UNIVERSITI SAINS MALAYSIA
GERAN PENYELIDIKAN UNIVERSITI PENYELIDIKAN
LAPORAN AKHIR

MITOCHONDRIAL GENOME INSTABILITY: ITS POTENTIAL ROLE IN BIOMARKER DISCOVERY FOR BRAIN TUMORIGENESIS

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LAPORAN AKHIR GERAN PENYELIDIKAN UNIVERSITI (RU)

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(JAB. NEUROSAINS)

TAJUK: "MITOCHONDRIAL GENOME INSTABILITY: ITS POTENTIAL ROLE IN BIOMARKERS DISCOVERY FOR BRAIN TUMORIGENESIS"

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FINAL REPORT CHECKLIST

Please use this checklist to self-assess your report before submitting to RCMO.
Checklist should accompany the report.

NO.	ITEM	PLEASE CHECK (✓)		
		PI	JKPTJ	RCMO
1	Completed Final Report Form	✓	✓	✓
2	Project Financial Account Statement (e-Statement)	✓	✓	✓
3	Asset/Inventory Return Form *(Borang Penyerahan Aset/Inventori)*	✓	✓	✓
4	A copy of the publications/proceedings listed in Section D(ii) (Research Output)	✓	✓	✓
5	Comprehensive Technical Report	✓	✓	✓
6	Other supporting documents, if any	–	–	–
7	Project Leader's Signature	✓	✓	✓
8	Endorsement of PTJ's Evaluation Committee		✓	✓
9	Endorsement of Dean/ Director of PTJ's		✓	✓

Project Code :
(for RCMO use only)

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FINAL REPORT FORM

Please email a softcopy of this report to rcmo@usm.my

A	**PROJECT DETAILS**
i	**Title of Research:** Mitochondrial Genome Instability: Its Potential Role in Biomarker Discovery for Brain Tumorigenesis
ii	**Account Number:**
iii	**Name of Research Leader:** Dr. Abdul Aziz Mohamed Yusoff
iv	**Name of Co-Researcher:** 1. Prof. Dr. Jafri Malin Abdullah 2. Prof. Dr. Hasnan b. Jaafar 3. Prof. Madya Dr. Zamzuri Idris 4. Mohamad Ros Sidek
v	**Duration of this research:** a) **Start Date** : 15 July 2012 b) **Completion Date** : 14 July 2015 c) **Duration** : 3 years d) **Revised Date** (*if any*) : July 2016 (extension date)
B	**ABSTRACT OF RESEARCH**
	(An abstract of between 100 and 200 words must be prepared in Bahasa Malaysia and in English. This abstract will be included in the Report of the Research and Innovation Section at a later date as a means of presenting the project findings of the researcher/s to the University and the community at large) **Background**: Mitochondria are major cellular sources of reactive oxygen species (ROS) generation which can induce mitochondrial DNA (mtDNA) damage and lead to carcinogenesis. MtDNA 4,977-bp deletion as well as alteration in mtDNA copy number have been implicated in various types of human cancers. The aim of the present study was to find out the association of mtDNA 4,977-bp deletion and mtDNA content in brain tumor from the Malaysian patients. **Methods:** Brain tumor tissues and corresponding blood specimens were obtained from 50 patients. For comparison, 40 blood samples of healthy controls were also included in this study. The mtDNA 4,977-

bp deletion was detected using the multiplex Polymerase chain reaction (PCR) analysis and later was confirmed by direct DNA sequencing. Furthermore, the mtDNA content was analyzed by using a quantitative real time PCR method.

Results: The mtDNA 4,977-bp deletion were observed in 24% (12 out of 50) of our patients. Presence of the ND3 10398A>G mutation did not show significantly correlation with any of the evaluated parameters such as patients age, gender and histological brain tumor types. Moreover, we found that mtDNA copy number was significantly reduced in tumor tissues (13.49±9.32) compared to corresponding blood samples (36.65±9.32). Our study also revealed that 28% of our patients (14 out of 50) were detected to have the IDH1 c.395G>A (R132H) mutation and a significant association was found with histological tumor types.

Conclusions: For the first time, we have been able to describe the occurrence of mtDNA 4,977-bp deletion and decreased mtDNA content in a Malaysian brain tumor population. Deletion of mtDNA 4,977-bp could be classified as pathogenic mutation in connection with mutations in other mitochondrial or nuclear genes as well as environmental factors in the development of various diseases and cancers. We believe that mtDNA 4,977-bp deletion and mtDNA content determination may be considered as potential diagnostic and prognostic biomarker among Malaysian population particularly in those with brain tumors.

C **BUDGET & EXPENDITURE**

i

Total Approved Budget :

Total Expenditure :

Balance :

Percentage of Amount Spent (%) :

 # Please attach final account statement (eStatement) to indicate the project expenditure

 # Please refer attachment

ii **Equipment Purchased Under Vot 35000**

No.	Name of Equipment	Amount (RM)	Location	Status
1.	UltraSlim LED Illuminator		Neurosciences Department	Good

 # Please attach the Asset/Inventory Return Form (Borang Penyerahan Aset/Inventori) – Appendix 1