Journal of Cardiovascular Disease Research

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

# Analysis Of Immunohistochemical Expression Of CD10 In The Lesions Of Prostate - AN OBSERVATIONAL STUDY

**1.Dr. Prakash, .Dr.S. R. Negi, 3. Dr. Rakesh kumar, 4.Dr. shweta Bhati, 5.Dr. Dudaram**
**(**Final year PG student)
(Senior Professor)
(Second year PG student)
(Final year PG Student)
(Second year PG student)

[1,2,3,4,5]*Department of Pathology, Dr. S.N. Medical College, Jodhpur*

**CORRESPONDING AUTHOR: Dr. Rakesh Kumar**

drprakashseervi86@gmail.com

**SOURCE OF FUNDING**- None.

**CONFLICT OF INTEREST**- All authors state that there are no conflicts of interests.

## ABSTRACT

**Background** : Prostatic adenocarcinoma is the most common cancer in men and the second leading cause of death after lung cancer in many countries around the world,and accounts for about 20% of all cancers in men in the United States. In prostatic cells CD 10 acts as a transmembrane peptidase .It plays an important role in the pathogenesis of prostatic cancer. Generally it cleaves the excessive growth factor from the stroma thereby it prevents the continuous and unwanted growth in the luminal epithelial cells.

**Aim and objectives:** To determine percentage of the expression of CD 10 in the prostate Adenocarcinoma and to analyse the pattern of expression (membranous, cytoplasm, both) and correlate the expression of CD10 with histopathological gleason score grading.

**Methodology:** Hospital based observational study was conducted in Department of Pathology ,Dr. S.N. Medical College, Jodhpur on Paraffin block of cases that fulfilled the inclusion criteria will be selected along with the permission to review the requisition form of these blocks biopsy specimen. Patient name, age, gender, registration number, path number, type of biopsy specimen and its gross feature will be noted. Issued blocks will be cut serially at 3 to 5-micron thickness using rotatory microtome to prepare slides. Slides will be stained with routine hematoxylin and eosin stain and then mounted with

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

DPX to review, after confirming and noting the diagnosis and microscopy details. We analysed 5 cases Benign prostatic hyperplasia, 5 cases Prostatic intraepithelial neoplasia, 70 cases Prostatic adenocarcinoma The correlation between CD10 and various clinico pathological parameters were analysed.

**RESULTS :** A total of 80 cases were studied for CD10 expression which included Benign prostatic hyperplasia shows Apical membranous positivity, decreased membranous expression in high grade PIN, and altered expression in prostatic carcinoma. In prostatic carcinoma none of the cases of Grade Group I and II showed cytoplasmic positivity. The 16.66% of cases of Grade Group III, 54.54% of cases of Grade Group IV and 72.22% of cases of Grade Group V showed cytoplasmic expression.

**Conclusion :** As the Gleason Score/Grade Group increased the pattern of expression changed from membranous to cytoplasmic to both types of expression. Still the exact mechanism and the role of CD10 in the pathogenesis of prostatic carcinoma is under study, In future this marker could be used as a diagnostic marker in differentiating benign and malignant lesions, to categorise the low grade and high grade tumors, and to determine the aggressive nature of the neoplasm

**Keywords:** Prostatic lesions, CD10, prostatic Adenocarcinoma

**Abbreviations:** BPH: Benign prostatic hyperplasia, LGPIN: Low grade Prostatic Intraepithelial Neoplasia, HGPIN: high grade Prostatic Intraepithelial Neoplasia, IHC: Immunohistochemistry,

## INTRODUCTION

Prostatic adenocarcinoma is the most common cancer in men and the second leading cause of death after lung cancer in many countries around the world,and accounts for about 20% of all cancers in men in the United States (1). Prostate cancer grading is an important factor in determining the prognosis and choosing the appropriate treatment. One of the histological methods of tumor grading is Gleason grading system.

This system is based on the glandular differentiation pattern of the tumor at relatively low magnification and cell characteristics do not play a role in it. There are two patterns including the primary pattern (the pattern that includes most of tumor view) and the secondary pattern (the second dominant view of the tumor), each marked with a score of 1-5 (2).

A high Gleason score has been shown to be a marker of more aggressive biological behavior of tumor and is one of the best predictors of disease outcome in prostate cancer patients which is available today (3).

