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Effect of Bee Venom on Some Physiological Parameters in Albino Rabbits

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Abstract

The study was conducted to the investigation the effect of bee venom on liver and kidney function (ALT,AST ,ALP ,Albumin, urea and creatinine)) using 20 albino rabbits, which were divided according to the following: The rabbits were divided into four groups, each group had five replicates. The first group was injected with 5 ml / day and the second group was injected with 10 ml / day. The third group was exposed to direct stinging and the fourth group was considered Control. results were a significant increase in the level The liver enzymes (ALP, ALT, AST) were found in the groups that were injected with bee venom(A,B and C) compared with the control group, also the results obtained significant increase in albumin concentration in group B and C compared with control group while the results showed a significant increase in the concentration of urea in the group that was exposed to direct sting compared with the control group, and the results did not show any significant differences between all groups. In concentrations of creatinine,

Keywords: bee venom ,albino rabbits, liver enzyme functions (AST, ALT, ALP), kidney function

Introduction

Bee venom is important products of the honey bee, which was treated many diseases (Hegazi, ,2015)

Bee venom was secreted from worker bees and is one of common poisons. It is composed of mast cell lysis peptide, melitin, histamine, phospholipase enzymes (PLA2, hyaluronidase, acid phosphatase, and non-peptide compound such as glucose and fructose [Son, et al., 2007). In general, the pH of venom is from 5.2 -5.5,(acidity), specific weight is 1.313 (Korean, 2019)

When venom enters the body of human, some chemical agents of venom cause allergic reactions, and in severe cases, anaphylactic shock such as hypersensitivity [Chen, et al., 2010]., Most toxins produce immediate pain, and are able to destroy red blood cells (Banks et al., 2013).PLA2 is the enzyme that is the main allergen in venom, and it is related to PLA2. Excretion of bee venom with inflammation and pain [Lee et al., 2016.[

Bee venom has the ability to protect hepatocyte and has anti-cancer properties [Lim et al. 2015]. The effect of bee venom on estimating the total protein content and estimating the content of albumin and globulin in the serum is also shown for the activity of liver enzymes (ALAT and ASAT) in the blood serum (Bauer et al., 1968). , The role that bee venom plays in modifying changes in cell membranes by modifying the interactions of lipoproteins that enter into the

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formation of these membranes due to the presence of melitin in it (Bollinger et al., 2004(

Honey bee venom is a liquid that dries at room temperature. Odorless, pungent odor, bitter taste, aqueous mixture of proteins with a basic pH (4.5 to 5.5) that bees use for defense (Schmidt, 1999. On contact with mucus membranes or eyes, it causes significant burning and irritation. venom is soluble in water and insoluble in alcohol. When contact with air they form grayish white crystals. The dried toxin is bright yellow, believed due to oxidation of toxin proteins. venom contains a highly volatile compounds that can be lost during collection. It is a rich source of biogenic enzymes, peptides and amines. (Alvare Z-Ficher et al. 2013,) The toxins of most stinging insects including bee venom are composed of enzymes, proteins and peptides,

Materials and methods of work

Experimental design

Used for this study were Twenty adult albino rabbits weighting (950± 50 gm). Rabbits randomly divided into four groups, each of five rabbits as follows: Group 1: Control group, healthy control rats received isotonic saline solution intra peritoneally (negative control). Group The second group was injected with 5 ml / day of bee venom and the third group was injected with 10 ml / day of bee venom. The fourth group was exposed to direct stinging for 21 days. Rabbits were given diet and tap water ad libitum. At the end of the experimental, rabbits were deprived of food overnight and blood was collected by heart puncture

: **extraction of bee venom**

the venom was extracted from honey bee workers by holding it with tongs and pulling the stinging machine with the poison bag and then placed in a ceramic mortar and the number of the stinging machine withdrawn is 30 machines with the addition of 10 ml of distilled water, then it is milled and then placed in a centrifuge for a period of five Min. 300 cycles / minute, then the solution is filtered with (0.22) filter paper (Mukund et al. 2011.(

Injecting the animals with bee venom

The animals were first weighed in order to know the concentrations of the treatments and it was 0.6 ml / 200 grams of body weight (Liu et al. 2002) and the concentration of the first treatment was 5 ml / day and the second treatment was 10 ml / day. The third treatment was exposed to direct stinging for each repeat 5 stings / day as for the worker. The first and second are injected with a fine needle (insulin needle), where the rabbit is grasped from the area of the ears and the rabbit's scalp is withdrawn, then the injection is below the neck. This process continues for a period of (21 days). Minutes for laboratory tests

Blood collection

The samples of blood were collected at the end of experiment from all groups, following the rabbits being anesthetized with chloroform. Approximately, blood of 5 ml was directly collected from the heart via cardiac puncture through utilizing 3ml syringe and a 22-gauge needle. Blood

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was collected in sterile plastic test tubes without anticoagulant were left vertically at room temperature, then sera were collected in sterile gel test tubes and centrifuged for 15min. at 3000 rpm , then kept in deep freeze at -18˚C for other experiments

Estimation of liver enzymes

Liver enzymes (ALT,AST and ALP) were meseared by using kits provided by Biomerieux-Frans for the colorimetric determination The absorbency was measured at wave length 546 nm and ALP was measured at 405 nm by using spectrophotometer.

