

99 lab problems?

Cell culture doesn't have to be one of them

Avoid culture room frustration with these troubleshooting tips

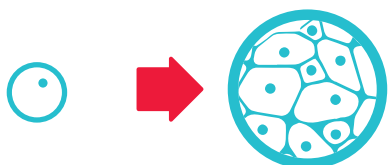
Since the introduction of cell and tissue culture techniques in the early 20th century, the ability to recapitulate aspects of mammalian biological systems *in vitro* has become essential for life scientists. Just about every lab in a biomedical science department performs cell culture, and these techniques are critical for the development of biopharmaceuticals, for toxicity studies in the testing of products for human use, and for countless other biotechnical applications.

Despite the fundamental presence of cell culture in labs worldwide, healthy, reproducible cell cultures are not to be taken for granted. Cell lines have diversified, treatments have evolved to be more innovative and complex, and 3D and stem cell culture approaches require specialized tools and technique. So if you've had problems with cell culture, remember three things: 1) you're not alone; 2) most culture hurdles are not only solvable, they're preventable; 3) there's more to cell culture mastery than just aseptic technique.

According to scientists who perform cell culture-based research, biopharma culture technicians, and leading cell culture experts at global cell repositories, the following are among the most common challenges with cell culture—along with likely reasons behind these undesirable conditions. More importantly, every problem here has a solution—and a link to comprehensive troubleshooting resources.

Cell death and poor growth

Keeping cells robust in culture is not always as simple as it sounds, but best practices will help keep your lines expanding. (Hint: it's more than just media and supplements.)



- If cells won't expand, try reseeded from new stock, with fresh media. While you're there, check liquid nitrogen tank levels.
- Thaw cells quickly and remove cryoprotectant immediately.
- Cells passaged too many times won't thrive. Always record passage number, and limit per cell line supplier guidelines.
- Always sterile filter media and supplements. Source serum only from reputable suppliers with geosourcing documentation.

Learn how to keep cells expanding here: [SigmaAldrich.com/TroubleshootPoorCellGrowth](https://www.sigmaaldrich.com/TroubleshootPoorCellGrowth)

More about common causes of cell death at: [SigmaAldrich.com/TroubleshootCellDeath](https://www.sigmaaldrich.com/TroubleshootCellDeath)

Misidentified or cross-contaminated cell lines

Among the most serious issues in the use of cell lines, the failure to verify their identity may call your work into question.

It has been estimated that up to 20% of cells in culture are not what they are reported to be.



Your lab's defense against misreporting data:

- Source cells ONLY from reputable cell repositories and suppliers. Don't borrow cells from other labs.
- Perform STR profiling or isoenzyme analysis to verify the identity of your stocks
- Test cryostocks and lines in culture now, or, simply replace any untested lines with verified stock from a repository supplier.

[SigmaAldrich.com/TroubleshootCellLines](https://www.sigmaaldrich.com/TroubleshootCellLines)

Contamination

Healthy culture conditions are also inviting for unwanted microbes in culture, even when users are trained in aseptic technique. Learn how to keep common sources of contamination away from your cells.

Most common: Bacteria, viruses, mycoplasma

Based on studies from the FDA and cell repositories, up to 30% of cultures in labs worldwide may be contaminated with mycoplasma, which can't be detected by visual methods.



- Test regularly for mycoplasma in cultures and stocks using validated kits/reagents.
- Know, train, and monitor personnel for adherence to aseptic technique.
- Dedicate an environmentally-controlled culture space. Keep traffic out.

Read here for all the ways to avoid contamination:

[SigmaAldrich.com/TroubleshootCultureContamination](https://www.sigmaaldrich.com/TroubleshootCultureContamination)

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