The lesions of prostate are responsible for significant morbidity and mortality among the males worldwide (4).The age range of males presenting with symptoms due to prostatic lesions is 40- 90 years, with majority of the cases were in the age group of 60 – 70

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

years (1).Prostatic lesions are broadly categorized as inflammatory and neoplastic lesions. The neoplastic lesions are inturnsubclassified as benign, in situ and malignant lesions.

Prostate cancer is the most aggressive malignant neoplasm with varied clinical presentations. This tumor does not show any warning signs in its early course of development.The most widely used screening test for detecting prostatic cancer is the measurement of serum Prostate specific antigen (PSA) level , in conjunction with digital rectal examination for all the suspected cases.Prostate Specific antigen is secreted by normal and malignant prostatic epithelial cells. Therefore their level inthe serum increases significantly in men with prostate cancer. Though it gives the suspicion for the underlying tumor, it is not specific.There are many benign conditions like benign prostatic hyperplasia and prostatitis which increases the serum PSA levels.Therefore it is of at most significance to use a newer marker to identify the prostatic cancer at an early stage.

The cluster designation (CD) antigens are cell surface molecules first defined on human leukocytes and laterfound to be expressed by a variety of human cell types inboth normal and pathologic states. The human prostatehas been CD immunophenotyped and differences in the expression of several CD molecules were seen between cancer and normal prostate tissue [1].

Several studies on CD10 revealed that it is not only seen in lymphocytes, but also found to be expressed in other human cells both in normal and in pathologica lstates. Regarding the prostate gland, CD10 is expressed constantly in the apical luminal surface of the normal prostatic epithelial cells.In various lesions of prostate the pattern of expression varies ranging from altered expression to loss of expression.

In prostatic cells CD 10 acts as a transmembrane peptidase .It plays an important role in the pathogenesis of prostatic cancer. Generally it cleaves the excessive growth factor from the stroma thereby it prevents the continuous and unwanted growth in the luminal epithelial cells.

Literature review shows that loss of CD10 expression is seen in lower Gleason score prostatic tumors whereas increased and altered expression in high Gleason score tumors, lymph node metastasis and in bone metastatic prostatic carcinoma. This concept signifies the use of CD10 as a diagnostic and prognostic marker in prostatic carcinoma.

Based on this we will analyse the expression of CD 10 in the malignant lesions of prostate.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

## MATERIAL AND METHODS

**Study setting**: The study entitled "ANALYSIS OF IMMUNOHISTOCHEMISTRY EXPRESSION OF CD10 IN THE PROSTATE ADENOCARCINOMA" was conducted in Department of Pathology, Dr. S.N. Medical College, Jodhpur.

The study was conducted after the ethical clearance from the ethical committee of institute.

**Study Design**: Observational study

**Study participants**: All the cases who fulfils inclusion criteria will be included in the study.

### INCLUSION CRITERIA

1. Blocks of Prostate biopsy specimens, proved histopathological as malignant in department of pathology

### EXCLUSION CRITERIA

1. Tissue blocks of patients who are diagnosed as prostatic carcinoma andunderwent preoperative Radiotherapy or Chemotherapy Follow up case.

1. Blocks with inadequate material
2. Tissue with Autolytic changes

### MATERIALS USED

Tissue sections prepared from paraffin embedded formalin fixed tissues

Haematoxylin and eosin staining kit

CD 10 monoclonal antibody kit

Secondary antibody kit
Positive control
Negative control

**Sample size:-**

Sample size was calculated at 95% confidence interval to verify an expected 55% prevalence of expression of CD10 among Prostate carcinoma cases (as per reference article 1) at relative allowable error of 20%. Sample size was calculated using the formula for sample size for estimation of proportion –

$$N = \frac{Z_{\alpha/2}{}^2 \; P\,(1-P)}{E^2}$$

Where,

$Z_{\alpha/2}$ = Standard normal deviate for 95% confidence interval (taken as 1.96)

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

P = expected prevalence of expression of CD10 among Prostate carcinoma cases (Taken as 55% as per reference article )
E = allowable error (taken as relative 20% of P )

Sample size was calculated to be minimum 78 biopsy specimen whichwas rounded to 80 biopsy specimen.

**Methodology**

Paraffin block of cases that fulfilled the inclusion criteria will be selected and issued by permission of HOD of department of pathology And written informed consent of patient will be taken, along with the permission to review the requisition form of these blocks biopsy specimen. Patient name, age, registration number, path number, type of biopsy specimen and its gross feature with histopathologicalgleason score grading taken from records will be noted. Issued blocks will be cut serially at 3 to 5-micron thickness using rotatory microtome to prepare slides. Slides will be stained with routine hematoxylin and eosin stain and then mounted with DPX to review, after confirming and noting the diagnosis and microscopy details, sections will be taken for CD10 IHC staining.

