

Effects of PACAP receptor gene ADCYAP1R1 on fear acquisition and generalization in humans

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Background

- Pituitary adenylate cyclase-activating polypeptide (PACAP) is a regulator of stress/anxiety in many species (Hammack et al., 2010)
- Higher circulating PACAP and a polymorphism in its receptor gene *ADCYAP1R1*(rs2267735), adenylate cyclase activating polypeptide 1 receptor type 1, have been linked with posttraumatic stress disorder (PTSD) in women and not men (Ressler et al., 2011)
- These effects could take place via fear conditioning/generalization processes

Goal

To study the effects of PACAP receptor gene (and its interaction with gender) on fear acquisition and generalization in a sample of healthy individuals.

Methods

PARTICIPANTS

Initial sample:
140 healthy controls (102 females, 73%). Mean age = 22.29, (SD = 2.55),

Final samples:
N=139 (fear acquisition).
N=122 (fear generalization).

GENOTYPING

Genomic DNA was extracted from saliva samples using the Collection Kit BuccalAmp DNA extraction kit (Epicentre, ECOGEN, Barcelona, Spain). The SNP rs2267735 of the *ADCYAP1R1* gene was genotyped using Applied Biosystems (AB) Taqman technology. AB assay-on-demand service was used to order the probes.

GENDER AND GENOTYPE DISTRIBUTION

Participants were divided according to their genotype into a RISK GROUP (CC genotype) or a NON-RISK GROUP (GC + GG genotypes).

Sex	Genotype groups	
	Risk	Non-risk
Male	6	32
Female	25	77

EXPERIMENTAL PROCEDURE

Fear acquisition and generalization experimental paradigm (Lissek et al., 2008).
Indexes of fear learning: Fear-potentiated startle (FPS), raw data; risk ratings

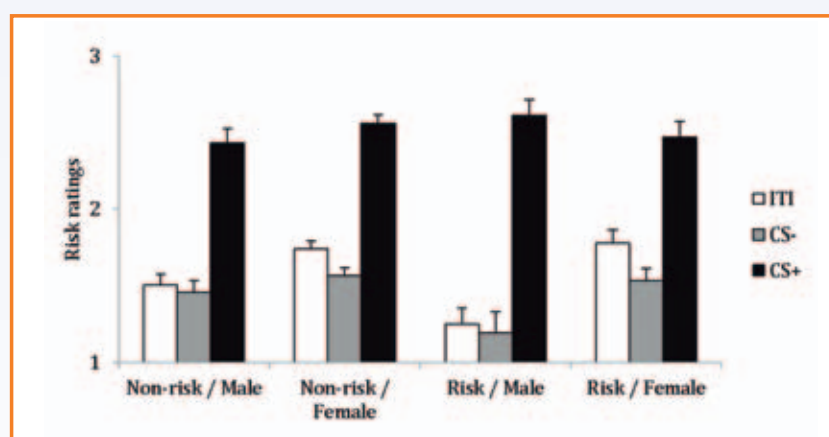
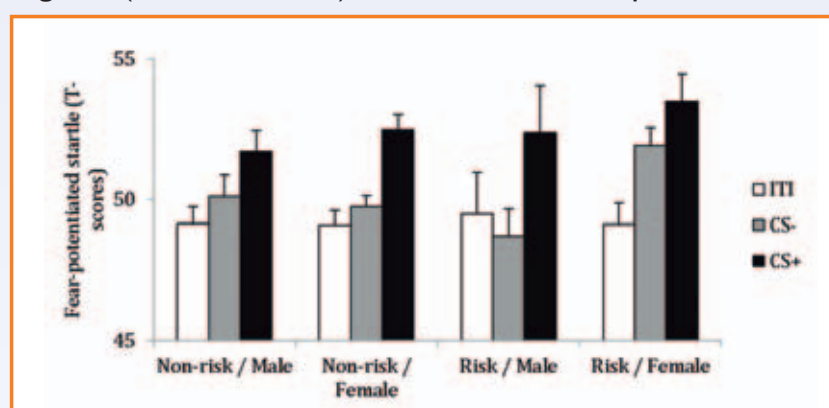
STATISTICAL ANALYSES

Mixed ANOVAs
Within-subjects factor: stimulus.
Between-subjects factors: risk group and gender.

Results

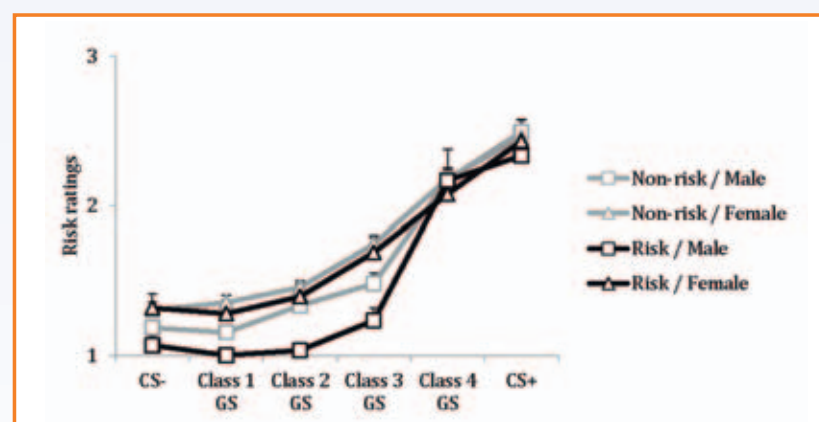
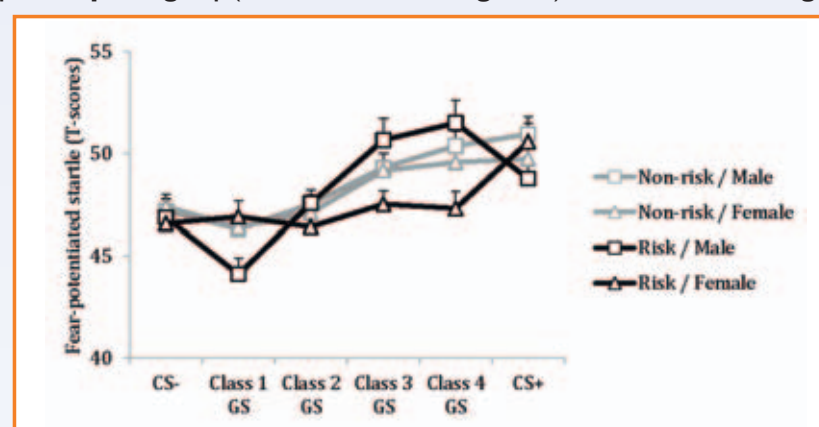
Fear acquisition

Fear was acquired overall by the whole group, as shown by a significant effect of Stimulus [$F(2,270)=11.86$, $p<.001$ for FPS and $F(1, 134) = 135.44$; $p < .001$ for risk ratings]. Risk group or gender (and its interaction) had no effect on fear acquisition.



Fear generalization

Generalization of fear conditioning was evidenced for the whole group as shown by a significant effect of Stimulus in both FPS [$F(4.39, 518.48) = 10.76$, $p < .001$] and risk ratings [$F(2.28, 271.02) = 114.02$; $p < .001$]. Risk group (or its interaction with gender) had no effect on fear generalization.



Conclusion

The PACAP receptor gene *ADCYAP1R1* does not seem to play a major role in fear acquisition or generalization in healthy humans.

References

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