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INTRODUCTION & AIM

In contemporary society, one of the most pressing concerns is the prevention and treatment of chronic diseases (CDs).

IECAN

Despite their high prevalence, epidemiological studies indicate that 30% of cancers, 80% of cardiovascular diseases, and 90% of type 2 diabetes could be avoided by diet and lifestyle changes.



Prolonged exposure to elevated levels of pro-oxidant factors has been linked to functional impairments in enzymes and cellular structures, which in turn lead to **aberrant gene expression**.

The integration of antioxidant compounds into the diet has been proposed as a **preventive strategy** to mitigate oxidative stress and thereby reduce the incidence of CDs.

dietary interventions is expected to Implementing oxidative imbalance that favors the the reverse development of these diseases by combining a **preventive** dietary approach with therapeutic intervention, being nutrigenomics a key tool by determining the influence on gene expression.

Cancer

Pro-oxidant factors

NUTRIGENOMICS CDs TO PREVENT INCORPORATING ANTIOXIDANT COMPOUNDS

Figure 1. Nutrigenomic general approach as a preventive tool in CD.

I. Food intake and digestion





AGENCIA

ESTATAL DE

ound-gene



nges involved in the n

Disease

Cancer, Alzheimer's,

CVD, Arthritis

CVD,

Neurodegenerativ

e Diseases, Diabetes

Hypertension,

CVD, Cancer

Cancer, Metabolic

Disorders, CVD

Cancer,

Atherosclerosis

CVD, Cognitive

Decline, Diabetes

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ls and its role in the

ANTIOXIDANT COMPOUNDS TO MODULATE CDs

CVDs

Lifestyle

behavior

Table 1. Compilation of studies unveiling antioxidant properties of compounds modulating chronic diseases.

