

Study suggests being a 'super-taster' of bitter flavours may put you at disease risk

February 9 2018

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OBA no	riodantal in taste genetics (T2R38 polymo	rnhieme)		-	A		
pe	riodontal status and rheumatoid arthritic	· pmsms)	,	1	DENTISTR	9	
Cruz de Jesus ^{1,2} , Mar	10i Reddy Medenatilla G	KA)		4	FACULTY HEALTH SCIENC		
emosensory Biology (MC	SB) Research Ground D. Gurpal Bhuttar ³ , Robert Schroth ¹³ , Car	ol Hitchont		UNIX	ERSITY "MANITO	LA CONTRACT	Effects of anaerobic ph
Department of Internal	Medicine ⁴ Max Pady Colline of Oral Biology ² , Department of Preven	live Dental Scie	rashen	Chelika	ni ^{1,2}		microtensile bond st
	realenne, Max Rady College of Medicine, Rady Faculty of Health Science	es. University of	f Manito	llege of D	entistry,	CTICS .	Dmitry Mikhlin, Cristina Fiuza
	Figure 1. Enzyme cut sites on amplified T2R38 (a) PAV and (b) AVI haplotypes	Table 1 co	· ···umitio	D4			Dental Biomaterals Research Laborator
T2Rs) have been detected in oral and		smoking, oral health	stics of RA status, and T.	R38 genotype.	cir distribution a		ion
ating immune cells.	Tables (1997)		Total	Ibper-taster	Bypo taster	STATES A	Notes and application marked and
oles for T2Rs in inflammation and		Apr (Yuan) *	(N=28) SL(C, 68)	PW (N=11)	AVLOS-7		re often overlooked.
		Sex - n (%) of female	26 (9354)	19(9)%	7000	400 100	a method that allows for persion and thus elimination
otypes present variations at 3 amino	I France (1904) 1 - Million (1904)	Disease duration (Vizaes)' Anti-CCP (sul-	10.05.31) 20.071562	8 (4,10) 0 (82%))	100	12	layer formed in adhesives
Valine combination (PAV - hyper-		Rheumatoid factor (vg.		7(64%)	1		
reased AMP expression,	(0)	Smoker (%) Current smoker	4()4%)	211816		- ABBBBB	thods
d with reduced AMP expression.	Data analysis: The observed and expected genotype frequency between the RA patients and control	Ever smoked	29(7)%)	10197%			and the second sec
the most common autoimmune	population group (Adappa and colleagues, 2014)' was evaluated by chi-square analysis using SAS software (version 9.4; SAS Inst. Inc. Cary, NC, USA).	Oral diagnose n(%) Educations	2,0%0				(198)
periodontal disease are described	source (scalar set and met and capters source)	Gingivitin Mild	9 (32%)	103741 3 (2754)			(sa)
n genetically susceptible individuals	RESULTS	Moderate Severe	7 (29%) 2 (7%)	2085		1 . C. C.	
A.	Figure 2. Agarose gel images showing the different cleaving patterns of the 12RS8 genotypes touto in the Rev	* Years at time of dental axis * Periodontal screening tria	en reported as med ad cavarage of 6-0	an (25m, 25m) al regiones			
isms may contribute to the generic		SUMMARY &	CONCLUS	ION	11		and the second second
		Our results sugg	est that T2R.	S may analy		1	
ms in P.A. patients		found among the	RA patients			1 mart	
veen the oral health status and T2R38	······································	All patients has ouartile) PSR with	s 2 (1.3, 2.5	1 cest		11	
		• Of the 19 (68%) patients w	NO NO	100		
	Mad wind Mad an and Mad and	hyper-tasters, p"	NS.			6	
matoid Arthritis		Twenty patients	ever smoke	and		-	
R) → Periodontal status a saliva samples	for second population.	Future approach	es using a la	ger	nest.	12	
amplified by PCR	Table 2. Comparison of T2R38 genotype requested sectors AVI/AVI PAV/AVI PAV/PAV Tetal	whether the 121 explore associat	ions between	T		The second second	
Cuernight at 37°C	RA patients 7 (25%) 10 (30%) 11 (3%) 23	REFERENCES		1			
5'GCTGC3'	Comparison group* [100 (29%) [177 (51%)] (0 (20%)	1+ Addapa et al. The characterization requiring	sinur tame reco			1	
sites in T2R38	"Composed of 347 individuals drawn visit of group rotes the frequencies	ACKNOWLEDGE	MENTS		and the second		
PAV AVI	The frequency of the PAV/PAV genotype was significantly lower than expected based on calabe	Funded by:	1		44 AREN 101		
CCA (Pro) CCA (Ala)	of the PAV/AVI and AVI/AVI generation $(a,b) = (a,b) $				eam		
GCT (Ala) GTT (Val)	population (2.1-) we the					A COLORADO	

