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The Effect of Deer Horn Extract on the Rabbit Tissues(1)

—The effect on the soluble proteins—

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녹용이 집토끼 조직에 미치는 영향(1)

—수용성 단백의 비교연구—

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적 요

녹용이 동물체에 미치는 영향을 조사하기 위한 일환으로 녹용 침출액을 집토끼에 주사한후 여기에서 여섯개의 조직(골격근, 간, 신장, 부신, 비장, 심장근)을 선택 적출하여 disc-gel electrophoresis로 수용성 단백 분획상을 비교 하여 보았다.

대조군과 5일간 주사한 군에서 간, 신장, 부신, 비장에서는 서로 동일한 영동분획상이 나타났으나 골격근과 심장근에서는 대조군 보다 실험군(5일간과 15일간 녹용침출액을 주사한 군)의 영동대에서 하나의 영동대가 더 나타났다. 한편 15일간 주사한 실험군과 5일간 주사한 실험군 사이에서는 단백분획상의 차이점이 없음을 알았다. 이와 같은 변화는 녹용의 어떤 특수성분이 주로 근육형 조직에서단백질을 합성하는 기작에 영향을 끼친 것이 아닌가 사려된다.

Introduction

Deer horn(Cornu cervi) has been widely used as a tonic drug in Korea and China from old times. Its virtues and biological natures are discribed in"Dong-Ue-Bo-Gam" (Oriental Medicine record), but they are hardly found in western pharmaceutical records.

Yong(1960) reported previously the free amino acids and trace elements in deer horn. He also reported the effect of deer horn on serum cholesterol level in cholesterol-fed rabbits. The electrophoresis of protein fractions in animals was studied by many workers (Branat, *et al*, 1961. Blave W. Moore and D. Mcgregor., 1965 etc.).

In order to know the effect of deer horn extract on the metabolism, the author studied the soluble protein patterns of 6 tissues(heart, liver, kidney, spleen, adrenal and skeletal muscle) from rabbits injected with deer horn extract. He also investigated it from the view point of enzymology and hematology. In this paper, the results of comparison of the soluble protein patterns separated by disc gel electrophoresis are reported.

Materials and Methods

White female rabbits(body weight 2 kg) were used after feeding for two weeks under normal conditions. Commercial feed for poultry mixed with vegetable was used as feed stuff. It was fed 3 times a day.

Deer horn used in this work was a product on market. It was sliced very thinly and 0.7g of the slice was boiled with 500ml distilled water for 4 hours to make 2 ml of extract.

The extract was injected into the femoral muscle

of rabbits. The experiment was carried out on 3 groups of rabbits; control group, a group injected with the extract for 5 days, and another group for 15 days. The each group was made with 4 rabbits.

Six tissues used were heart, liver, kidney, spleen, adrenal and skeletal muscle.

The rabbits were dissected to separate the 6 tissues under an anesthetic. The residual blood of the tissues was washed out with 0.85% NaCl solution. 1.0g of each tissue added with 5ml distilled water was crushed with a pestle homogenizer. The suspension was centrifuged at 4,000 rpm for 40 min, and the supernatant was used as sample.

The electrophoresis was accomplished by using polyacrylamide gel(7%) with tris-glycine buffer solution (pH 8.6) according to the method of Davis B.L. and Ornstein, L.(1962). It was carried out within 60min, at a current of 4 mA for each column. Amido black 10 B was used as the staining agent. The gels sumitted to electrophoresis was submersed in 7% acetic acid solution.

The experiment was carried out at 4°C.

Results and Discussion

In the control group, the protein patterns from the 6 tissues are shown in Fig. 1.

As indicated in Fig. 1, it was observed that in the skeletal muscle, only 8 bands were observed and the 6th and 10th bands were not shown which were present in other, tissues. In the liver,spleen and adrenal, 12 bands were appeared but there were some differences among them in the stain density and mobility of the bands.