Source	Study type	Sample	Chronic disease	Dose	Time	Results	Ref.						
Tomato	Randomized controlled trial	n=36	CVD	7 mg/day	2 months	Improves endothelial function on optimal secondary prevention in CVD patients.	[1]				II Antiouido		
Garlic	in vitro in vivo	Neonatal rat cardiac myocytes and fibroblasts Adult male C57/B6 mice	CVD	0.1-10 μM	48 hours 120 min	Inhibition of cardiac hypertrophy and block of excess ROS production	[2]				interaction	nt compou	
Blueberry and strawberry	Prospective study	n=87242 women (NHS II) n=46672 women (NHS I) n=23043 men (HPFS)	Hypertension	12-15 mg/day	4 years	Anthocyanins may contribute to the prevention of hypertension.	[3]					AUGAAG MET LYS b. Antioxid	
Turmeric	Randomized trial	n=20	Obesity	500mg/day 750mg/day	12 weeks	Lower LDL and lipid peroxidation levels, lower oxidized LDL, and protein levels. Lower protein	[4]				a. Absortion of antioxidant compounds	b. Antioxic generated stir genetic change CD prevention	
NS				160mg/day		It may contribute to the cardioprotective effects of tea possibly by		Table 2. Gene modulation produced by antioxidant compounds prevention and treatment in chronic disease.					
	Randomized	n=37	Prehypertension		4 weeks	function and reducing inflammation.	[5]	Antioxidant compound	Food source	Effective dose	Mechanism of action	Modulated genes	
NS	tia		patients	100mg/day		cardioprotective effects of cocoa and tea through improvements in		Curcumin	Turmeric	500-2000 mg/day	Inhibits NF-κB, reduces oxidative stress and inflammation	Nrf2, TNF- α, IL-6, COX-2	
CVD: cardic	ovascular disease	es; NHS: Nurs	es' Health Study; H	HPFS: Health P	Professionals F	endothelial function. Follow-up Study; NS: not		Resveratrol	Grapes, Red Wine, Berries	150-500 mg/day	Activates SIRT1, reduces ROS, modulates inflammatory pathways	SIRT1, PGC-1a, Nrf2	
ostion	of ant					t in soveral	food	Quercetin	Onions, Apples, Berries	500-1000 mg/day	Inhibits lipid peroxidation, modulates MAPK and NF- κB pathways	Nrf2, HO-1, IL-1β	
matrices, modulate gene involved in the development of these CDs. Therefore, understanding these gene changes can be useful for the							Epigallocatechin Gallate	Green Tea	200-800 mg/day	Scavenges ROS, modulates apoptosis, inhibits NF-κB	Nrf2, Bcl-2, Bax, p53		
	1 1 1	· 1					4 .						
		U	U	U		be useful for intervention		Lycopene	Tomatoes	10-20 mg/day	Inhibits oxidative damage, reduces LDL oxidation	Nrf2, SOD, CAT	
(Tomato Garlic Blueberry and strawberry Turmeric NS CVD: cardio	Tomato Randomized controlled trial Tomato in vitro Garlic in vitro Blueberry and strawberry Prospective study Turmeric Randomized trial NS Randomized trial	Tomato Randomized controlled trial n=36 Garlic in vitro Neonatal rat cardiac myocytes and fibroblasts Adult male C 57/B6 mice Blueberry and strawberry Prospective study n=87242 women (NHS II) n=46672 women (NHS II) n=23043 men (HPFS) Turmeric Randomized trial n=20 NS n=37 NS Randomized trial n=37 NS CVD: cardiovascular diseases; NHS: Nurs CVD: cardiovascular diseases; NHS: Nurs	SourceStudy typeSamplediseaseTomatoRandomized controlled trialn=36CVDGarlicin vitroNeonatal rat cardiac myocytes and fibroblasts Adult male in vivoCVDGarlicin vitroNeonatal rat cardiac myocytes and fibroblasts (NHS II) n=46672 women (NHS II) n=23043 men (HPFS)CVDBlueberry and strawberryProspective studyNeonatal men (NHS II) n=23043 men (HPFS)HypertensionTurmericRandomized trialn=20ObesityNSRandomized trialn=37Prehypertension patientsNSCVD: cardiovascular diseases; NHS: Nurses' Health Study; ICONCLLUSCONCLLUSestion of antioxidant comp	Source Study type Sample disease Dose Tomato Randomized trial n=36 CVD 7 mg/day Garlic in vitro Neonatal rat cardiac myocytes and fibroblasts Adult male CVD 0.1-10 µM Blueberry and strawberry Prospective study Adult male (NHS II) n=46672 women (NHS II) n=23043 men (HPFS) Hypertension 12-15 mg/day Turmeric Randomized trial n=20 Obesity 500mg/day NS Randomized trial n=37 Prehypertension patients 160mg/day NS 100mg/day 100mg/day 100mg/day CVD: cardiovascular diseases; NHS: Nurses' Health Study; HPFS: Health F CVD: cardiovascular diseases; NHS: Nurses' Health Study; HPFS: Health F CONCLUSIONS	Source Study type Sample disease Dose Time Tomato Randomized controlled trial n=36 CVD 7 mg/day 2 months Garlic in vitro Neonatal rat cardiac myocytes and strawberry Neonatal rat cardiac myocytes in vivo CVD 0.1-10 μM 48 hours Blueberry and strawberry Prospective study Nemen (NHS I) n=23043 men (HPFS) Hypertension 12-15 mg/day 4 years Turmeric Randomized trial n=20 Obesity 500mg/day 750mg/day 12 weeks NS Randomized trial n=37 Prehypertension patients 160mg/day 4 weeks NS 100mg/day 4 weeks 500mg/day 100mg/day 4 weeks	Source Study type Sample disease Dose Inne Results Tomato Randomized controlled n=36 CVD 7 mg/day 2 months Improves endothelial function on optimal secondary prevention in CVD patients. 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NS 100mg/day 100mg/day It may contribute to the cardioprotective effects of coco and te at brough improvements i	Source Study type Sample disease Dote Time Results Res Tomato controlled n=36 CVD 7 mg/day 2 months Improves endothelial function on optimal secondary prevention in CVD patients. [1] Garlie Neonatal rat cardiae and fibroblasts CVD 0.1-10 µM 48 hours Inhibition of cardiae hypertrophy and block of excess ROS [2] [2] Blueberry study Prospective study NS CVD 0.1-10 µM 48 hours Inhibition of cardiae hypertrophy and block of excess ROS [2] [2] Blueberry study Prospective study NS [1] n=67242 women (NHS I]) n=20403 [3] men (HPFS) Hypertension (HFS) 12-15 4 years Anthocyanins may contribute to the prevention of function levels. Lower LDL and lipid providicion levels. Lower contribute to the cardioprotective effects of tea possibly by contaition. [3] NS n=37 Prehypertension patients 100mg/day It may contribute to the cardioprotective effects information. [5] NS 100mg/day 100mg/day It may contribute to the cardioprotective effects information. [5] <	Source Study type Sample disease Dose Inne Result Result Result Tomato Controlled controlled trial n=36 CVD 7 mg/day 2 months Incoverse endothelial function on optimal secondary prevention in CVD patients. [1] Gartie Neonatal in vitro Neonatal mycoryces CVD 0.1-10 µM 48 hours Inhibition of cardiae hypertrophy and block of excess ROS [2] Blueberry and strawberry Prospective study Neonatal men (HPFS) 12-15 49 cars Anthozyanias may contribute to the contribute to the cardioprotective effects of tex possibly big improvements [3] Table 2. Gen prevention and rodidation NS n=-20 Obesity 500mg/day 12 weeks Lower LDL and lipid proxidation [4] NS n=-37 Prehypertension patients 160mg/day 12 weeks Lower LDL and lipid proxidiation [5] NS n=-37 Prehypertension patients 4 weeks In may contribute to the cardioprotective effects of tex possibly big improvements in endothelial function. [5] CVD: cardiovascular diseases; NHS: Nurses' Health Study; HPFS: Health Professionals Follow-ap Study; NS: not Resveratrol CUTD: cardiovasc	Source Name Name Addition Tornato Randomized entral n=36 CVD 7 mg/day 2 months Improves Rendomized entral n=36 CVD 7 mg/day 2 months Improves Neonatal rat cardiac more Neonatal rat cardiac fibrobalats CVD 0.1-10 µM 48 hours Inhibition of cardiac hypertrophy and block of excess ROS production [2] Blueberry and strawberry and strawberry Prospective study Hypertension (NFIS D) wromen (HFFS) 12-15 4 years Anthocyanins may prevention in ot prevention [3] Turmeric Randomized trial n=20 Obesity 500mg/day 12 weeks Lower LDL and lipid prevention [4] NS and (HFFS) 160mg/day 12 weeks and rotain provements [4] NS 100mg/day 100mg/day It may contribute to the cardioproterive effective informorable to the cardioproterive effective informorable to the cardioproterive effective informorable to the cardioproterive effective informorements Food source CVD: cardiovascular diseases; NHS: Narse' Health Study; HPFS: Health Profesionals Pollow-wg Study; NS: not [5] CVD: cardiovascular diseases; NHS: Narse' Health Study; HPFS: Health Profesionals Pollow-wg Study; NS: not CVD: cardiovascular diseases; NHS: Narse' Health Study; HPFS: Health Profesionals Pollow-wg Study; NS: not	source Name Lose Lose <thlose< th=""> Lose Lose</thlose<>	source study type	

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