Enhancing precision in mouse intravenous tail vein injection using veinlite

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Introduction

This introduction sets the stage by acknowledging the importance of mice in cancer research and the challenges associated with tail vein access in the presence of tumours. It introduces Veinlite as an advanced vein visualisation device and outlines the primary benefits setting the tone for a detailed exploration of its applications in imaging studies, cell implants and therapeutic interventions. The goal is to emphasise how Veinlite can significantly enhance the precision and efficiency of research procedures involving mice with tumour burden.

Background

Laboratory mice are pivotal in cancer research, with successful intravenous (IV) administration aiding in the development of imaging techniques, cell implants and therapeutic interventions. Therefore precise tail vein identification and access is crucial for a proportion of our work. Tumour burden in mice often complicates these procedures leading to increased stress and procedural challenges which is often multiplied when training. Addressing this, Veinlite technology emerges as a significant change offering a novel approach to tail vein observation and greatly increase welfare (3Rs).

The challenges

Many of our transgenic mice are on a C57BL6 background with dark tails which makes vein identification less straightforward when compared to those that are albino, nude or lighter skinned. These groups of lighter mice may also present vein identification difficulties when showing a tumour burden.

As part of the University of Cambridge we often must teach this technique to students with limited mouse experience, which is a technique that not even many experienced mouse technicians use or could maintain. Traditional methods may result in time-consuming procedures and increased stress for the mice.

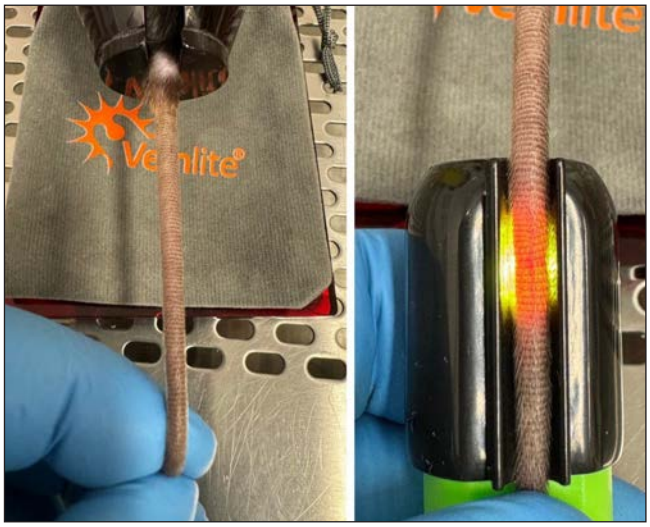

Figure 1. Dexterity challenge.

Veinlite ergonomics

We have been using the Veinlite for just over a year and in that time there has always been a desire for better ergonomics (see Figures 1 and 2). The 1st edition (Figure 1) was great for vein identification but gave a dexterity challenge if trying to complete the injection whilst holding the light. Plexx approached the manufacturer and the 2nd edition was designed (Figure 2). This enables the preferred angle for IV injection while keeping the vein illuminated throughout.

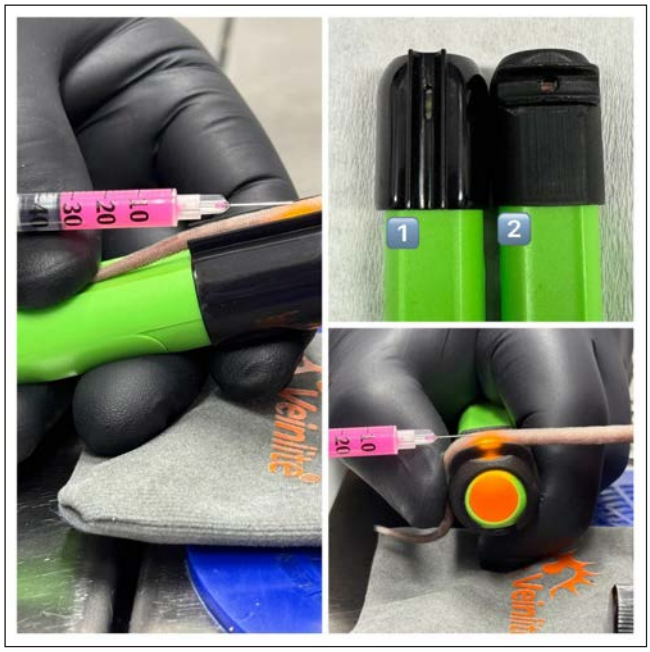

Figure 2. Preferred angle.

The benefits

- Enhanced Visibility:
  Veinlite provides clear visualisation of the tail vein even in mice with tumour burden.

- Reduced procedure time:
  Quick and efficient identification leads to reduced procedure times, minimising stress on the mice.

- Increased Precision:
  Improved accuracy in tail vein access ensures successful IV administration of contrast agents.

Veinlite has been used in our facility for the smooth IV administration of therapeutic agents, cell implantation and provision of contrast agents for imaging.

Conclusion

From training to application, the utilisation of Veinlite during experimental procedures highlights undeniable benefits. It provides new licensees with confidence enabling precise focus irrespective of mouse strain or condition. While it does not replace highly skilled technicians, it significantly enhances training, thereby minimising the number of animals needed. Moreover, in lengthy studies it reduces restraint time subsequently alleviating stress for the animals. This underscores its pivotal role in refining procedures and promoting Animal Welfare.

Thank you and acknowledgements

Thank you to Plexx and Nilgun Fullbrook who not only listened to their customers comments regarding the ergonomics of the light but actively sourced a solution with the manufactures. In my opinion this makes the Veinlite an asset to any facility looking to improve training time and promote the 3Rs.