

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 *skn-1* 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 μ M of UA, 100 μ M 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 $2^{-\Delta\Delta Ct}$ 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 $2^{-\Delta\Delta Ct} \pm SD$ and <i>p</i> value	
	<i>skn-1</i>	<i>prdx2</i>
Control	1.1 \pm 0.1	1.0 \pm 0.2
Fluoxetine	9.9 \pm 2.5 (<i>p</i> < 0.05)	2.4 \pm 0.3 (<i>p</i> < 0.05)
Ursolic acid	7.6 \pm 1.9 (<i>p</i> < 0.05)	2.6 \pm 0.4 (<i>p</i> < 0.05)
QV225	<i>prdx2</i>	
Control	0.8 \pm 0.1	
Fluoxetine	4.2 \pm 0.7 (<i>p</i> < 0.05)	
Ursolic acid	6.90 \pm 0.3 (<i>p</i> < 0.05)	
VC289	<i>skn-1</i>	
Control	1.3 \pm 0.2	
Fluoxetine	4.4 \pm 0.6 (<i>p</i> < 0.05)	
Ursolic acid	3.8 \pm 0.4 (<i>p</i> < 0.05)	

Values expressed mean \pm 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 *Sk-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.