**Table - 1: CD10 scoring[8]**

| Score | CD10 staining |
|---|---|
| Negative | <5% stromal positive cells/core |
| Focally Positive | 5–20% stromal positive cells/core |
| Diffusely positive | >20% stromal positive cells/core |

## RESULTS

**Table 1: Correlation between Gleason Grade and pattern of CD10 expression**

| **Gleason Grade** | Negative | Membranous | Cytoplasmic | Both | **Total** |
|---|---|---|---|---|---|
| I | 4 (80.00%) | 1 (20.00%) | 0 (0.0%) | 0 (0.0%) | 5(100%) |
| II | 8 (44.44%) | 10 (55.55%) | 0 (0.0%) | 0 (0.0%) | 18(100 %) |
| III | 5 (27.77%) | 3 (16.66%) | 3 (16.66%) | 7 (38.88%) | 18(100 %) |
| IV | 0 (0.0%) | 0 (0.0%) | 6 (54.54%) | 5 (45.45%) | 11(100 %) |
| V | 0 (0.0%) | 0 (0.0%) | 13 (72.22%) | 5 (27.77%) | 18(100 %) |
| | 17 | 14 | 22 | 17 | 70(100 %) |

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

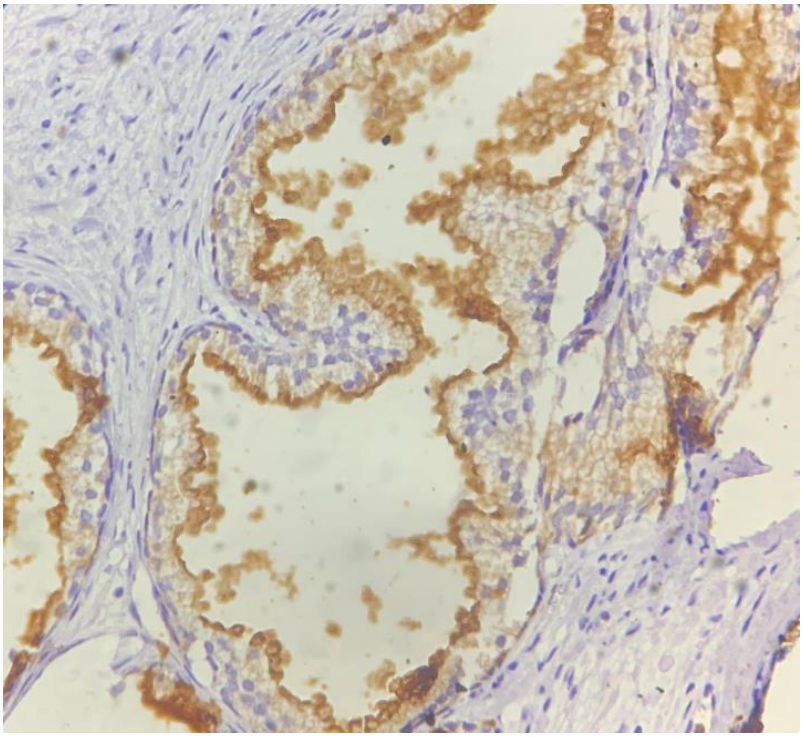
A total no of 70 cases of prostatic adenocarcioma was analysed .It includes 5 cases of Group Grade I, 18 Cases of Group Grade II, III & V .Group grade IV include 11 cases . In Group grade I expression of CD 10 is negative in 4 cases and 1 case show membranous positivity. Group grade II 8 case shows negative expression of CD10 and 10 cases show membranous positivity. Among Group grade III 5 cases shows negative expression of CD10 and 3 cases show membranous positivity and 3 cases show cytoplasmic positivity,7 cases show both membranous and cytoplasmic positivity. In Group grade IV 6 cases show cytoplasmic positivity and 5 cases show both membranous and cytoplasmic positivity.In Group Grade 5 includes 13 cases of cytoplasmic positivity and 5 cases of both cytoplasmic and membranous positivity.

