Glossary

Term	Definition
Anaphase	Phase of mitosis in which sister chromatids are pulled apart by the mitotic spindle to opposite sides of a cell.
Bar graphs/Bar charts	A type of plot with rectangular bars whose heights or lengths are proportional to their values.
Brightfield channel	A version of a microscopy image created by illuminating the sample with white light.
Cell culture	A laboratory technique in which cells are grown under controlled conditions.
Cell cycle	The series of events in a cell's life which include growth, activity, and division into two daughter cells.
Cell cycle checkpoint	A control mechanism which helps ensure that a cell does not proceed through the cell cycle unless certain conditions are met, as indicated by the abundance of regulatory proteins.
Centriole	Paired barrel-shaped organelles that anchor the spindle fibers to extend toward the chromosomes during mitosis.
Centromere	The location where spindle fibers attach to chromosomes during mitosis.
Chromatin	DNA coiled around associated proteins. Chromatin can be highly condensed or loosely coiled.
Chromosome	Threadlike structures made of protein and DNA organized together for the purpose of carrying genomic information from cell to cell. Human cells typically have 23 pairs of chromosomes.
Cytokinesis	Stage of cell division after mitosis in which the cytoplasm of a single parental cell is divided into two daughter cells. After cytokinesis, cell division is complete.
Dependent variable	A variable that may be affected by other variables, such as an independent variable.
Differentiation	The process of a stem cell transforming into a distinct, specialized cell type.
Deoxyribonucleic acid (DNA)	A molecule made of nucleic acids that form a double helix and carries the genetic information of an organism.
Fluorescent labeling	Attaching a fluorescent molecule to a target structure within a cell so that this structure will fluoresce (glow) under a microscope when exposed to a specific wavelength of light.
Fluorescence microscopy	The use of microscopes with the capability to visualize light-emitting molecules in cells. Fluorescent microscopes use a

	combination of filters and mirrors that only allow certain wavelengths of light to pass through them.
G0 phase	A phase of the cell cycle often referred to as the "resting" phase. During this phase, the cell is carrying out its normal functions such as removing waste, storing energy, and/or responding to any pathogens. It is not preparing for or going through the process of mitosis during this phase, but it is not inactive during this time.
G1 phase	A phase of the cell cycle often referred to as the "growth" phase. During this phase, cells make proteins and organelles to prepare for cell division and are still carrying out their normal functions.
G2 phase	A phase of the cell cycle that occurs after S phase which involves further cellular growth as the cell synthesizes proteins and organelles to prepare for cell division.
Gene	A sequence of nucleotides in DNA that is transcribed to produce RNA.
Green Fluorescent Protein (GFP)	A protein that fluoresces (glows) green. This protein was originally isolated from jellyfish and is now used for research as a common fluorescent label. There are also other fluorescent proteins such as Red Fluorescent Protein (RFP).
Human Induced Pluripotent Stem Cells (hiPSCs)	Stem cells that began as differentiated cells but have been reprogrammed to convert back into an undifferentiated, stem cell state. • Human refers to the species of the cells. • Induced refers to the reprogramming of these cells from differentiated cells back to stem cells. • Pluripotent refers to the potential for the cells to differentiate into many different cell types. • Stem Cells are cells that can grow and divide indefinitely, differentiate into the various adult cell types, and respond to environmental triggers for growth and/or differentiation.
Histogram	A type of chart that shows the frequency distribution of data points across a continuous range of numerical values.
Hoechst	A commonly used stain that binds specifically to DNA.
Hypothesis	A proposed explanation made based on preliminary evidence as a starting point for further investigation.

Image channels	A version of an image created by illuminating the sample with a specific wavelength of light. Composite images consist of multiple image channels viewed at once.
Independent variable	A variable whose value is not affected by other variables measured.
Interphase	The portion of the cell cycle that includes the G1, G2, and S phases.
M Phase	A phase of the cell cycle that takes place after G2. This phase is when mitosis and cell division take place.
Mean	The average of a set of values.
Metaphase	Phase of mitosis in which chromosomes align on the metaphase plate.
Metaphase plate	The location in the cell where chromosomes align during metaphase.
Microtubules	Filament-like cell structures composed of several tubulin molecules that assemble and disassemble as needed.
Mitosis	The division of DNA into two separate nuclei.
Mitotic spindle	A structure consisting of the centrioles and spindle fibers, responsible for physically separating sister chromatids during mitosis.
Open science	The practice of sharing scientific knowledge in ways that are accessible and usable by others.
Organelles	Distinct subunit of a cell with a specific function.
Pluripotent stem cells	Cells that have the ability to become any type of cell in the body and self-renew.
Prophase	A phase at the start of mitosis in which the nuclear envelope dissolves, DNA condenses, and mitotic spindle begins to form.
Protein	A biomolecule composed of chains of amino acids.
S Phase	S phase is often called the “synthesis” phase of the cell cycle since this is when the DNA within a cell is replicated to prepare for division.
Scatterplot	A plot using coordinates to display values for two or more variables in space.
Segmentation	Process of determining where, in a given image, a structure is located.
Sister chromatids	Two identical copies of DNA that are formed during the replication process that occurs in S phase.
Spindle fibers	An assembly of microtubules that extend from the centrioles.

Standard deviation	A measure of variability which describes how dispersed the data are around the mean.
Telophase	A phase of mitosis in which the nuclear envelope re-forms around the two new nuclei and a cleavage furrow forms. Telophase marks the end of mitosis.
Variable	A variable is a characteristic that can be measured and that can assume different values.
Z-stack	A series of images taken from multiple sequential focal planes on the Z axis. Z-stacks help visualize structures in 3D.