Nuclear flash burns and the associated keloids and hypertrophic scars

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Nuclear attacks in the past have led to many victims with flash burns. However, there is relatively little information about these consequences that has been shared with citizens worldwide. To address this, I collected some scientific records and >20,000 pages of documents and drawings by hibakusha (atomic bomb survivors).

The symptoms of nuclear flash burns can be divided into three groups depending on the wavelength of the flash light, namely, infrared ray (IRR, >750 nm), visual light with long wavelengths (VLL, approximately 600–750 nm), and visual light with short wavelengths (VLS, approximately 400–600 nm).

IRR is colorless and is superficially absorbed: as a result, the skin and hair of IRR-exposed people were scorched and their clothes crumbled. VLL selectively damages the pigments in the skin and the dyes of colored clothes. Since melanin is a major pigment in the skin that lies in the basal layer of the epidermis and the hair follicles in the dermis, the VLL-induced wounds on skin areas without hair follicles tended to have a prolonged healing process and to form keloids or hypertrophic scars. VLS penetrates deeply into the skin and damages not only the pigmented tissues but also the hemoglobin in erythrocytes, resulting in rupture of the blood vessels. Thus, people around ground zero would suffer IRR, VLL, and VLS flash burns at various rates along with ordinary thermal burns.