup>2</sup>Centro de Estudos em Estresse Oxidativo, Departamento de Bioquímica, Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil



# Cardioproteção

- Inibição da agregação plaquetária:

- Suco de uva tinta:

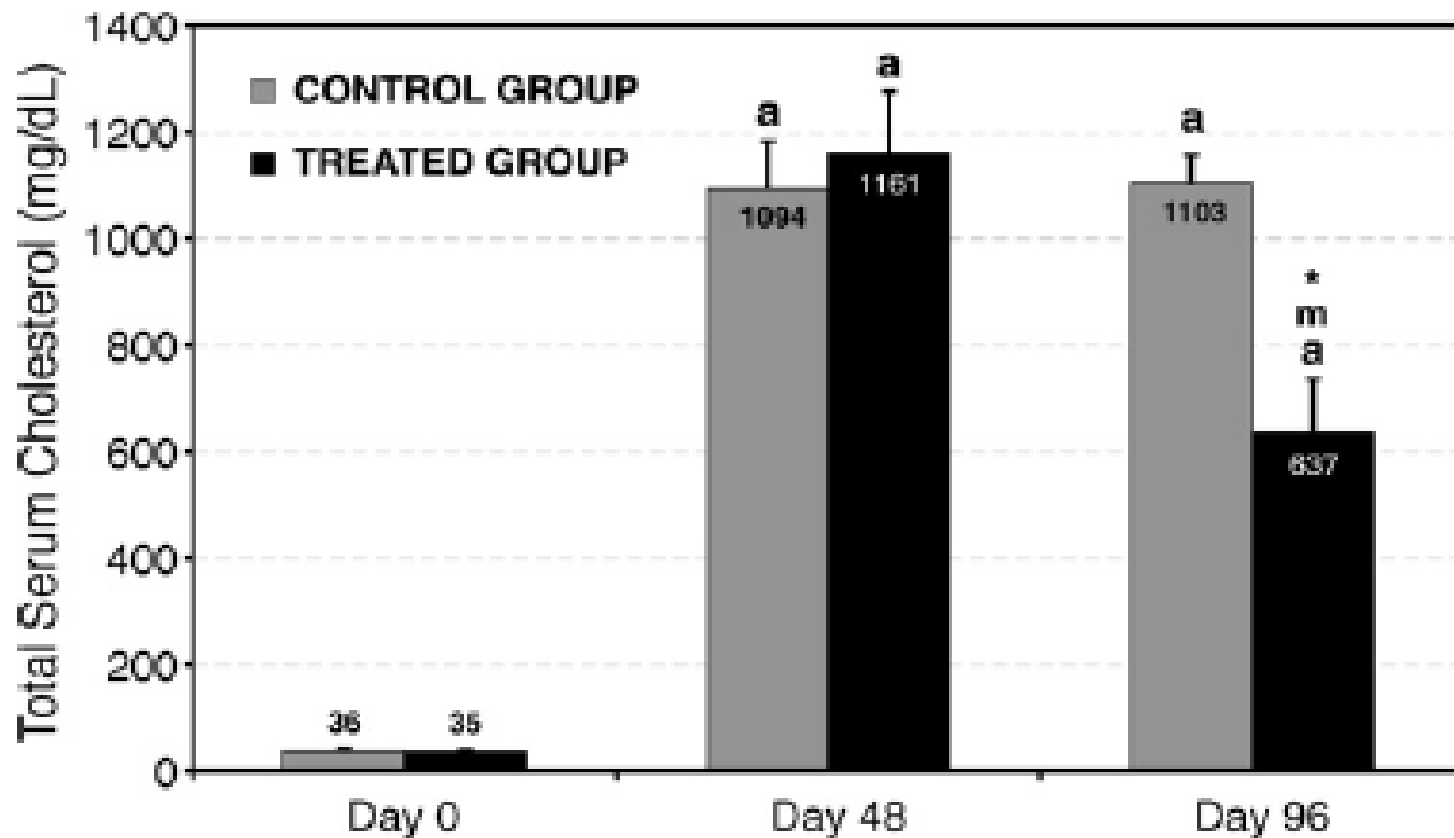
Keevil et al., 2000.; Osman et al., 1998; Demrow et al., 1995

