

قسم : الباثولوجيا - كلية الطب البيطرى - جامعة أسيوط .

رئيس القسم : أ.د / محمد ابراهيم الشرى

د راسة على التثام الرحم بعد العملية القيصرية

فى الأغنام باستعمال خيوط جراحية مختلفة

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اجريت العملية القيصرية فى الشهر الأخير من الحمل والقرب من تاريخ الولادة المتوقع  
فى عدد سبعة وعشرون غنمة . قسمت الحيوانات الى خمسة مجموعات وفى كل مجموعة استخدم  
نوع معين من الخيط الجراحى .

الخيوط الجراحية التى استعملت فى البحث هى كات جيت عادى ، كروميك كات جيت  
ميرسيلين ، حرير ، بولين .

درست النتائج الباثولوجية عينيا وميكروسكوبيا على التثام الرحم ونوقشت النتائج .

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## UTERINE HEALING AFTER CEASAREAN SECTION IN SHEEP USING VARIOUS SUTURE MATERIALS (With 7 Figures)

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### SUMMARY

Caesarean sections were performed at the last month of pregnancy in 27 ewes. The animals were classified into five groups, A,B,C,D and E. Plain catgut, Chromic catgut, Merseline† Silk and Prolen\*\* were used respectively.

On macromorphological and micromorphological examination, it was observed that the best suture material used was Merseline in which the edges of the wound throughout the entire line of incision were held together by definite scar tissue, the latter did not impair the uterine involution.

### INTRODUCTION

Perfect uterine healing following caesareotomy is important to avoid any hazards in the future pregnancy. The process is known to be influenced, among other factors, by the type of suture material employed (CAMBLE, 1922, DAVIS, 1922, BABCOCK, 1942, POTTER and NORMAN, 1942, MILNE, 1951, MADSEN, 1953, SCHMITZ and GAJEWSKI, 1959, POSTLETHWEIT *et al.*, 1959, TYAGI and LUMB, 1961, VERMA and TYAGI, 1973).

Due to the increasing number of caesarean sections performed routinely, it becomes thus essential to find the most suitable suture material for approximating the surgical uterine incision. The purpose of the present work is to study the tissue reaction incited by various suture materials, namely, Catgut, Chromic catgut, Merseline, Silk and Prolen in Awasi sheep. The process of healing was also taken in consideration.

### MATERIAL and METHODS

For this study, 27 clinically healthy pregnant adult ewes in advanced stages of gestation were procured. Age and weight of the animals used varied from 3-5 years and 35-55 kgs respectively. The animals were divided into 5 groups (A,B,C,D and E) each containing 5-6 animals. Near term, caesarean sections were performed when the usual physical signs of approaching parturition appeared. 10 minutes before the operation, 0.3 ml/ Rompun as a tranquilizer was intramuscularly given. The operation site was prepared in the usual manner for aseptic surgery. Linear infiltration with 30 cc<sup>3</sup> 1% orthocaine as a local anesthetic was done at the proposed line of abdominal incision. A vertical incision was made through the skin, muscles and peritoneum. The gravid horn was incised between the rows of the cotyledons and the foetuses, the foetuses were then delivered through this incision. The uterine incisions were approximated using oo Plain catgut, oo Chromic catgut, Merseline, oo Silk and oo prolen in groups A,B,C,D and E respectively. After foetuses were delivered, the protruding foetal membranes were removed before closure of the uterus which was done using transverse and longitudinal lembert sutures. Otoceel as a local antibiotic was used and the uterus was returned into its normal position. The incision in the peritoneum and muscles of the abdominal wall were closed using simple continuous sutures, and the skin with mattress sutures. Neopan, 5 ml was given intramuscularly for six days. Fifteen days post-operatively, the animals were slaughtered and samples of the uterine wall were taken from suture site. Samples were preserved in 10% neutralized formal solution. The preserved tissue specimens were processed in the usual manner for paraffin embedding. Five micron thick sections were stained with haematoxylin and eosin and microscopically examined.

\* Merseline A, suture material produced by Ethriconl Scotland.  
\*\* Prolen A, suture material produced by Ethriconl Scotland.

## RESULTS

Generally, suturing process appeared to elicit the formation of granulation tissue, the latter involved an active proliferation of fibroblasts and newly formed blood vessels.

In the endometrium, connective tissue formed caused an increase of size of the material villi and led to degeneration and disappearance of the uterine glands. Moreover, compression of two villi during the process of suturing as well as the pressure induced by fibroblastic, enlarged villus in which suturing took place induced degeneration of the covering epithelium of the sides of the villi (Fig. 1). However, a band of regenerating cuboidal epithelium was occasionally observed at the tips of these villi. Many of the infiltrating macrophages, laden with golden-yellow hemosidrin pigment, were commonly observed probably at the sites of old haemorrhage from severed blood vessels.