**Table 2:Correlation between WHO Grade Group and intensity of CD10 expression**

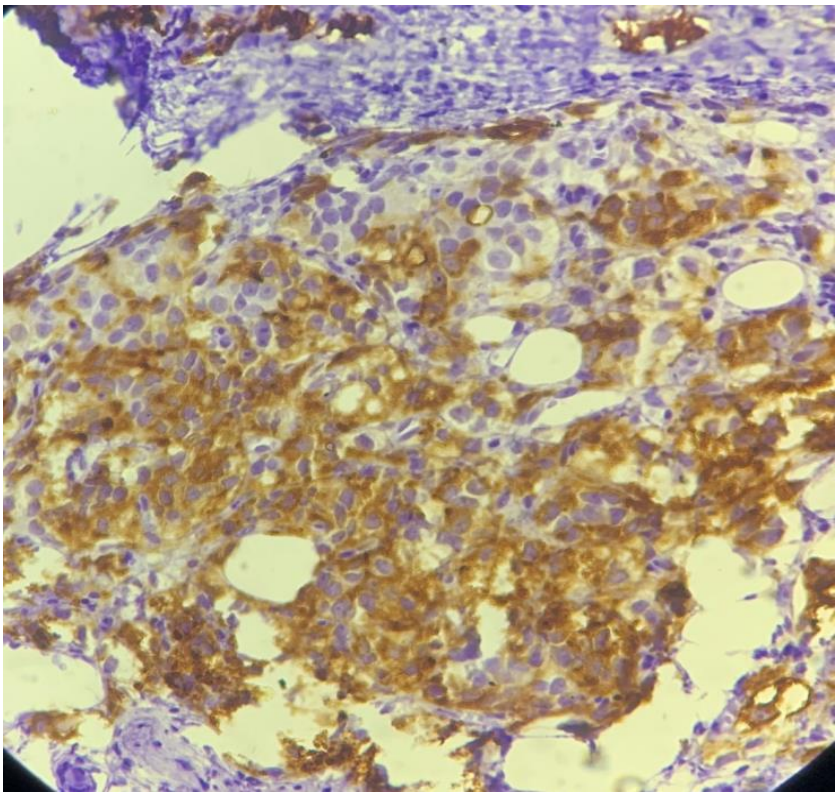
| **WHO Grade Group** | Negative | Focally positive | Diffusely positive | **Total** |
|---|---|---|---|---|
| I | 4(80.00%) | 0 (0.0%) | 1(20.00%) | 5(100.0%) |
| II | 8(44.44%) | 10(55.55%) | 0 (0.0%) | 18(100.0%) |
| III | 5(27.77%) | 6(33.32%) | 7(38.88%) | 18(100.0%) |
| IV | 0 (0.0%) | 4(36.36%) | 7(63.63%) | 11(100.0%) |
| V | 0 (0.0%) | 2(11.11%) | 16(88.88%) | 18(100.0%) |
| TOTAL | 17 | 22 | 31 | 70 |

In Prostate Adenocarcinoma 1 cases of Group grade I,7 cases of group grade III & IV, 16 cases of Group grade V Shows diffuse positivity of CD 10 expression. 10 cases of Group grade II, 6 cases of Group grade III , 4 cases of group grade IV and 2 cases of group grade V shows focal positivity.Negative expression of CD 10 in 4 cases of Group grade 1,8 cases of Group II, 5 cases of Group grade III .

