### Reference:

### Background:
- **Tubulins** are a major class of cytoskeletal proteins and divided into five distinct classes, namely α, β, γ, δ, and ε. The most abundant members of this family are α and β-tubulins which are the major components of cytoplasmic microtubules. The various subunits have molecular weights of approximately 50kDa and are 50% identical to one another at the protein sequence level.
- Microtubules are assembled from stable dimers of one α and one β subunit, and regulated polymerization and depolymerization of these dimers controls the number and location of microtubules in cells (1,2). Microtubules are involved in a number of essential cellular functions including the maintenance of cell shape, vesicle and organelle transport, cell motility, cell signaling, meiosis and mitosis. The important role of microtubules in forming the mitotic spindle during cell division makes them a desirable target for the development of therapeutic agents directed against rapidly dividing cancer cells (3). For example, Taxol, a.k.a. Paclitaxel, is a low molecular weight drug which binds αβ tubulin dimers and prevents their polymerization. This prevents formation of the mitotic spindle, inhibits cell division and so halts tumor growth. For an interesting review of the first 50 years of tubulin research see reference 4.

The MCA-1B12 antibody was raised against tubulin purified from pig brain and reacts with recombinant β-tubulin (Abcam), but not recombinant α-tubulin (Abnova) by ELISA and dot blots. β-tubulin is regarded as a "house keeping" protein which is generally not altered much in expression as a result of experimental manipulations. As a result antibodies to β-tubulin are widely used as loading controls in western blotting experiments as a standard by which the levels of other proteins may be measured. As shown here, MCA-1B12 produces a single clean and strong clean band on Western blot analysis of whole tissue or cell lysates using mouse mAb to β-tubulin, MCA-1B12, dilution 1:10,000 in green: [1] protein standard (red), [2] adult rat brain, [3] adult mouse brain, [4] NIH-3T3 cells, [5] HEK293 cells, [6] HeLa cells, [7] SH-SY5Y cells. The strong clean band with apparent SDS-PAGE molecular weight of ~50kDa corresponds to the β-tubulin proteins.

Immunofluorescent analysis of HeLa cells stained with mouse mAb to β-tubulin, MCA-1B12, dilution 1:5,000 in green, and costained with chicken pAb to the nucleic acid binding protein FOX2, CPCA-FOX2, dilution 1:1,000 in red. Blue is DAPI staining of nuclear DNA. MCA-1B12 antibody produces strong staining of microtubules in the cytoplasm, while the CPCA-FOX2 antibody labels the nuclei of HeLa cells. Mouse select each image for larger view.