why is the cytoplasm basic?

- Most proteins in the cytoplasm are positively charged due to arginine and lysine amino acids residues; eosin is negatively charged so it binds to these positively charged residues, staining the protein pink.

DNA is acidic, and therefore haematoxylin strongly stains the nucleus; additionally RNA in ribosomes and rough endoplasmic reticulum stains strongly with haematoxylin.

Role of the Cellular Pathologist

- The stained tissue sections are sent to the cellular pathologist, who interprets the appearance of the cells and tissue.
- The tumour is graded — an assessment of how far the tumour tissue deviates from normal, non-cancerous tissue.
- Colorectal cancers are broadly described as well-differentiated, moderately differentiated, and poorly differentiated.

CANCER GRADE: how different are the cancer cells from the healthy ones near the origins; a lower grade indicates a slower-growing cancer, and a higher grade indicates a faster-growing one.

CANCER GRADE: staging is a way of describing the size of a cancer and how far it has grown; when identifying cancer, doctors carry out tests to check how big the cancer is and whether it has spread into surrounding tissues; they also check whether it has spread to another part of the body.

Basic pathological definitions

- **Hyperplasia**: increase in cell number. A reversible process which may be caused by hormonal stimulation (e.g. uterus during pregnancy) or loss of cells (e.g. regeneration of the squamous epithelium during the healing of a superficial skin wound).

- **Metaplasia**: replacement of one differentiated adult cell type by another differentiated adult cell type (e.g. replacement of squamous epithelium in the oesophagus by columnar epithelium - Barrett’s oesophagus). Potentially reversible, however metaplasia may predispose to the development of neoplasia (irreversible).

- **Neoplasia** (“new growth”): results in an irreversible abnormal mass of tissue which exceeds and is uncoordinated with the normal growth of that tissue. It persists even in the absence of growth stimuli.

  - Neoplasms can be **benign** (e.g. colorectal adenoma [a polyp]) or **malignant** (colon adenocarcinoma).

  **Grade** describes how closely a neoplasm resembles the normal tissue it is derived from, and refers to the level of cellular differentiation.