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

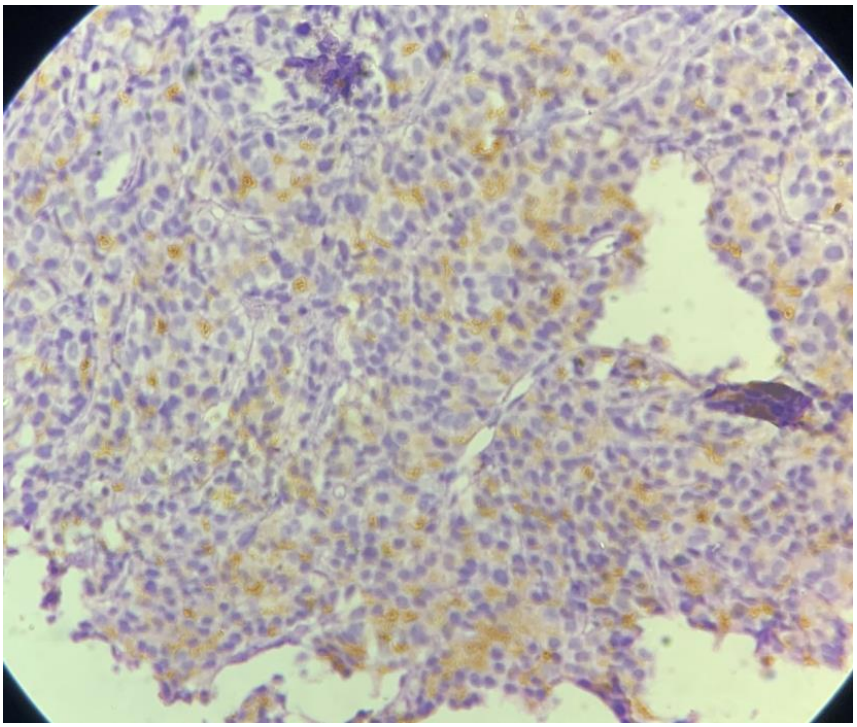


**BHP 40X IHC CD10 Apical Membrane positivity**

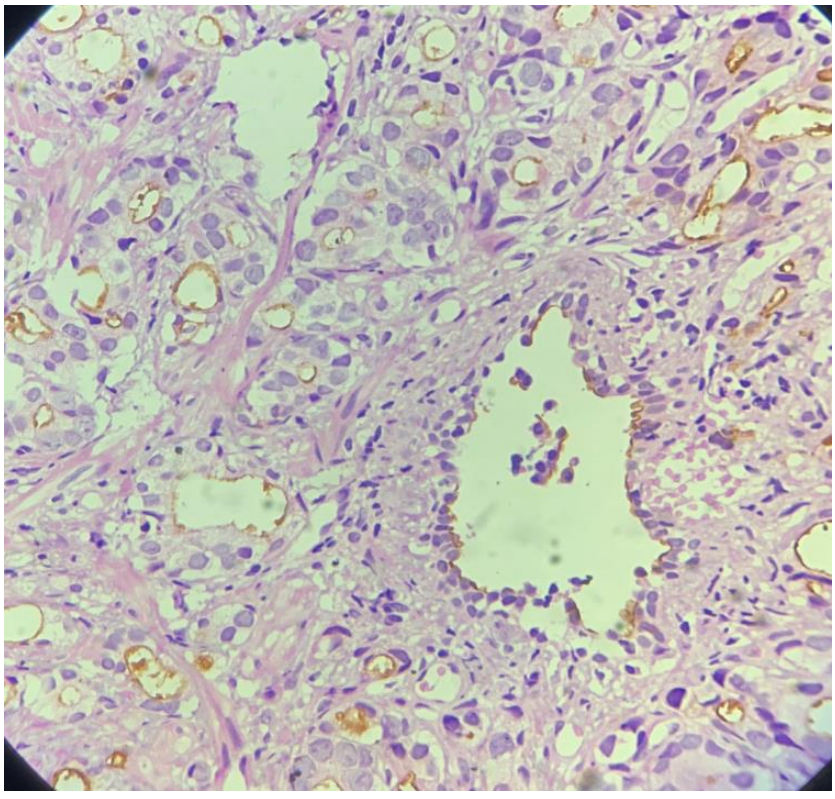


ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

**Gleason Grade V IHC CD10 Diffuse cytoplasmic positivity**



**Gleason grade IV 40X IHC Diffuse cytoplasmic positive**



ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

**Gleason grade II IHC Slide Membranous focal positive**

## DISCUSSION

A total sample of 80 cases were analysed. We categorized the total cases as benign, premalignant and malignant lesions, their age wise distribution was analysed. The cases of prostatic cancer was anlysed according to various Gleason grade, Gleason score. We performed IHC detection in sections of formalin fixed paraffin embedded tissue of prostatic biopsy cases and correlated the various patterns of CD10 expression among the different lesions of prostate with respect to histopathological diagnosis.

Sherif tawfic et al (9**)** and Mellisa et al (9) in their study, also observed similar pattern of expression in low grade tumors (grade 2 and 3).Study by Achim Fleischmann et al (10) showed variable expression patterns ingrade 3. In his study he observed that 40 % of grade 3 lesions showed total absence of expression, whereas 30 % showed membranous expression and fewcases showed cytoplasmic expression.

In this study observed that malignant cells of Gleason pattern 4 and5 showed increased cytoplasmic expression (71% and 100%) respectively. Inall the cases the adjacent normal glands showed membranous positivity andtherefore the pattern of expression is easily compared. It is evident that there isa sharp alteration in the subcellular localization of CD10, shifting from membranous in benign to cytoplasmic in malignant. Among the malignant lesions there is again a shift from absence of expression in lower grade to increased expression in higher grade.

