TRANSFER OF BIOLOGICAL MATERIALS: IS IT EASY?

Jun Yu LEE, Jiayu TAN, Juliana SIM, Guo Wei KUA, Xavier CHAN, Baoqiang HENG, Tiam Shi NG, Yan Yu NG, Christopher Kiu Choong SYN, Biology Division, Applied Sciences Group, Health Sciences Authority

Locard's exchange principle in forensic science states "Any action of an individual, and obviously the violent action constituting a crime, cannot occur without leaving a trace". According to this principle, it is possible for an individual to leave his DNA behind through body fluids like blood and semen, or even a simple touch on an object. In our Laboratory, we are often requested to recover DNA from such body fluids and 'touch' evidence,

The use of DNA analysis as an aid in investigation for different crimes has become very common. Recent technological advancements in instruments and kit sensitivities may have enhanced the ability to recover a DNA profile, thereby addressing identification of 'who'. However, of equal importance is the activity, i.e. 'how', leading to the deposition of the DNA profile. While direct contact and deposition may be probable, alternative possibilities such as indirect DNA transfer cannot be dismissed.

The present study seeks to answer several questions with regards to transfer of DNA from blood, semen and touch evidence.

(1) Do biological fluids and DNA get transferred through laundry? We investigated the propensity of blood, semen and DNA transfer via laundry.

(2) Does every contact really leave behind a trace? To investigate this, we tracked the propensity of individuals to deposit DNA across different time points.

(3) Is DNA easily transferred? To address this question, we evaluated two modes of indirect DNA transfer – through an activity such as a handshake and also via an intermediary item (secondary and tertiary transfer).

The results of this study will (1) strengthen understanding on biological fluid and DNA transfer and (2) elucidate the association between shedder status and DNA profiles recovered from touched evidences.