



TROUBLESHOOTING IN IVF LAB

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IVF laboratories operate within a highly sensitive environment, handling human gametes and embryos through complex, multistep procedures that demand unwavering precision. As a result, these laboratories are inherently vulnerable to disturbances that may compromise embryological performance and, ultimately, clinical outcomes. Suboptimal results may arise from deviations in culture conditions, equipment malfunction, poor-quality media, human errors such as lapses in judgement or negligence, incorrect timing of manipulations and observations, breaches in aseptic technique, or mismatching of biological samples. Even isolated incidents can disrupt established workflows and negatively influence IVF success.

The principal aim of this work is to identify routine technical and procedural challenges encountered in IVF laboratories, trace their underlying causes, and implement timely corrective actions to mitigate their impact on patient outcomes. The objectives include: (1) early recognition of environmental or procedural irregularities, (2) the use of systematic, stepwise troubleshooting to accurately localize the source of each problem, and (3) prompt resolution of identified issues to restore optimal laboratory function.

Effective troubleshooting must be disciplined, analytical, and hypothesis-driven. Each incident should be dissected thoroughly, potential causes documented, and possibilities eliminated sequentially until the root cause is confirmed. A defined troubleshooting framework and a competent, trained team must be available at all times to investigate, record, and address deviations without delay.

Preventive strategies remain fundamental. Essential measures include daily monitoring of environmental parameters and laboratory cleanliness, regular calibration and servicing of critical equipment, scheduled replacement of AHU and laminar-flow filters, quarterly evaluation of key performance indicators, and sustained professional development through structured training, CMEs, and conferences.

Recent technological advancements—such as Electronic Witnessing Systems, microfluidic platforms, and artificial intelligence—offer significant potential to enhance accuracy, traceability, and safety. However, without adequate expertise, experience, and stringent supervisory oversight, these innovations may introduce new complexities. Therefore, laboratories must ensure comprehensive preparedness before incorporating advanced technologies.

Ultimately, robust SOPs, meticulous documentation, and a highly trained, empowered embryology team remain the cornerstone of a safe, efficient, and high-performing IVF laboratory.