**Lalit Singh1, Nisha Marwah2, Namita Bhutani**et al (2019)[4] was done a prospective observational study conducted on 75 patients suspected to have prostate cancer. Our result are almost similar to this study. So below the comparison done

The majority of cases i.e 80% with Gleason Score 6 (WHO Grade Group I) were negative for the CD10 expression ,while **Lalit Singh1, Nisha Marwah et al** cases i.e 88.9% with Gleason Score 6 (WHO Grade Group I) were negative for the CD10 expression.

Half of the cases (44.44%) with Grade Group II were negative and the remaining 55.55% showed focal positivity, while **Lalit Singh1, Nisha Marwah et al** Half of the cases (50%) with Grade Group II were negative and the remaining half showed focal positivity similar to our study.

SURESH MJR(2017)[5] 76.92% of grade 3 components showed absence of expression and 23.07% showed apical membranous positivity. None of the grade 3 lesions showed combined or cytoplasmic positivity. Among grade 4 lesions, 71.43% showed intense cytoplasmic positivity and 28.57% showed absence of expression. All cases of grade 5 lesions (100%) showed diffuse cytoplasmic positivity with intense staining pattern.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

## CONCLUSION

As the Gleason Score/Grade Group increased the pattern of expression changed from membranous to cytoplasmicto both types of expression. Still the exact mechanism and the role of CD10 in the pathogenesis of prostatic carcinoma is under study, one of the hypothesis states that cytoplasmic positivity is due to localization of CD10 molecule in the cytoplasm. This intracytoplasmic accumulation of CD10 drives the cell to constant signaling pathway leading to uncontrolled cell proliferation. Our study also favors this hypothesis as there is cytoplasmic expression in high grade tumors.

In future this marker could be used as a diagnostic marker indifferentiating benign and malignant lesions, to categorise the low grade andhigh grade tumors, and to determine the aggressive nature of the neoplasm.

## REFERENCES

1.Siegel RL, Miller KD, Jemal A. Cancer statistics, 2017. CA Cancer J Clin. 2017;67(1):7-30.

2.Lattouf J-B, Saad F. Gleason score on biopsy: Is it reliable for predicting the final grade on pathology?. BJU Int.2002;90(7):694-8.

3.Dall'Era MA, True LD, Siegel AF, Porter MP, Sherertz TM, Liu AY. Differential expression of CD10 in prostatecancer and its clinical implication. BMC Urol. 2007;7:3.

4.Lalit Singh1, Nisha Marwah2, Namita Bhutani3*, Devendra Pawar4, Raman Kapil1, Rajeev Sen5 Study the Expression of CD10 in Prostate Carcinoma and its Correlation with Various Clinicopathological Parameters Iran J Pathol. 2019; 14(2): 135-141

5.SURESH MJR Analysis of immunohistochemical expression of CD10 in themalignant lesions of prostatee-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 16, Issue 7 Ver. I (July. 2017), PP 78-8

6. Lisa Fahim;Gina Lockwood ,Neil Fleshner;Joan SweetDifferential expression of CD10 immunohistochemistry in stroma and epithelium of prostatic adenocarcinoma *Cancer Res* (2010) 70 (8_Supplement): 3995.

7.Dr. Raj Kumar Gupta 'Dr. Namita Bhutani, Dr. Sunil Arora EXPRESSION OF CD10 IN CARCINOMA PROSTATE AND ITS CORRELATION WITH VARIOUS CLINICOPATHOLOGICAL PARAMETERS. August - 2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr

8. A. Ghasemi (MD)1, M. JalaliNadoushan (MD)2, R. Sedaghat (MD) Evaluation of CD10 Expression and Its Relationship with Gleason Score inProstatic Adenocarcinoma J BabolUniv Med Sci; 23; 2021; PP: 60-6439.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 07, 2023

9. SherifTawfic, Md, Phd, Gloria A. Niehans, Md,Et Al., the pattern ofcd10 expression in selected pathologic entities of the prostate gland.,human pathology, may 2003.

10. Achim Fleischmann et al., Distinct Subcellular Expression Patterns ofNeutral Endopeptidase(CD10) in Prostate Cancer Predict DivergingClinical Courses in Surgically Treated Patients Clinical CancerResearch. 2008 December 1;14(23):7838-42