Common misconceptions regarding neoplasia

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Dysplasia

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Misconception	Correction
• Dysplastic cells are infiltrative and have invaded the basement membrane	• No basement membrane or stromal invasion
• Dysplastic cells are poorly differentiated / undifferentiated	• Differentiation is described for invasive cancer, rather than dysplastic cells
• Dysplastic cells are not neoplastic	• Dysplasia is an early part of the neoplastic process
• Dysplastic cells show pavementing 	• Pavementing is simply a feature of squamous differentiation (benign or malignant). It does not denote dysplasia or neoplasia.
• Dysplasia is encapsulated	• Dysplasia is not mass-forming. It is an intraepithelial process, and appears grossly either normal or as a flat patch of colour change, but NO MASS (Mass - neoplasm – benign or malignant)

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- Dysplasia is part of the neoplastic process
  - The cells have some genetic changes early in the course of malignant transformation, but do not yet have the capability to invade and metastasize (i.e. premalignant change)
  - Terminology: dysplasia = intraepithelial neoplasia
  - What tissues?
    - Epithelial tissues eg. squamous epithelium (skin, cervix, metaplastic squamous epithelium in lung); glandular epithelium (eg. tubular adenoma in colon)
  - Characteristics?
    - Cells are still bound by basement membrane.
    - There can be varying grades of dysplasia – low grade (least severe), high grade, carcinoma-in-situ (most severe)

- Morphology?

  Grossly – May be a change in colour eg reddish or pale appearance of mucosa, but NO MASS lesion

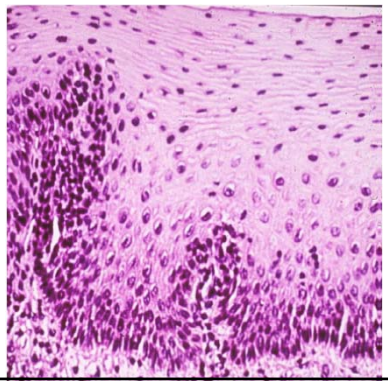
  Similar to features in malignant cells, but may be less severe

  Most severe changes are in carcinoma-in-situ

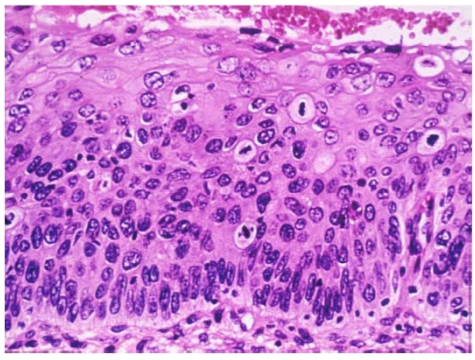
  Stratified squamous epithelium: full thickness dysplasia (vs low grade dysplasia – changes more in basal layers)

  Cells do NOT breach the basement membrane; NO stromal invasion; NO desmoplasia

- Benign stratified squamous epithelium



- High grade dysplasia



Mechanism of HPV induced cervical intraepithelial neoplasia

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• Misconception	• Correction
• Mechanism is by insertional mutagenesis	• Mechanism is by viral oncoproteins acting on host proteins (not by causing mutations at the gene level)
• E6 and E7 genes act on p53 and RB genes • E6 and E7 proteins act on p53 and RB genes	• E6 and E7 protein (gene products) act on p53 and RB proteins (gene products), *NOT* the genes themselves
• p53 and RB genes bring about regulatory effects on cell cycle, DNA repair and apoptosis	• The regulatory effects are brought about by p53 and RB proteins (gene products), not the genes themselves – they need to be translated into proteins first!

Grading of cancer

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• Misconception	• Correction
• Grading is used to decide of a neoplasm is benign or malignant • (i.e. low grade tumours are benign while high grade tumours are malignant)	• Grading and Staging are performed specifically on MALIGNANT tumours, i.e. cancer ("cancer" means it is by definition malignant –i.e. infiltrative, can spread via lymphatics and blood etc.)
• In low grade / well differentiated tumours, the cell look normal	• In low grade tumours, the cells are already cytologically malignant. But the tumour cells and architecture still resembles benign counterpart i.e. forms glands if adenoca, forms keratin pearls if squamous
• In breast carcinoma, myoepithelial cells are present in low grade carcinoma	• Myoepithelial cells are absent in low grade invasive breast carcinoma.

Grading of cancer

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- Misconception
  - In lung carcinoma, low grade carcinoma shows ciliated columnar cells, while high grade carcinoma is squamous cell carcinoma
- Correction
  - Each carcinoma type can be low or high grade. They do not change types from low to high grade.

- Ciliated columnar cells are almost always benign. In adenocarcinoma, cilia are not seen.

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Staging of cancer

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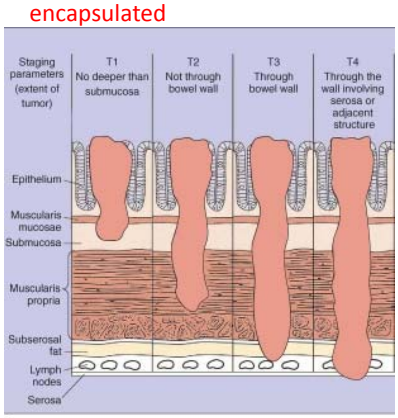
- Misconception
  - Grading is part of staging
  - Low stage tumours are benign and encapsulated



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- Correction
  - Grading and Staging are different ways to assess tumour behavior and prognosis, and are independent.
  - Staging is applied to already established cancer (i.e. invasive malignancy), Hence there is no benign encapsulated stage. The earliest stage is Tis – in-situ carcinoma, which is included for completeness.

- All other stages T1-4 involve malignant tumours that have already penetrated the basement membrane and are invasive. Stages of T1-4 would assess parameters like size, depth of penetration of primary organ, and involvement of adjacent tissues.

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The End

Keep Calm and Study On