

Basic Laboratory Equipment Safety: Transilluminators at UTIA

What is a transilluminator?

Transilluminators are used in UTIA laboratories to view DNA (or RNA) that has been separated by electrophoresis through an agarose gel.

What is the purpose of a transilluminator?

During or immediately after electrophoresis, the agarose gel is stained with a fluorescent dye which binds to nucleic acid. Exposing the stained gel to a UVB light source causes the DNA/dye to fluoresce and become visible. This technique is used wherever the researcher needs to be able to view their sample, for example sizing a PCR product, purifying DNA segment after a restriction enzyme digest, quantifying DNA or verifying RNA integrity after extraction.

What is the primary hazard when using a transilluminator?

Transilluminators produce ultraviolet radiation which can cause damage to human tissue in the eyes and skin. Transilluminators can adversely affect the eyes and skin. Skin condition may include skin erythema (sunburn like condition) or elastosis (skin cancer). Hands, arms, face and eyes are the most likely sites of injury. Working unprotected for even a few minutes may cause injury and some individuals have greater than usual photosensitivity which can put them at a higher risk.

What are some basic considerations to be made before using a transilluminator at UTIA?

Control

The manufacturer's specification should be consulted for information as to the potential exposure level and frequency of radiation and their suggested operating protocols.

Substitution of UV for safer frequency

Alternative systems of visualization must be considered.

Guarding

UV transilluminators should be guarded (enclosed in an absorbent polymer) with an interlock that will make the device safe (i.e. turn it off) if the guard is opened. Eye and skin exposure should be avoided, and alternatives to manipulating gels with hands while under UV should be used.

Administrative Controls

People using transilluminators should be trained to understand the risk, know the correct operating procedures and actions to be avoided. Old transilluminators that are not interlocked should be disposed of and replaced with compliant alternatives.