Sutures occurring in the myometrium were associated, likewise, with fibrosis in which fibroblasts and mature fibrocytes were observed (Fig. 2). The area of connective tissue formation usually extended throughout the whole layers of the myometrium. The muscle fibers of the latter usually showed hyalinization manifested as loss of fine structure and increased acidophilia (Fig. 3). Hyalinization was also observed to occur in the connective tissue of the zona compacta and basalis of the endometrium (Fig. 4), as well as in the stratum vasculosum of the myometrium especially in the adjacent areas of the sutures. Moreover hyalinized blood vessels were occasionally seen (Fig. 5).

Serosa of the perimetrium appeared continuous and the two excised edges were connected together with a band of connective tissue.

In the wall of the uterus remnants of suturing materials could be observed microscopically in group A, B, C, and D. In group A, suturing material consisted of homogenous basophilic material occupying the whole area. Suturing material of group C and D consisted of narrow strands, that of group D was more fine. While a slight mononuclear cell reaction was seen partly surrounding the suture material in group A and B (Fig. 6), similar findings were not observed in any of the other groups, the reaction was mainly in the form of fibrous connective tissue formation (Fig. 7).

In all groups involution and regeneration of the gravid uterus appeared not to be affected by this surgical procedure. The glandular lumina were free of any cellular debris and there were no features of inflammation neither acute such as glandular cuffing nor chronic such as periglandular fibrosis. In the lamina propria of the endometrium mild infiltrating microphages were observed. Remnants of foetal villi were also seen indicating that the process of uterine involution was still progressing.

From the above, it can be concluded that the best suture material was that used in group C and that the reaction was mainly local in the form of connective tissue formation and cicatrization which did not impair uterine involution. Care must be taken during suturing in order to avoid the endometrium.

## DISCUSSION

In the present work, healing of incised uterus following caesarean operation was found to take place by scar formation. The ability of smooth muscle fibres to grow and regenerate (WILLIAM, 1917, CAMBE, 1922, ARTHUR, 1952) was not observed. In contrast, the muscle fibres around sutures undergo degenerative changes in the form of hyalinization. Similar results were also reported by many investigators in different species, in man (BABCOCK *et al.*, 1942, POTTER and NOTMAN, 1942, SCHMITZ and GAJEWSKI, 1959), cattle and sheep (CHELI, 1957), goats (TYAGI and LUMB, 1961, VERMA and TYAGI, 1973) as well as guinea pigs (SCHWARTZ and PODDOCK, 1938). Tissue reaction was found to be the least in severity, the more finer the suture material applied. This may be related to reducing the size of foreign bodies embedded in the lining tissue. Regeneration of the uterus post-partum developed normally, and the process of caeseratomy did not impair this process.