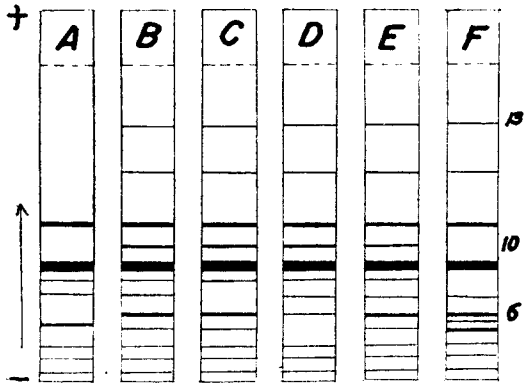

Fig. 1. Diagrammatic representation of soluble -protein pattern in various tissues of *L.Cuniculus*.
A. Skeletal muscle; B. Liver; C. Kidney;
D. Adrenal; E. Spleen; F. Heart;

As the 5th and 7th bands were not appeared in the kidney, total 11 bands were observed in it. In the heart, 11 bands were shown and the 8th and 10th bands were not presented.

From the above results, it was supposed that the band patterns depend on the tissues.

Bailey and Heald (1961) reported previously that the protein components differ from the tissues as each tissue has its own function in organ.

The band patternsin the group received the extract for 5 days are shown in Fig. 2.

As indicated in Fig.3. the band pattern in the group injected with extract for 15 days was shown

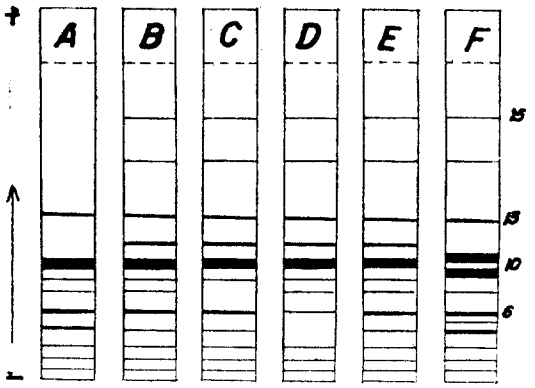

Fig. 2. Diagrammatic represention of soluble protein pattern in various tissues of *L. Cuniculus* injected deer horn extract for 5 days.
A. Skeletal muscle; B. Liver; C. Kidney;
D. Adrenal; E.Spleen; F. Heart;

Table 1. The Numbers of soluble proteins in various tissues of *L. Cuniculus*.

Tissues \ Days	Control group	5 days injected group	15 days injected group
Skeletal muscle	8	9	9
Liver	12	12	12
Kidney	11	11	11
Adrenal	11	11	11
Spleen	12	12	12
Heart	11	12	12

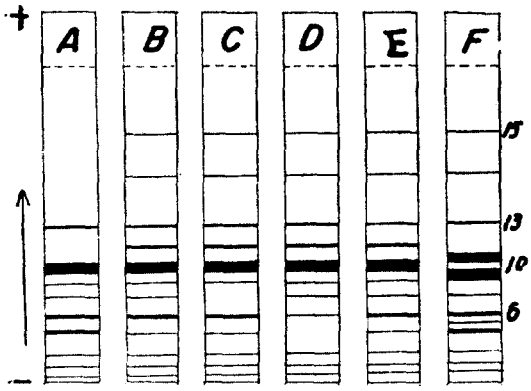

Fig. 3. Diagrammatic representation of soluble prote in pattern in various tissues of *L. Cuniculus* injected deer horn extract for 15 days.
A. Skeletal muscle; B. Liver; C. Kidney;
D. Adrenal E. Spleen; F. Heart;

In the liver, kidney, spleen and adrenal the number of bands is the same as that of the control group.

The protein pattern in the skeletal muscle was shown as consisted of 9 bands as the 5th band was appeared.

In the heart, the 9th band of the control group was seperated into two so that 12 bands were presented as indicated in Fig. 3. The band pattern in the group injected with extract for 15 days was shown as the same so as that of 5 days group. (see table 1.)

Summary

To study the effect of deer horn extract on the matabolism, the rabbit-groups injected with the extract for 5 days and 15 days were compared with the control group which was not injected,in their soluble protein patterns separated by disc-gel electrophoresis. The results of these investigations are as follows.

In the control group, the protein patterns of heart, liver kidney, spleen, adrenal and skeletal muscle were indicated by the 11, 8, 12, 11, 11 and 12 bands respectively.

In the group injected with the extract for 5 days, the protein pattern was separated into 12, 9, 12, 11, 11 and 12 bands respectively. The protein pattern in the group for 15 days was shown as the same band types as that of 5 days-group.

