

Human identification

A 35-year journey enhancing crime scene and DNA analysis

How partnering with Human Identification Professional Services (HPS) helped improve forensic capabilities in Taoyuan, Taiwan

Deputy Commissioner Kao Li-Gi has dedicated nearly 35 years to criminal forensics. Throughout her career, she has held various roles, beginning as a frontline crime scene investigator and eventually serving in all three departments of the Criminal Investigation Bureau (CIB) of the National Police Agency (NPA) of Taiwan. The CIB, comparable to the United States Federal Bureau of Investigation (FBI), comprises the Forensic Physics and Chemistry Division, the Fingerprint Division, and the Forensic Biology Division. Deputy Commissioner Kao Li-Gi steadily advanced in her career, moving from a case officer to a section chief, and then to the Director of the Forensic Science Center at the Taoyuan Police Department. Recently, Director Kao Li-Gi was promoted to the Deputy Commissioner of the Hualien County Police Bureau. We had the honor of speaking with Deputy Commissioner Kao Li-Gi to gain insights into her remarkable journey and contributions to forensic science.



Thermo Fisher Scientific: Will you please tell us about the Taoyuan Police Department Forensic Science Center?

The Taoyuan Police Department Forensic Science Center was established in July 2005, initially focusing exclusively on handheld air gun identification. In 2012, the unit was relocated to the Forensic Science Center, and by 2021, DNA forensic operations were formally initiated. Last year, we expanded our services significantly and introduced eight key forensic disciplines: DNA identification, chemical analysis, fingerprint comparison, footwear impression analysis, trace evidence examination, air gun analysis, ballistic comparison, and crime scene investigation.

The Forensic Science Center operates as an integral part of the Taoyuan Police Department. The department itself is led by a commissioner, supported by three deputy chiefs and an inspector general, and comprises a comprehensive structure of eight divisions, eight offices, three centers, six corps, 10 police precincts, and 84 police stations, with approximately 5,100 personnel. Our center functions as an internal division, offering round-the-clock support to internal and external units. We are on call 24/7 to handle forensic needs, from evidence analysis to crime scene investigations.

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Currently, the Forensic Science Center is staffed by 53 dedicated forensic professionals. Among them, 17 are assigned to police precincts for frontline support, while 36 are stationed at the center. This includes six personnel handling managerial roles, 10 specializing in DNA and chemical analyses, and the remainder focusing on crime scene investigations and evidence collection.

Taoyuan City serves a population of over 2.33 million people, with Taoyuan District and Zhongli District being the most populous, with 470,000 and 430,000 residents, respectively. These areas are not only the largest in the city, but are also among the most densely populated nationwide, second only to Banqiao District in New Taipei City.

Thermo Fisher: Will you please tell us about your caseload?

This year, we have processed over 1,000 cases, averaging approximately 120 per month. Property crimes, especially vehicle theft, constitute the majority of cases in Taoyuan. A significant portion of the evidence we analyze involves touch DNA samples, which present challenges for our DNA laboratory due to the low quantity and quality of DNA often associated with such samples.

Thermo Fisher: Will you please describe some of the other challenges you face in your lab?

Our current judicial system is increasingly human-rights-focused, subjecting forensic operations to heightened scrutiny and challenges from multiple sectors. Enhancing team capabilities and ensuring the credibility of our work are persistent challenges. To address this, we engaged with the Thermo Fisher HPS team. The Thermo Fisher HPS team's validation experience has been instrumental in alleviating the burden on our staff and improving sample processing efficiency.

Thermo Fisher: Can you tell us a little more about those validations from HPS?

Our initial engagement with HPS involved validating the Applied Biosystems™ 3500xL Genetic Analyzer. That experience was so positive that we re-engaged them for our Applied Biosystems™ SeqStudio™ 8 Flex Genetic Analyzer. This time, HPS performed the validation and provided teachback training, which significantly expedited the process to get the instrument online and improved our understanding of the instrument's operations. However, the HPS contributions extended beyond validation by offering critical insights into serial dilution and quantitative experimental design. They also provided practical recommendations regarding instrument usage and profile interpretation.

Thermo Fisher: Will you please tell us more about your experience working with the HPS team?

The HPS team's global structure, with representatives fluent in the local language and attuned to cultural nuances, greatly facilitated communication and established effective workflows. During validation, HPS provided frequent progress updates and engaged in detailed discussions of experimental results. Notably, they helped us identify an issue with our quantification results, which stemmed from a defect in one of our plastic consumables. Their proactive approach allowed us to resolve the issue swiftly, resulting in improved quantification outcomes.

The final validation reports delivered by HPS were comprehensive, featuring detailed data analysis, tables, and figures. The teachback sessions distilled key findings from these reports into an accessible format, enabling our team to internalize the experimental procedures and data analysis effectively.



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Thermo Fisher: Will you please comment on the teachback process?

The teachback sessions offered a detailed summary of the key findings from our validation. The training was meticulously tailored to align with the validation experiment procedures and subsequent data analysis specific to our laboratory. Delivered in person by HPS, the lessons and supplemental materials provided our laboratory personnel with a clearer understanding of our core values and procedural expectations.

The teachbacks were a great experience.

Thermo Fisher: Would you engage HPS in the future?

Absolutely. Following the purchase of laboratory solutions, installation and validation are critical steps that demand precision and accuracy. HPS delivered exceptional professionalism and reliable results, establishing a stable foundation for our laboratory operations. Their collaboration was seamless, providing us with practical experimental techniques, relevant insights, and concepts that closely aligned with our processes. This support proved invaluable and greatly enhanced our operational efficiency.

Thermo Fisher: What are your future plans for the lab?

Our vision is to develop a comprehensive forensic team with a global outlook. For DNA analysis, we aim to expand beyond routine cases to include research and development. This includes handling diverse evidence types, such as bone, plant, and protected animal DNA. Furthermore, we plan to incorporate advanced techniques like mitochondrial DNA sequencing and Y-STR analysis. While these goals require gradual implementation, we are committed to establishing a strong foundation for sustained growth.

Thermo Fisher: What challenges have you faced on your path to obtaining your goals?

The primary challenge lies in balancing routine casework with the demands of research and development. Training personnel and implementing new techniques are time-consuming processes that require additional resources. The technical support and knowledge provided by the Thermo Fisher HPS team have been invaluable in addressing these challenges. Their insights during validation have helped us identify and resolve issues we might have otherwise overlooked. Additionally, their effective bilingual communication in English and Chinese has greatly enhanced collaboration and operational efficiency.

Thermo Fisher: Before we conclude, is there anything else you'd like to share?

The HPS team demonstrated professionalism, enthusiasm, and a strong commitment to understanding and addressing our needs.