- Antitrombótica e vasodilatadora:

- Suco de uva tinta

(Folts et al., 2002 Demrow et al., 1995; Takahara et al., 2005; Chou et al., 2001; Stein et al., 1999 )





atherosclerosis  
  
 clerosis

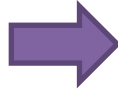
Fig. 1. Total serum cholesterol on Days 0, 48 (hypercholesterolemic diet) and 96 (hypercholesterolemic diet + sugar water (Control group;  $n = 10$ ) or CGJ (Treated group;  $n = 10$ )). a, Indicates significant ( $p \leq 0.001$ ) change within groups when compared to Day 0. m, Indicates significant ( $p \leq 0.005$ ) change within group when compared to Day 48. Asterisk (\*) indicates significant ( $p \leq 0.001$ ) difference between groups at each time point.

# Redução da pressão arterial

	Control group			Treated group		
	Day 0	Day 48	Day 96	Day 0	Day 48	Day 96
Body weight (kg) (n=10/group)	2.75 ± 0.03	3.05 ± 0.03c	3.46 ± 0.03c, n	2.73 ± 0.03	3.02 ± 0.03d	3.19 ± 0.06d, o, †
Blood pressure (mmHg) (n=6/group)						
Systolic	77.8 ± 2.6	93.3 ± 2.9d	103.0 ± 1.9d, m	78.5 ± 3.5	93.7 ± 4.1a	69.3 ± 6.9m, †
Diastolic	57.0 ± 2.1	64.3 ± 2.0a	66.8 ± 2.7b	56.7 ± 2.4	63.5 ± 3.9	47.7 ± 4.6*
Mean	63.9 ± 2.0	74.0 ± 1.9a	78.9 ± 1.9a, m	63.9 ± 2.1	73.6 ± 3.9	54.9 ± 5.3m, *

# Melhora da circulação sanguínea

Triatletas que ingeriram



Diariamente durante 20 dias

Microcirculatory parameters	Baseline	After grape juice intake
Functional capillary density (n/mm <sup>2</sup> )	10.7 ± 2.3	14.9 ± 2.7 *
Afferent diameter (µm)	17.6 ± 2.9	17.9 ± 2.0
Apical diameter (µm)	23.7 ± 4.1	23.7 ± 1.4
Efferent diameter (µm)	19.8 ± 4.7	20.9 ± 3.3
RBCV (mm/s)	0.3 ± 0.05	0.3 ± 0.01
RBCV <sub>max</sub> (mm/s)	0.3 ± 0.02	0.4 ± 0.01*
TRBCV <sub>max</sub> (mm/s)	5.9 ± 2.8	4.0 ± 1.1 *

