UNIVERSITI SAINS MALAYSIA
GERAN PENYELIDIKAN UNIVERSITI
PENYELIDIKAN
LAPORAN AKHIR

EFFECT OF ALOE EMODIN ON THE GENE EXPRESSION PROFILING IN HUMAN GLIOMA CELL LINES

PENYELIDIK

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2014

KEMENTERIAN PENDIDIKAN MALAYSIA

FINAL REPORT
FUNDAMENTAL RESEARCH GRANT SCHEME (FRGS)

Laporan Akhir Skim Geran Penyelidikan Fundamental (FRGS)
Pindaan 2/2013

A **RESEARCH TITLE:** Effect of aloe-emodin on the gene expression profiling in human glioma cell line

PHASE & YEAR: 2010

START DATE: 01 May 2010
END DATE: 30 April 2012
EXTENSION PERIOD (DATE): 1) 01 May 2012 – 31 Oct 2012; 2) 01 Nov 2012 – 30 April 2013

PROJECT LEADER: Dr. Abdul Aziz Mohamed Yusoff

PROJECT MEMBERS (including GRA):
1. Dr. Muhammmad Farid Johan
2. Prof Madya Dr. Shahrum Shamsudin
3. Khalilah Haris (M.Sc. Student)
4. Samhani Ismail (M.Sc. Student)

PROJECT ACHIEVEMENT *(Prestasi Projek)*

B

ACHIEVEMENT PERCENTAGE			
Project progress according to milestones achieved up to this period	**0 - 50%**	**51 - 75%**	**76 - 100%**
Percentage (please state #%)			100%

RESEARCH OUTPUT

Number of articles/ manuscripts/ books *(Please attach the First Page of Publication)*	**Indexed Journal**	***Non-Indexed Journal***
	Enhanced induction of cell cycle arrest and apoptosis via the mitochondrial membrane potential disruption in human U87 malignant glioma cells by aloe emodin. *Journal of Asian Natural Products Research 2013* (in press)	
Conference Proceeding *(Please attach the First Page of Publication)*	**International**	***National***
	Aloe emodin inhibits proliferation and induces apoptosis in U87 human glioma cells in vitro, *Asian Society of Neuro-oncology, Taipei, Taiwan, 2012*	Microarray Gene Expression Profiling Analysis for The Response of Human Glioma U87 cells to Aloe Emodin Treatment. *AKEPT 2nd Global Annual Young Researchers Conference and Exhibition in Melaka 2012.*
Intellectual Property *(Please specify)*		

HUMAN CAPITAL DEVELOPMENT

Human Capital	Number				Others (please specify)
	On-going		Graduated		
Citizen	Malaysian	Non Malaysian	Malaysian	Non Malaysian	
PhD Student					
Master Student	2				
Undergraduate Student					
Total	2				

EXPENDITURE *(Perbelanjaan)*

C

Budget Approved *(Peruntukan diluluskan)* :
Amount Spent *(Jumlah Perbelanjaan)* :

Balance *(Baki)* :
Percentage of Amount Spent :
(Peratusan Belanja)

ADDITIONAL RESEARCH ACTIVITIES THAT CONTRIBUTE TOWARDS DEVELOPING SOFT AND HARD SKILLS
(Aktiviti Penyelidikan Sampingan yang menyumbang kepada pembangunan kemahiran insaniah)

D

International

Activity	Date (Month, Year)	Organizer
(e.g : Course/ Seminar/ Symposium/ Conference/ Workshop/ Site Visit)		

National

Activity	Date (Month, Year)	Organizer
(e.g : Course/ Seminar/ Symposium/ Conference/ Workshop/ Site Visit)		

PROBLEMS / CONSTRAINTS IF ANY *(Masalah/ Kekangan sekiranya ada)*

E

RECOMMENDATION *(Cadangan Penambahbaikan)*

F

RESEARCH ABSTRACT – Not More Than 200 Words *(Abstrak Penyelidikan – Tidak Melebihi 200 patah perkataan)*

G

Aloe emodin has been previously reported to promote anticancer activity via inhibiting the expression of several genes. This study was aimed to investigate the apoptosis and cell cycle arrest inducing by aloe emodin on U87 human malignant glioma cells as well as to explore its effect on the gene expression profile of U87 cells by utilizing microarray technology. In this study, aloe emodin showed a time- and dose dependent inhibition of U87 cells proliferation and decreased the percentage of viable U87 cells via the induction of apoptosis. Characteristic morphological changes, such as the formation of apoptotic bodies, were observed with confocal microscope by Annexin V-FITC/PI staining, supporting our viability study and flow cytometry analysis results. Our data also demonstrated that aloe emodin arrested the cell cycle in the S phase and promoted the loss of mitochondrial membrane potential in U87 cells that indicated the early event of the mitochondria-induced apoptotic pathway. Microarray analysis also reported that more than 8,000 gene expression alterations out of 28,000 gene-label probe sets were detected after treatment with 58.6 µg/ml aloe emodin concentration for 24 hour. However, only 34 genes were considered statistically significant ($p<0.05$). Interpretation of microarray data revealed 22 genes that were up-regulated and 12 genes that were down-regulated in response to aloe emodin treatment. This study demonstrates that expression of genes in glioma cells affected by aloe emodin involved in various cellular functions mainly in cell proliferation and apoptosis. These results could serve as guidance for further studies in order to recover molecular targets for targeted cancer therapy-based aloe emodin treatment. Besides that the involvement of certain genes in the formation and progression of brain tumors need further evaluation.

Date : 25/7/2013
Tarikh

Project Leader's Signature:
Tandatangan Ketua Projek

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COMMENTS, IF ANY/ ENDORSEMENT BY RESEARCH MANAGEMENT CENTER (RMC)
(Komen, sekiranya ada/ Pengesahan oleh Pusat Pengurusan Penyelidikan)

H

Completed.

Name:
Nama:

Signature:
Tandatangan:

Date:
Tarikh: 15/8/13