Renal function measurement

Blood urea and creatinine levels were measured by using the colorimetric method and used Human kit (Human Gasellschaft fur Biochemica und Diagnostica mbH, Germany) were measured spectro-photometrically at 578 nm

Results and Discussion

The results in Table (1) showed a significant increase in the level of p≤0.05 in the enzyme ALT)) in group B, C (0.93 ±), (41.60 60.60 ± 4.43), respectively, compared with the control group (29.00 ± 1.15) UI. / L The results showed no significant differences at the level of P≤0.05 in the enzyme (AST) in groups B and C (49.20 ± 1.57) and (52.00 ± 2.91), while there was a significant increase in group B and A (49.20 ± 1.57) and (34.25 ± 1.31). Respectively, compared with the control group (27.67 ± 3.84) UI / L, and the results showed a significant increase in the level of P≤0.O5 in the enzyme (ALP) in the B and C group (142.40 ± 20.10) and (178.00 ± 10.61) compared with the control (60.67). The results showed a significant increase in albumin concentration in groups B and C (4.50 0.15 and 4.47 0.15) compared with group A (3.66 0.18) and control group (2.81 ± 0.34) gm / dl (2.81 ± 0.34). The results in Table (2) showed a significant increase in the level of P≤0.05 in urea in group C (42.60 ± 2.78) compared with group B (35.80 ± 124). The results did not show significant differences between the control group and the rest of the groups with respect to the concentration of creatinine.

Table 1 Comparison between difference groups in liver and kidney in albino rabbits treated with bee venom the different letters in same column differed significantly. * (P≤0.05).

Group	Mean ± SE			
	ALT (U/L)	AST (U/L)	ALP (U/L)	Albumin (gm\dl)
Control	29.00 ±1.15 c	27.67 ±3.84 c	60.67 ±4.09 b	2.81 ±0.34 c
A	37.25 ±1.88 bc	37.25 ±1.31 b	89.00 ±6.13 b	3.66 ±0.18 b
B	41.60 ±0.93 b	49.20 ±1.57 a	1421.40 ±20.10 a	4.50 ±0.15a
C	60.60 ±4.43 a	52.00 ±2.91 a	178.00 ±10.61 a	4.47 ±0.15 a
LSD value	9.02 *	7.58 *	43.84 *	1.02

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Table 2 Comparison between difference groups in B. Urea and Creatinine albino rabbits treated with bee venom

Group	B. Urea (mg/dl)	Creatinine (mg/dl)
Control	36.33 ±4.63 ab	0.400 ±0.11 a
A	41.50 ±1.44 ab	0.290 ±0.11 a
B	35.80 ±1.24 b	0.252 ±0.11 a
C	42.60 ±2.78 a	0.434 ±0.09 a
LSD value	6.04 *	0.352 NS

According to previous in vitro and in-body research, Bee venom from honey bees (Apis mellifera) is a mixture of substances with bioactive properties including anticancer, anti-inflammatory and antioxidant effects. (Jang MH et al., 2003) These methods had an effect on the effects of melatin on the liver function due to the liver's importance in removing harmful or toxic chemicals (ie detoxification). Protein helps Integration into food digestion and bile production as well as storing vitamins (A, D, E, K, B12) [Darwish et al., 2013] One study found that high levels of ALP due to many conditions such as normal physiological or pathological conditions have a role in protein breakdown. 30

Apamin helps increase the production of cortisol in the adrenal gland. It acts as a mild neurotoxin (Mahmoud, 2012). The kidneys are the most important organ in the body with a higher value, and the kidneys have many roles that keep the body at ease in regulating osmotic, hydrogen concentration and blood pressure. In this study, the results showed that the relationship between melitin and creatinine was positive and statistically significant increase, and the level of creatinine and urea increased. These results were in agreement with Geraldo et al. (2017) [34], which determined creatinine and kidney function, and a high level indicated that the kidneys function, and a high level indicated that the kidneys do not function properly due to bee venom and that a number of stings cause acute kidney injury as a result of many factors, such as intravascular hemolysis, pneumolysis. , Hypotension and direct toxicity of vital elements toxins

Conclusions

The results showed an increase in liver enzymes (ALP, ALT, AST,) as a result of using bee venom and a clear increase in albumin concentration compared to the control group, and there was a significant increase in the level of urea compared with the control, and bee venom did not make any significant difference between the four groups in Creatinine concentration level.

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