Indica melhor nutrição para os tecidos

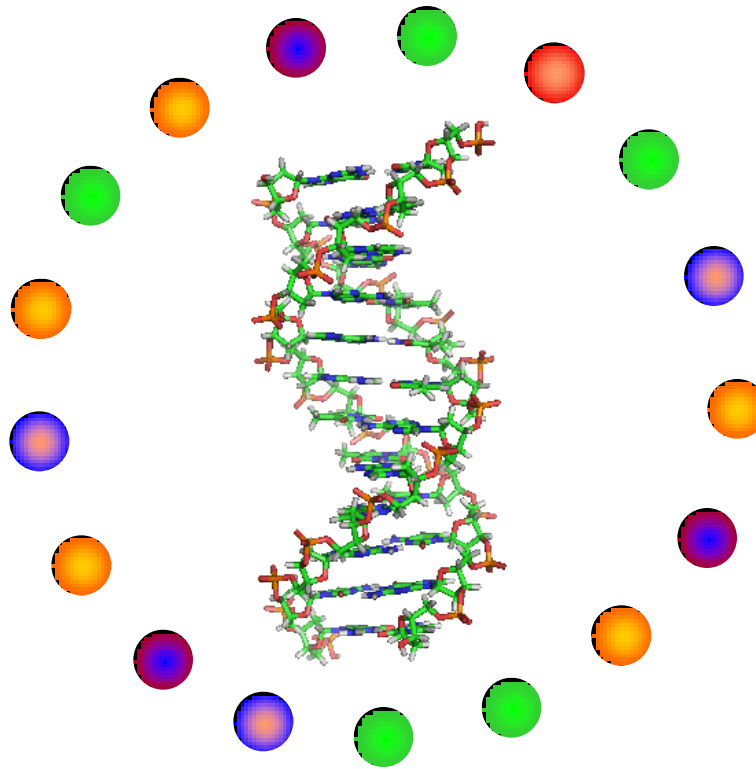
- Melhora na função endotelial;
- Aumento da produção e utilização de Oxido nitrico

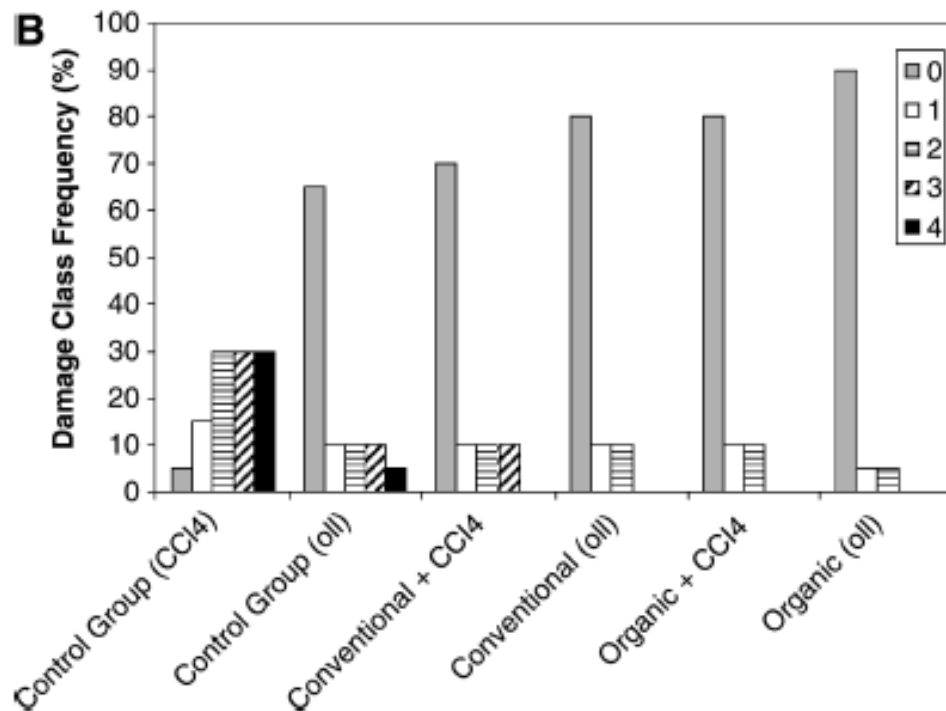
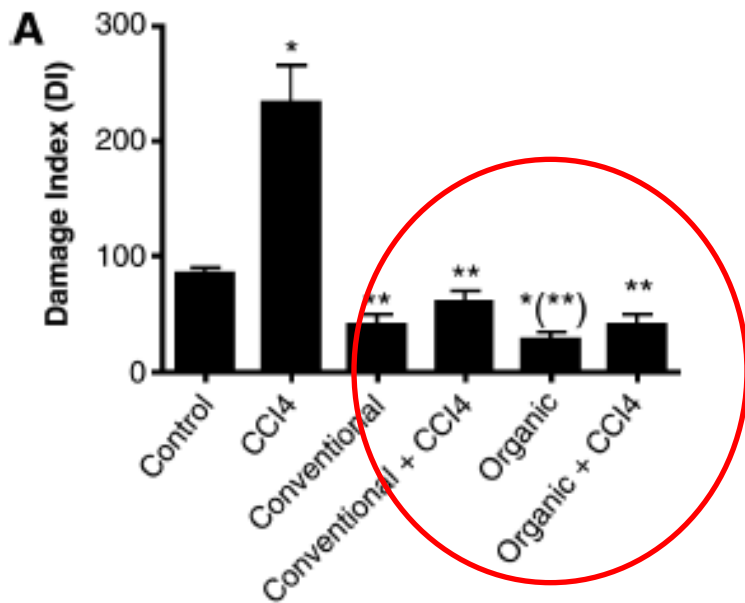
Podendo verificar que a ingestão de suco de uva pode contribuir para uma melhor adaptação circulatória em resposta ao exercício intenso.



