NEW INSTRUMENTATION FOR SECURE AND COST EFFICIENT LONG-TERM STORAGE OF FORENSIC SAMPLES AT AMBIENT TEMPERATURE

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Due to the steady rise in the number of samples from criminal cases worldwide, the need for efficient long-term preservation of forensic samples is growing accordingly. Although cold storage currently remains a widely used technology, ambient temperature storage techniques are becoming available. Those techniques aim at providing cost effective and easy to handle ways of storing nucleic acids and/or biospecimens and collection devices from which they can be extracted when needed. This fundamental change in storage conditions makes it possible to avoid all the well-known limitations of cold storage: space requirements, time-consuming and cumbersome access to samples, costly and complex thermo-regulation logistics, deleterious freeze/thaw cycles, costs of energy, maintenance and infrastructure, exposure to natural disasters, etc. Nevertheless, mid- to long-term storage at ambient temperature has a specific and mandatory requirement which must be not overlooked : the absolute protection from the atmosphere.

In order to meet this requirement, IMAGENE has developed a breakthrough preservation procedure for long-term, stand-alone storage of dried biospecimens.
Once desiccated, samples are kept in airtight stainless steel capsules, under an anhydrous and anoxic atmosphere; that way, full protection from deleterious factors (oxygen, ozone, moisture, and light) is achieved. These tamper-proof capsules are 2D-bar coded and placed in 96-well racks allowing fully automated upstream and downstream processes. Once processed, the capsules can be stored with no additional cost.

Under these conditions, the samples integrity can be preserved for very long periods of time: for instance half of a population of 10,000 nucleotides long DNA fragments should be uncut after a 100 year period of storage (extrapolation from accelerated aging studies). Recovery of the samples from the capsules is 100%, even in the low pg range ($\leq$10 pg), which would in addition enable to concentrate the samples if needed.

Initially offered as a service solution, this procedure can now be carried out "in-house", thanks to medium to high-throughput instruments, allowing forensics laboratories to conveniently and economically benefit from this powerful technology.