

Table 11-1  
**Visualization Agents Used in Vitreoretinal Surgery**

<i>Visualization Agent</i>	<i>Target Tissue</i>	<i>Concentration</i>	<i>Toxicity</i>	<i>FDA Approval</i>
Triamcinolone	Vitreous	Variable dilutions	No, when completely removed	Yes
ICG	ILM	0.5%	Suggested	Off-label
BBG	ILM	0.025%	-	No, approved in Europe
Trypan Blue	ERM	0.15%	-	Yes

BBG also selectively stains the ILM, but not with the same intensity when compared to ICG. BBG is considered to have high biocompatibility in the eye, and thus binds well to the target tissue, is nontoxic, and degrades quickly with time. BBG is strongly absorbed at wavelengths in the visible spectrum compared to ICG, which has maximal absorption in the near infrared range. What this means is that a higher concentrations of ICG is needed compared to BBG to produce the desired effect.

Trypan Blue is used as a visualization agent to selectively stain ERM.<sup>3</sup> Generally, ERMs are easier to visualize under normal viewing conditions and therefore do not need to be stained. If using ICG, ILM stains but not ERM, and thus there is negative staining that identifies the ERM. However, Trypan Blue is useful in staining complex ERMs in the macula and periphery, especially those due to proliferative vitreoretinopathy (PVR), and those that seem unusually adherent. It can also help differentiate the ERM from residual posterior cortical vitreous to ensure complete removal of an ERM.

Depending on the study, dyes have been linked to toxic effects, such as visual field defects and decreased functional outcomes. Measures to limit toxicity include using a low concentration, limiting dye time in the eye, limiting peeling time, and limiting light intensity by lowering the light, and limiting exposure by moving the light pipe away from the macula.<sup>4</sup>

Dyes can be injected in an air- or fluid-filled eye. If you are injecting into a fluid-filled eye, you will need to mix the dye in a solution heavier than water, such as glucose or dextrose. Injecting into an air-filled eye typically results in a darker stain due to a higher effective concentration of dye.

## *Gas Tamponade*

Using gas as an intraocular tamponade has been an important adjunct to treating retinal pathology from retinal detachments to macular holes. Many different gases are used (Table 11-2), and the choice of gas depends on the duration of tamponade desired by the surgeon.

In most instances, the gas you choose will be based on how long you need the retina approximated to the retinal pigment epithelium (RPE) for the chorioretinal adhesions to form. The force of the bubble promotes apposition of the neurosensory retina against the RPE. In eyes with a