

Depression-associated Gene Regulation Potential of Active Constituent of *Ocimum sanctum*

OBJECTIVE

To investigate the effect of triterpenic acid: ursolic acid (UA) on expression of *skn1* and *prdx2* genes in *C. elegans* wildtype and *skn-1*- and *prdx2*- deficient strains.

MATERIALS AND METHODS

The *C. elegans* strains (N2 wildtype, QV225 *skn-1* deficient, and VC289 *prdx2* deficient) were used in this study. Age synchronized L4 and L1 larvae respectively were either treated with 100 µM of UA, 100 µM fluoxetine or DMSO 0.1% (Control) for 24 h. Total cellular RNA was isolated and reversely transcribed. The qRT-PCR was performed and measured with SYBR Green master mix. Each treatment group was compared with the control group to determine the relative RNA levels. Act-1 was used as reference gene. The RNA levels were determined by calculating 2^{-ΔΔCt} values.

RESULTS

qPCR analysis of *C. elegans* strains treated with ursolic acid or fluoxetine to detect the influence on *skn-1* and *prdx2* expression

N2	Mean value fold induction 2 ^{-ΔΔCt} ± SD and p value	
	<i>skn-1</i>	<i>prdx2</i>
Control	1.1 ± 0.1	1.0 ± 0.2
Fluoxetine	9.9 ± 2.5 (p < 0.05)	2.4 ± 0.3 (p < 0.05)
Ursolic acid	7.6 ± 1.9 (p < 0.05)	2.6 ± 0.4 (p < 0.05)
QV225	<i>prdx2</i>	
Control	0.8 ± 0.1	
Fluoxetine	4.2 ± 0.7 (p < 0.05)	
Ursolic acid	6.90 ± 0.3 (p < 0.05)	
VC289	<i>skn-1</i>	
Control	1.3 ± 0.2	
Fluoxetine	4.4 ± 0.6 (p < 0.05)	
Ursolic acid	3.8 ± 0.4 (p < 0.05)	

Values expressed mean ± SD; n=3
*p<0.05 as compared to control based on unpaired t-test (two-tailed)

CONCLUSIONS

- Ursolic acid induced the transcription of *skn-1* and *prdx2* mRNA.
- The expression of *skn-1* and *prdx2* was significantly upregulated upon ursolic acid treatment (p<0.05).

OUTCOME

These data implied that ursolic acid possess antidepressant and stress diminishing effects through upregulation of *Prdx2* and *Skn-1* genes.

Reference:
Naß J, Abdelfatah S, Efferth T. The triterpenoid ursolic acid ameliorates stress in *Caenorhabditis elegans* by affecting the depression-associated genes *skn-1* and *prdx2*. *Phytomedicine*. 2021;88:153598.