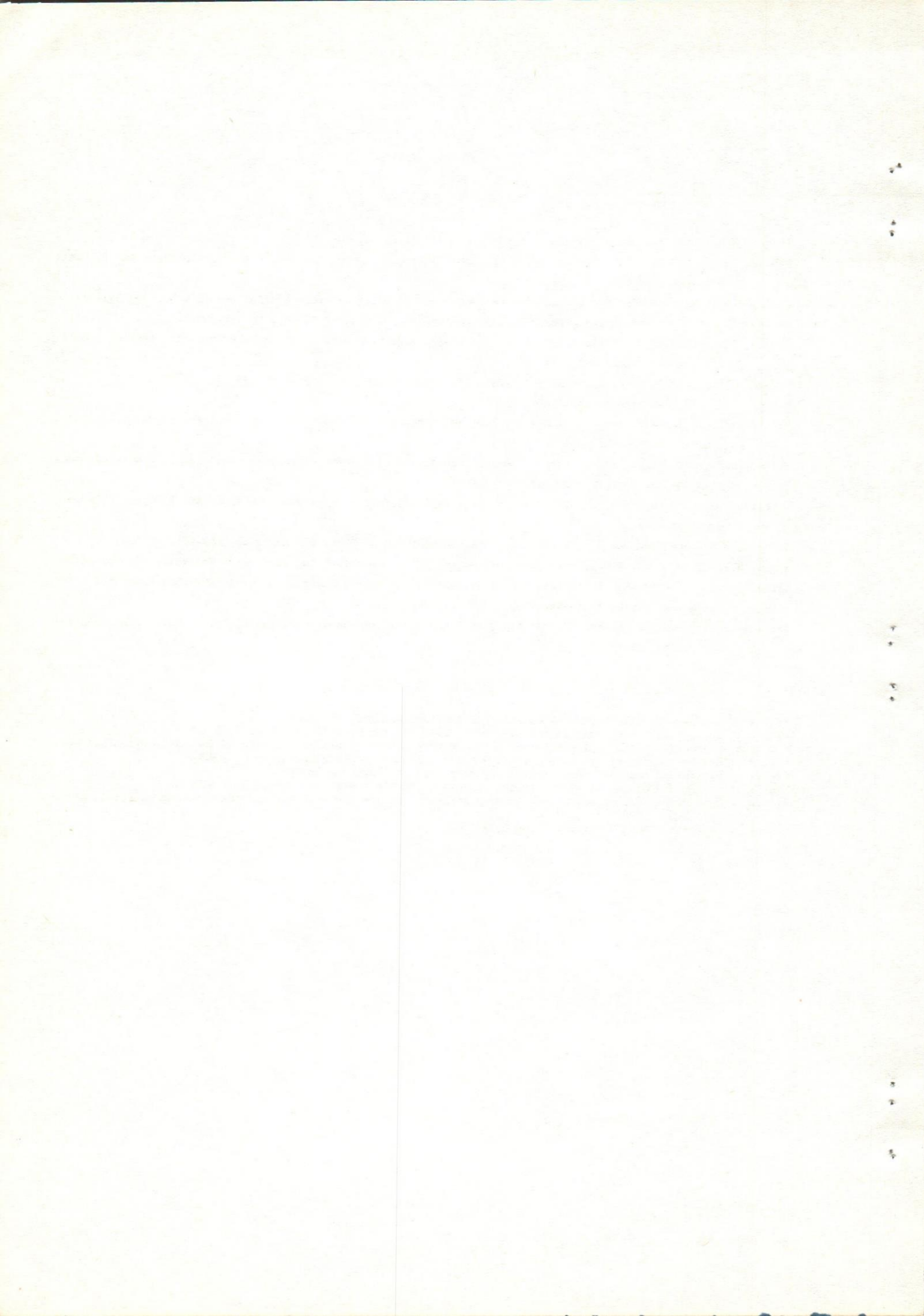
## UTERINE HEALING

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## DESCRIPTION OF FIGURES

- Fig. 1 : Two uterine villi, loss of covering epithelium. Group C, X 400.
- Fig. 2.a: Connective tissue band at the site of incision in the myometrium. Group C, X 100.
- Fig. 2.b: Connective tissue lying between hyperatrophied muscle fibers at the site of incision. Group D, X 400.
- Fig. 3 : Hyalinized connective tissue in zona basalis of the endometrium. Group C, X 400.
- Fig. 4 : Hyalinized muscle fibers in the adjacent area of a suture. Group C, X 400.
- Fig. 5 : Hyalinized blood vessel in stratum vasculosum of the myometrium. Group B, X 400.
- Fig. 6 : Mononuclear cell reaction surrounding a suture, notice the structure of the suturing material. Group B, X 400.
- Fig. 7 : Fibrosis around a suture, Group E, X 100.