Que um determinante importante para o desempenho de um atleta

# Proteção de dano ao DNA





**FIG. 1.** (A) DNA damage index and (B) damage class frequency in whole blood of rats treated with organic and conventional grape juices. \* $P < .05$ , different from control; \*\* $P < .05$ , different from  $CCl_4$ . Control rats received saline.

## Purple grape juice in (DMBA)-induced rats DMBA-

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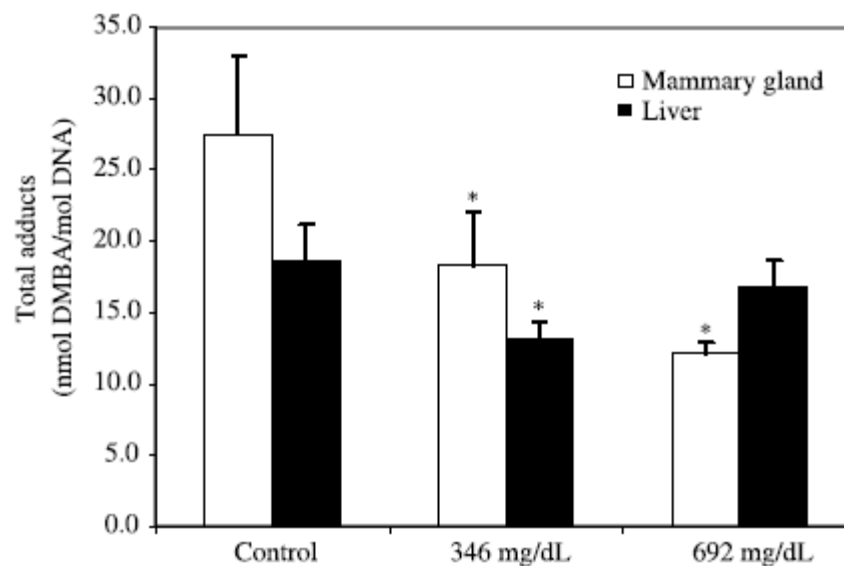
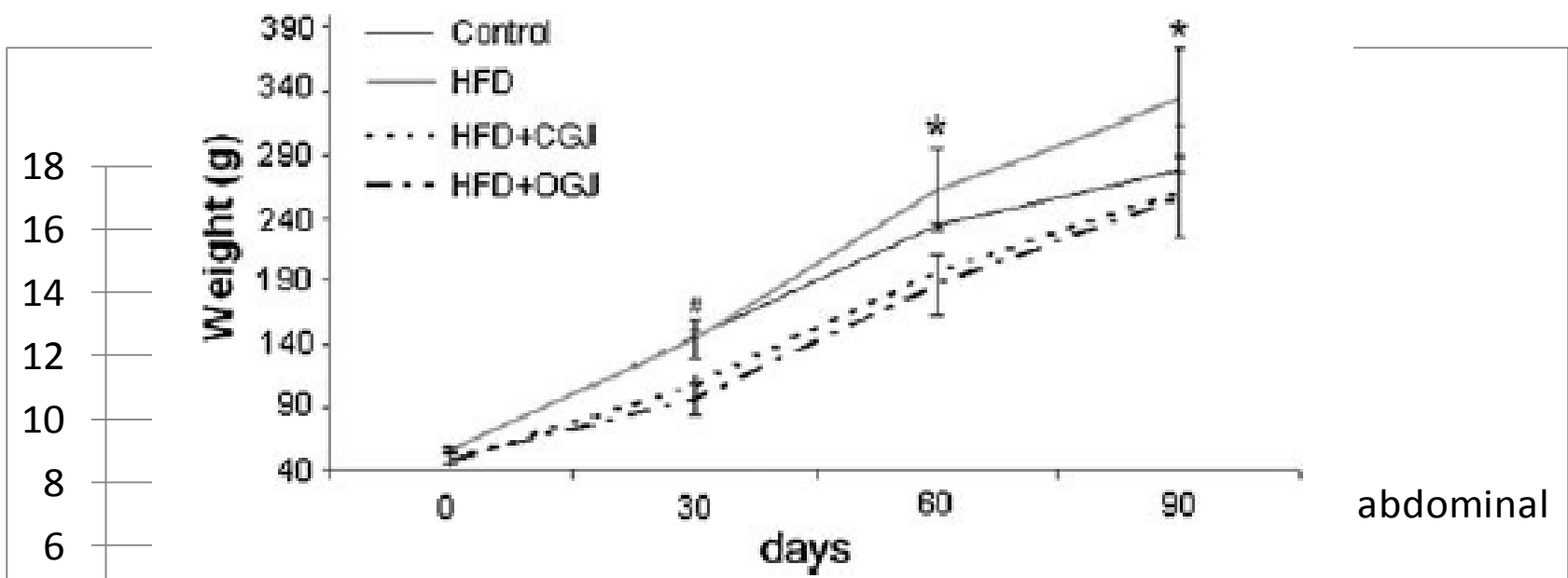


