Blue light

Blue light isn’t some special form of light that only comes from computers and LED lights - it’s actually all around us. In fact, sunlight is the main source of blue light. When you walk outside during the daytime, you’re exposed to blue light.

The blue light emitted by the sun is the reason we see the sky as blue. It's these light waves that get reflected and bounced around the most by the Earth’s atmosphere.

The light spectrum consists of UV, visible and infrared light. Visible light accounts for 50% of the light spectrum and, as the name suggests, it’s the only part of light that can be detected by the human eye (UV and Infrared Light are both invisible). These different colored light rays contain different amounts of energy.

It remains uncertain how light intensities of the blue light source and 5-ALA-derived fluorescence intensities of the illuminated tissue are connected. Aim of a study of Kamp et al. was to compare light intensities of different blue light sources and Protoporphyrin (PpIX) fluorescence intensities of PpIX solutions with defined concentrations after illumination with different light sources.

The light spectrum of seven different blue light sources and the fluorescence intensity of two PpIX solutions (0.15 µg/ml and 5 µg/ml) were quantified after illumination. They compared the Zeiss OPMI Pentero microscope, the Zeiss OPMI Pentero 900 microscope, the Leica M530 OH6 microscope, an endoscope equipped with the 5-ALA technique, a mini-spectrometer equipped with a multi-channel LED source (MCLS) emitting monochromatic light, a modified commercially available LED-Head Lamp and a commercially available unmodified UV-LED lamp. PpIX fluorescence was quantified in a standardized setup using a mini-spectrometer.

Maximum light intensities of the evaluated light sources were reached at different wavelengths. All tested devices were able to detect PpIX-induced fluorescence. However, the intensity of PpIX-fluorescence of the differently concentrated PpIX solutions (0.15 µg/ml and 5 µg/ml) was significantly dependent on the light source used.

Intensity of the 5-ALA-derived fluorescence is related to the light source used [1].

1)
Kamp MA, Knipps J, Neumann LM, Mijderwijk HJ, Dibué-Adjei M, Steiger HJ, Slotty PJ, Rapp M, Cornelius JF, Sabel M. Is the intensity of the 5-ALA-derived fluorescence related to the light source? World Neurosurg. 2019 Jul 24. pii: S1878-8750(19)32042-X. doi: 10.1016/j.wneu.2019.07.136. [Epub ahead of print] PubMed PMID: 31351208.