



## Contactless Plasma Jet Treatment of a Cancer Tumour

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In this presentation, we discuss recent results from the helium plasma jet treatment of a subcutaneous cancer tumour embedded underneath the skin of a live mouse. We compare two different treatment methods with the treatments carried out: (1) with the visible plasma plume in direct contact with the mouse skin, and (2) with only the plasma afterglow in contact with the mouse skin. We discover both methods to be equally effective at treating the tumour, which was determined by measuring the number apoptotic cells within the tumour. We explain this effect by the plasma jet efficiently delivering reactive oxygen species into the tumour (through both treatment methods), resulting in killing of the cancer cells through oxidative stress. Histological inspection of the skin revealed significant skin damage with the plasma plume in contact with the skin, but this damage was negated by treatment with only the plasma afterglow. We explain the opposing effects in skin damage between both methods by considering the differences in current transfer through the skin during the treatments. Overall, we find it is possible to effectively treat subcutaneous cancer tumours with only the plasma afterglow, which we refer to as “contactless plasma jet treatment”. Contactless plasma jet treatment has an added advantage by avoiding potentially unwanted side-effects in skin damage that can sometimes result when the plasma plume is in direct contact with skin.