Fig. 1. Effect of grape juice consumption on in vivo DMBA-DNA adduct formation in mammary and liver tissues. Values represent mean  $\pm$  SE. \*Means are significantly different vs. control ( $P < 0.05$ ).

	Control group			Treated group		
	Day 0	Day 48	Day 96	Day 0	Day 48	Day 96
Body weight (kg) (n=10/group)	2.75 ± 0.03	3.05 ± 0.03c	3.46 ± 0.03c, n	2.73 ± 0.03	3.02 ± 0.03d	3.19 ± 0.06d, o, †



**Fig. 2** Effect of chronic treatment with high-fat diet and purple grape juices on body weight of rats. Data are reported as weight variation (g) ± SD of ten animals per group. One-way ANOVA for repeated measures, followed by Tukey test: \**P* < 0.05, from HFD + CGJ and HFD + OGJ. *HFD* high-fat diet, *CGJ* conventional grape juice, *OGJ* organic grape juice

abdominal

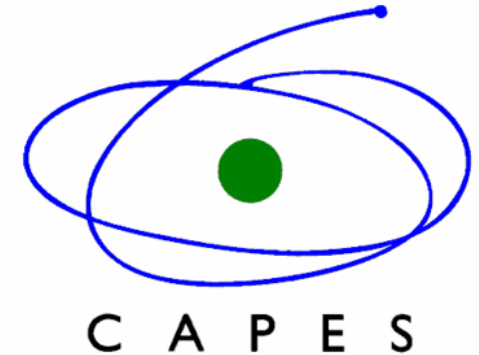
Danos  
cumulativos

Hábitos de vida  
atuais  
Sedentarismo e  
obesidade

Prevenção



# Agradecimentos



# Obrigada!

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