As the results of the comparison of the protein patterns of control group with that of the groups treated by the extract, there was not observed any differance among them in the liver, kidney, spleen and adrenal. In heart and skeletal muscle, however, the number of bands were appeared one more in both groups injected with the extract than in the control group. From this result, it was supposed that a unknown factor in the deer horn extract might activate the protein which is correlated with biosynthesis. On the other hand, the patterns on the gel submitted to electrophoresis were observed no difference among the groups treated by the extract for 5 days and 15 days. To investigate the effect of deer horn extract, the author will take experiments for its blood composition and enzymological study.

References

B.F.S. Baily and P.J. Heald, 1961. The Separation of the cytoplasmic proteins of brain by electrophoresis in a Starch gel medium. J. Neurochem. 342-349.

Blake W. Moore and D. Mcgregor.,1965. Chromatographic and electrophoretic factionation of Soluble proteins of brain and liver. J. Biol. Chem. 240 1647-1653.

Brandt, L.W., Clegg, K.E., and Andrew, A.C., 1961 The effect of age and degree of maturity on the serum proteins of the chicken. J. Biol. Chem.191. 105.

Davis, B.L., and Ornstein, L., 1962. Disc-electrophoresis preprinted by distilation products 1nd.

Jae IK Yong, 1960. Studies on deer horn(Ⅱ). Contents of trace elements. J. Phar. Soci. Kor. 5. 3-5.

————, 1960. Effect of deer horn on serum chole sterol level in cholesterol fed rabbits. J. Phar. Soci. Kor. 5. 6-9.

————, 1964. The effects of deer horn on the lever and other organs of holesterol-administered rabbits. J. Phar. Soci. Kor. 8. 12-29.

Sam, Sorof and Philip. P Cohen,1950. Electrophoretic studies of the soluble proteins of rabbit liver. Nat, Canc, Insti, 303-316.

허준, 1610. 동의보감(국역 남산당 김영훈감수 1973) 1128-1129.

EXPLANATION OF FIGURES

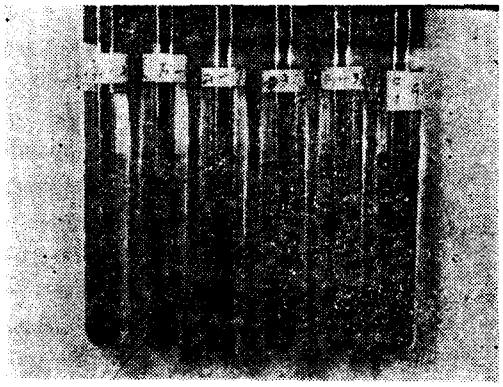

Fig. 4. Photographic representation of soluble protein pattern in various tissues of *L. Cuniculus*.

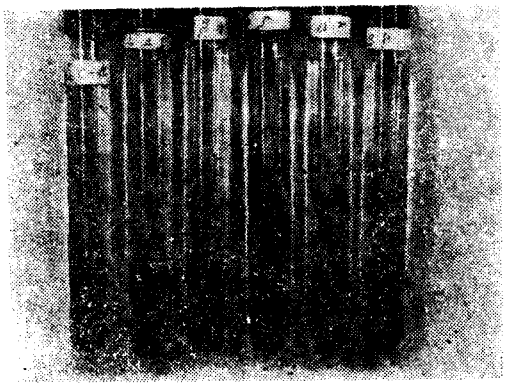

Fig. 5. Photographic representation of soluble protein pattern in various tissues of *L. Cuniculus* injected deer horn extract for 5 days.

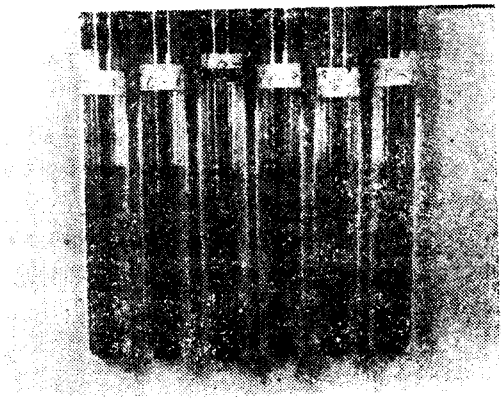

Fig. 6. Photographic representation of soluble protein pattern in various tissues of *L. Cuniculus* injected deer horn extract for 15 days.

ABBREVIATIONS

A. Skeletal muscle; B. Liver; C. Kidney; D. Adrenal; E. Spleen; F. Heart;