Cruz believes her study is the first to suggest a link between genetic dislike of bitter flavours and risk of rheumatoid arthritis. Credit: University of Manitoba

Do you find vegetables like brussels sprouts, kale, cabbage and broccoli disgustingly bitter? How about grapefruit juice or black coffee?



If such flavours strike you as horribly intense, you may be a "hypertaster," also known as a "super-taster."

It's in your genes, says Vivianne Cruz, a U of M master's student in oral biology whose research poster won an award at the College of Dentistry's recent 2018 Research Day.

People with the genotype PAV/PAV, Cruz explains, are highly sensitive to certain bitter-tasting compounds in food. Those with the genotype PAV/AVI – roughly half the population, including Cruz herself – are "medium tasters" of bitterness.

And those with the genotype AVI/AVI are "hypo-tasters" or "non-tasters" who can't detect the bitter compounds at all.

A quick way to identify your genotype is by placing a paper test strip coated with a bitter chemical onto your tongue. (Testing kits can be ordered online.) Cruz says the results are dramatic. "Super-tasters make a scary face," she says. "One friend of mine almost threw up. Nontasters say things like, 'What am I supposed to be tasting?'"

These genetic differences have been known to scientists for decades. But less than 10 years ago, researchers discovered that <u>bitter taste receptors</u> aren't only found on the tongue. They're in other parts of the body, such as the digestive and respiratory systems. Understanding the receptors' functions outside the oral cavity has become an exciting field of research, Cruz says.

Scientists are starting to find associations between taste receptors and disease. It's been shown, for example, that non-tasters are at greater risk for chronic sinus infections and tooth decay.

Cruz believes her study, funded by the Canadian Arthritis Network and



the Natural Sciences and Engineering Research Council of Canada, is the first in the world to search for a link between "taste genetics" and rheumatoid <u>arthritis</u>.

"Studies are finding that bitter taste receptors are related to the immune system, and rheumatoid arthritis is an autoimmune disease," she notes.

Cruz, who graduated as a dentist three years ago in her home country of Brazil, came to the U of M last year to conduct research with the interdisciplinary Manitoba Chemosensory Biology Research Group, led by oral biology professor Dr. Prashen Chelikani.

With Chelikani as her advisor, Cruz collaborated with a Rady Faculty of Health Sciences team including Dr. Carol Hitchon, rheumatologist and associate professor of internal medicine, and Dr. Robert Schroth, clinician scientist and associate professor of preventive dental science.

The team analyzed DNA from the saliva of 28 patients with rheumatoid arthritis, comparing their genotypes with those in a control group of 347 healthy individuals. The findings were more significant than expected.

"We found a higher frequency of super-tasters in the rheumatoid arthritis population than in the normal population, and a lower frequency of medium tasters and non-tasters," Cruz says.

"Research has shown that super-tasters present a stronger immune response against bacteria than the other two genotypes. That response results in increased secretion of antimicrobial compounds – an inflammatory process. We think this may contribute to the development of rheumatoid arthritis, a disease of chronic inflammation."

Cruz says the field of studying taste receptors holds great promise, particularly since there are 25 bitter taste receptors in humans, and her



study focused on just one.

"For my Ph.D. research," she says, "we want to use a larger sample size and further explore the apparent association between <u>taste</u> genetics, inflammation, immunity and the risk of <u>rheumatoid arthritis</u>."

Provided by University of Manitoba

Citation: Study suggests being a 'super-taster' of bitter flavours may put you at disease risk (2018, February 9) retrieved 4 May 2024 from <u>https://medicalxpress.com/news/2018-02-super-taster-bitter-flavours-disease.html</u>

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