



## Serum Level of Activin-A in Patients with Scarring and non Scarring Acne Vulgaris

Authors

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### Abstract

**Background:** *Acne vulgaris (AV) is a common chronic inflammatory skin disease involving the pilosebaceous follicles characterized by comedones, papules, pustules, nodules and sometimes scars,*

**Objective:** *The aim of the present study is to evaluate serum level of activin-A in patients with scarring and non scarring acne vulgaris and assessment of its clinical significance.*

**Methods:** *A case control study that included 25 patients suffering from scarring acne vulgaris and 25 patients suffering from non scarring acne vulgaris., All studied subjects were tested for serum level of Activin-A.*

**Results:** *There was a statistically significant difference in serum level of activin-A between scarring and non-scarring acne vulgaris (P. value=0.039).*

**Conclusion:** *Evidence has been accumulated for an important role of activin in inflammation, tissue repair, and fibrosis. Thus, these findings strongly suggest that activin-A is a potent inducer of fibroblast activation and involved in the pathogenesis of scars.*

**Keywords:** *Acne Vulgaris, Activin-A.*

### Introduction

Acne vulgaris (AV) is a common chronic inflammatory skin disease involving the pilosebaceous follicles characterized by comedones, papules, pustules, nodules and sometimes scars<sup>(1)</sup>. It is a multifactorial disease in which several factors have been implicated, including hormonal effects, follicular hyperkeratinization, proliferation of propionibacterium acnes, inflammatory, environmental factors and genetics<sup>(2)</sup>. Inflammation plays one of the main roles in the development of acne vulgaris<sup>(3)</sup>

Acne scars are caused by inflammation within the dermal layer of skin and are estimated to affect 95% of people with acne vulgaris<sup>(4)</sup>. The scar is created by abnormal healing following this dermal inflammation<sup>(5)</sup>. Scarring is most likely to take place with severe acne, but may occur with any form of acne vulgaris<sup>(4)</sup>. Acne scars are classified based on whether the abnormal healing response following dermal inflammation leads to excess collagen deposition or loss at the site of the acne lesion. Atrophic acne scars have lost collagen from the healing response and are the most common type of acne scar (account for

approximately 75% of all acne scars). Hypertrophic scars are uncommon, and are characterized by increased collagen content after the abnormal healing response<sup>(5)</sup>.

Activin and inhibin are two closely related protein complexes that have almost directly opposite biological effects, as identified in 1986<sup>(6)</sup>. Activin is a member of the transforming growth factor beta family of growth and differentiation factors<sup>(7)</sup>.

## Subjects and Methods

**Type of the Study:** A case control study.

**Study Population:** The study included 25 patients suffering from scarring acne vulgaris and 25 patients suffering from non scarring acne vulgaris. All patients were selected from the outpatient clinic of Dermatology, Venereology and Andrology Department of Benha University Hospitals. All studied subjects were tested for serum level of Activin A.

## Sampling

Five milliliters of venous blood was collected from patients on plain tubes. The tubes were allowed to clot and centrifuged immediately at 3000 rpm for 15 min to remove the serum. The serum samples were separated and kept at -20 °C until use. The serum activin-A levels measured by

enzyme linked immunosorbent assay (ELISA) kit for research use only (catalogue number: 201-12-0015, sun Red Bio, China).

## Test principle

The kit uses a double-antibody sandwich enzyme-linked immunosorbent assay (ELISA) to assay the level of Human Activin A (ACV-A) in samples. Activin A (ACV-A) was added to monoclonal antibody Enzyme well which is pre-coated with Human Activin A (ACV-A) monoclonal antibody, incubation; then, Activin A (ACV-A) antibodies labeled with biotin was added, and combined with Streptavidin-HRP to form immune complex; then incubation and washing again was carried out to remove the uncombined enzyme. Then Chromogen Solution A, B, was added the color of the liquid changes into the blue, And at the effect of acid, the color finally became yellow. The chroma of color and the concentration of the Human Substance Activin A (ACV-A) of sample were positively correlated.

## Results

**Table (1):** Shows that there was a statistically significant difference in serum level of activin-A between scarring and non-scarring acne vulgaris (P. value=0.039).

**Table (1):** Comparison of serum level of activin-A between studied groups.

lab data (ng/l)	Groups						ANOVA	
	Non Scarring			Scarring			F	P-value
Range	34.9	-	359.4	34.3	-	673	3.393	0.039*
Mean ±SD	106.652	±	73.833	162.317	±	157.520		

SD, standard deviation; ANOVA, analysis of variance; p< 0.05 is significant.

## Discussion

Acne is often associated with the development of scars, mainly in moderate or severe inflammatory forms but also in some mild forms as well.

In patients with moderate acne, scars can form from papules (inflammatory lesions) or post-inflammatory lesions with only a third resolving within six months, hence the link between early acne management and scar prevention. Though it

has been poorly researched, acne scarring is often associated with burdensome psycho-social consequences and deficits in quality of life<sup>(8)</sup>.

Acne scars are associated with decreased self-confidence, including perception of decreased employability and embarrassment and be negatively perceived by society, thereby reinforcing the need for early and effective treatments<sup>(9)</sup>.

Activin was initially described as a protein that stimulates release of follicle stimulating hormone from the pituitary, and it is well known for its important roles in different reproductive functions. In recent years, this multifunctional factor has attracted the attention of researchers in other fields, as new functions of activin in angiogenesis, inflammation, immunity, fibrosis and cancer have been discovered. Studies from our laboratory have identified activin as a crucial regulator of wound healing and skin carcinogenesis<sup>(10)</sup>.

This study was conducted to evaluate serum level of activin-A in 25 patients with scarring and 25 patients with non-scarring acne vulgaris and assessment of its clinical significance.

All patients were subjected to complete history, complete general examination including dermatological clinical examination & Estimation of serum level activin-A in patients groups by enzyme linked immunosorbent assay (ELISA).

To the best of our knowledge, this is the first study to evaluate serum level of activin-A in acne and investigate its role in the pathogenesis of acne scars. The mean value of serum activin-A was significantly higher in patients with scarring than non-scarring acne vulgaris (P. value= 0.039). In addition to the skin, activin overexpression is a hallmark of fibrotic disorders of various other organs, including liver, pancreas, kidney and lung<sup>(11)</sup>

The first evidence for a role of activin-A in wound healing came from the studies of *Hübner et al.*<sup>(33)</sup>

They demonstrated an increased induction of activin-A expression within 24 h after injury, which remained high until the end of the repair process<sup>(12)</sup>.

However, *Antsiferova and Werner*,<sup>(10)</sup> also found negative consequences of activin-A over expression. For instance, the healed wounds of activin transgenic mice had a much larger scar area. Furthermore, the late granulation tissue and the resulting scar tissue were characterized by a higher cellular density compared with that in

control mice as well as by the presence of keratinocytic cysts<sup>(10)</sup>

Taken together, *Wada et al.*,<sup>(13)</sup> results identify activin as a potent pro-fibrotic factor in different tissues and organs<sup>(13)</sup>.

Several studies have implicated activin-A as an important player in fibrotic disorders. *Sugiyama et al.*<sup>(14)</sup> demonstrated an upregulation of activin-A in cirrhotic and fibrotic rat livers<sup>(14)</sup>.

### Conclusion

Evidence has been accumulated for an important role of activin in inflammation, tissue repair, and fibrosis. Thus these findings strongly suggest that activin-A is a potent inducer of fibroblast activation and involved in the pathogenesis of scar.

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