



Case study

Oragene®/saliva kits facilitate DNA collection in cancer patients for pharmacogenetic research in South Africa

Gameda Benefeld, research nurse

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Study overview

Ototoxicity is the degeneration of the inner ear tissue caused by therapeutic drugs and can lead to irreversible bilateral hearing loss. Ototoxic drugs include cisplatin for cancer treatment and streptomycin for tuberculosis treatment. Cisplatin-induced ototoxicity affects 23-50% of adults and up to 60% of children receiving the drug, while streptomycin-induced ototoxicity affects between 2-33% of patients. Those receiving similar doses of these drugs exhibit individual variation in response to treatment which can be attributed to genetic variants in the genes encoding drug-metabolising enzymes. Sr. Gameda Benefeld and her study team at the University of Cape Town are currently involved in a research endeavor identifying susceptibility genes associated with cisplatin- and streptomycin-ototoxicity. Through pharmacogenetic analyses the group is determining whether an association exists between certain genetic markers and ototoxicity. The goal of the research is to contribute to the development of a pre-treatment genetic test for susceptibility to ototoxicity, which will allow clinicians to optimize drug therapy, prevent hearing loss and preserve patient quality of life.

Main challenges

Sr. Benefeld recruits adult cancer patients in clinic each week during their chemotherapy drug treatment. Recruiting participants into the study is a challenge as many candidates are quite ill and want to avoid unnecessary invasive procedures. Therefore, to maximize participation and ensure discomfort is minimal, blood draws are not always preferable. Sr. Gameda required a non-invasive DNA collection method that would reliably deliver sufficient high integrity DNA for downstream genotyping.



Oragene device prior to collection

Sample ready for transport, storage and processing



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“As a research nurse, one constantly has to balance between the study requirements and the maxim “Do no harm.” Because of the frailty of these patients, Oragene fills the gap in being a non-invasive procedure and has helped my work in terms of recruitment, which should be patient centred and not research centred. The easy application of the Oragene process makes me feel at ease that I have not harmed or caused anyone pain and I can be satisfied that our research has remained patient centred.”

*Gameda Benefeld, research nurse,
Division of Human Genetics,
University of Cape Town, South Africa*

Why Oragene®/saliva samples?

Oragene was the primary method considered due to its non-invasive, easy-to-use collection and high quantity, high quality DNA stabilization. Buccal swabs were not an option as the yield and quality of DNA obtained may not be adequate for lab analysis.

Results

With the use of Oragene/saliva collection kits, Sr. Benefeld is successfully recruiting cancer patients into the study without undue pain or discomfort while collecting reliable DNA that performs on the genotyping analysis. The DNA quality obtained with Oragene, as measured by the A_{260}/A_{280} absorption ratio, was found to be between 1.8-1.9 and the range of DNA yield between 12.37-157.58 μg from a 2 mL saliva sample.



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