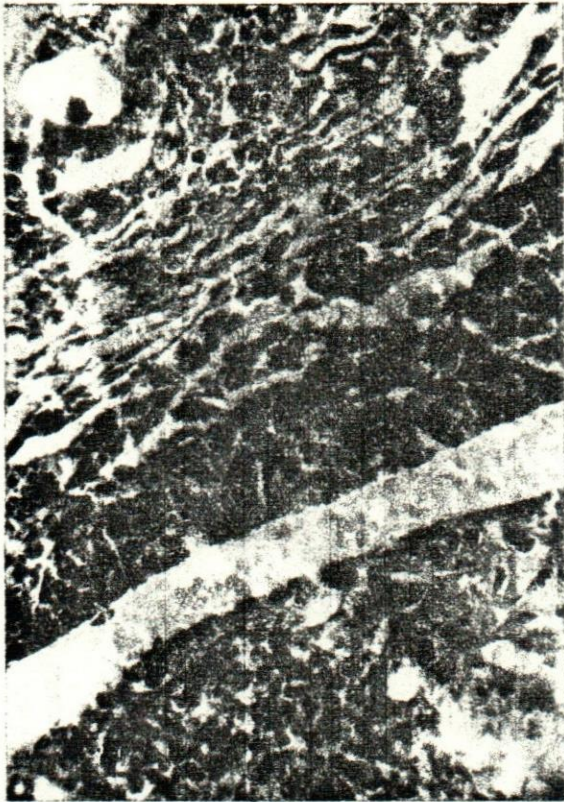


Fig. 1

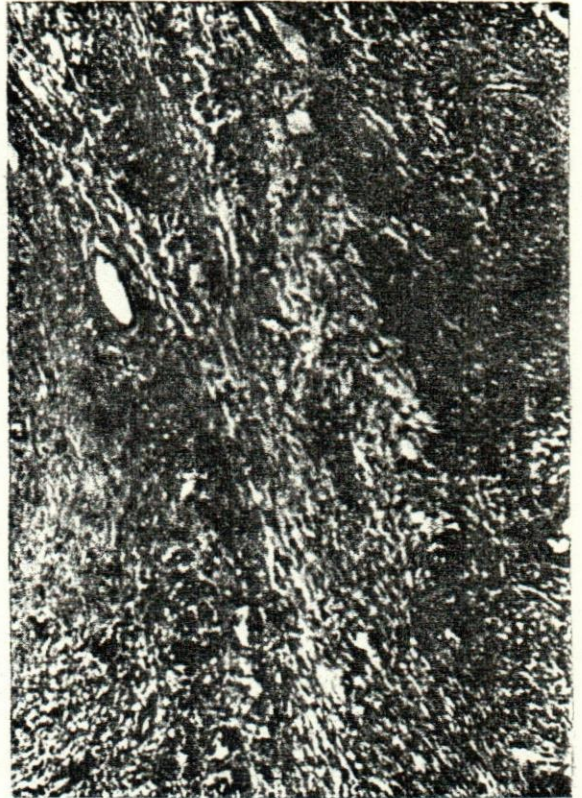


Fig. 2a



Fig. 2b



Fig. 3





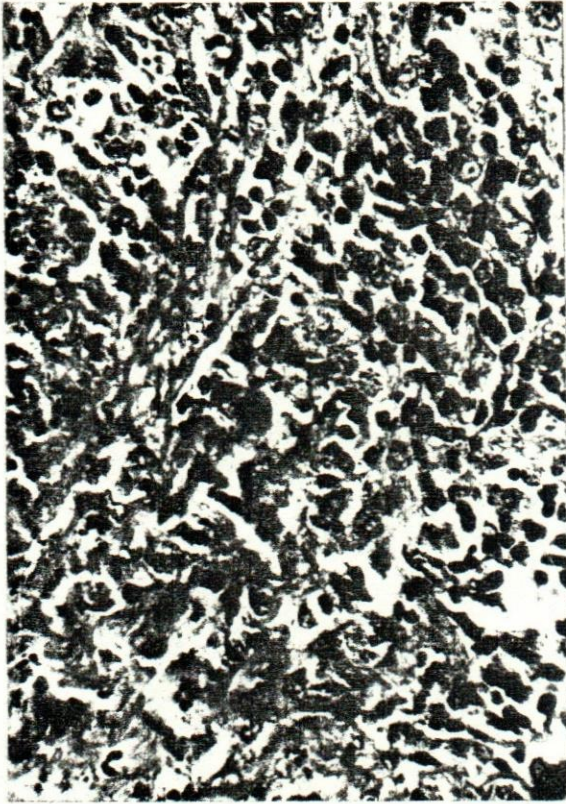


Fig.4

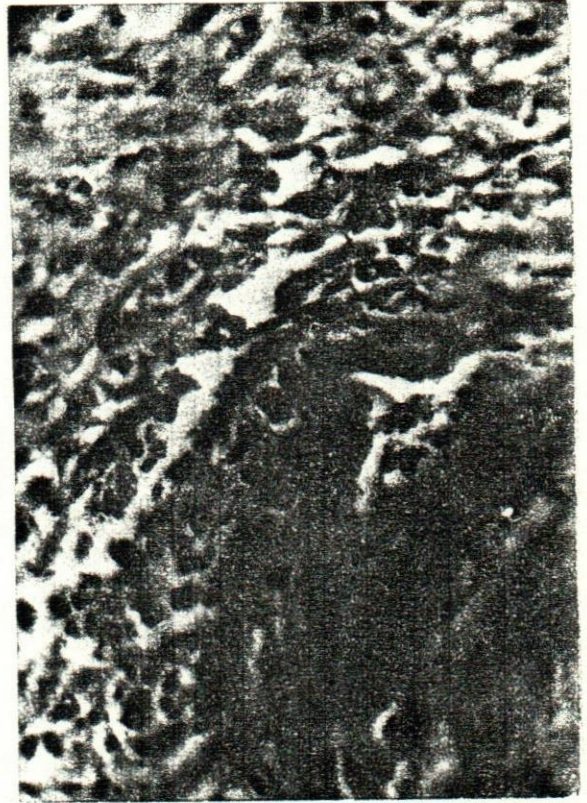


Fig.5



Fig.6



Fig.7

