

**UNIVERSITI SAINS MALAYSIA  
GERAN PENYELIDIKAN UNIVERSITI  
PENYELIDIKAN  
LAPORAN AKHIR**

**MOLECULAR EPIDEMIOLOGY AND REVERSE  
TRANSCRIPTASE (RT) AND PROTEASE INHIBITORS (PR)  
RESISTANCE GENOTYPING OF HUMAN  
IMMUNODEFICIENCY VIRUS (HIV) IN KELANTAN**

**PENYELIDIK**

**DR. RAFIDAH HANIM SHUEB**

**PENYELIDIK BERSAMA**

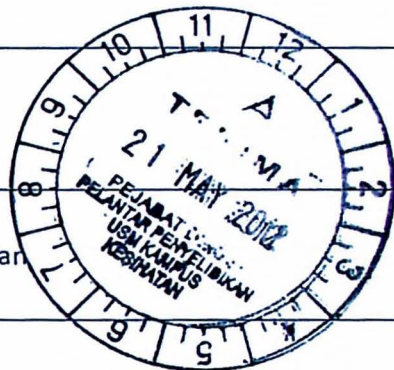
**PROF MADYA DR. ZAKUAN ZAINY DERIS  
DR. MAHIRAN MUSTAFA  
DR. NIK KHAIRULDDIN YUSOF  
PROF MADYA DR. WAN ZAHIRUDDIN WAN MUHAMAD**

**2012**



**RESEARCH UNIVERSITY GRANT  
FINAL REPORT ASSESMENT FORM**  
*Borang Penilaian Laporan Akhir  
Geran Universiti Penyelidikan*

A.		<b>TITLE OF RESEARCH:</b> <i>Tajuk penyelidikan:</i>	Molecular Epidemiology and Reverse Transcriptase (RT) and Protease Inhibitors (PR) Resistance Genotyping of Human Immunodeficiency Virus (HIV) in Kelantan.				
B.		<b>PERSONAL PARTICULARS OF RESEARCHER / Maklumat Penyelidik:</b>					
	(i)	<b>Name of Research Leader:</b> <i>Nama Ketua Penyelidik:</i>	Dr. Rafidah Hanim Shueb				
	(ii)	<b>School/Institute/Centre/Unit:</b> <i>Pusat Pengajian /Institut/Pusat/Unit:</i>	Pusat Pengajian Sains Perubatan				
	(iii)	<b>Research Platform:</b> <i>Pelantar Penyelidikan:</i>	Clinical Sciences				
C.		<b>SUMMARY OF ASSESSMENT</b> <i>(Tick (✓) the appropriate box. Also, provide additional comments in Section F)</i>	Inadequate		Acceptable	Very Good	
			1	2	3	4	5
1.	Achievement of Project Objectives		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Quality of Output		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.	Quality of Impacts		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.	Technology Transfer / Commercialization Potential		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5.	Quality and Intensity of Collaboration		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6.	Overall Financial Expenditure		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7.	Overall Assessment of Benefits		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>





D.	ACTION TO BE TAKEN (Tick (✓) the appropriate boxes)
<input checked="" type="checkbox"/>	Project file to be closed. (For financial and administration purposes):
<input type="checkbox"/>	Project to be Reviewed Once Additional Information Has Been Obtained by the Project Leader (Please see section E)
<input type="checkbox"/>	Forward to Innovation Office for Consideration: <input type="checkbox"/> Patent <input type="checkbox"/> Commercialisation <input type="checkbox"/> Technology Transfer  <input type="checkbox"/> Others (Please specify): _____
<input type="checkbox"/>	Forward to Division of Industry & Community Network (DICN)
<input type="checkbox"/>	Others (Please specify): _____ (E.g.: Formations of teas or cluster etc.)

E.	Additional information to be provided by the Project Leader:
—	

F.	Endorsement & Comments/Suggestions of Evaluator:
<p>This project has a potential to be continued as 2<sup>nd</sup> phase project</p> <p>Limitations include <del>because of</del> too small sample size (due to inadequate facilities, i.e.: limited access to Biological Safety Cabinet dedicated to virology - dedicated work) - that caused epidemiology / <sup>or prevalence</sup> study of HW resistance genotyping not a success.</p> <p>I would suggest that this important resistance genotyping study to be continued with enough budget to buy needed facilities which later on can be converted to serve as diagnostic service for HW resistance genotyping test to be offered to communi</p>	



**RESEARCH UNIVERSITY GRANT  
FINAL REPORT ASSESMENT FORM**  
*Borang Penilaian Laporan Akhir  
Geran Universiti Penyelidikan*



**TITLE OF RESEARCH:**

*Tajuk penyelidikan:*

Molecular Epidemiology and Reverse Transcriptase (RT) and Protease Inhibitors (PI) Resistance Genotyping of Human Immunodeficiency Virus (HIV) in Kelantan.

**PERSONAL PARTICULARS OF RESEARCHER / Maklumat Penyelidik:**

(i) **Name of Research Leader:**  
*Nama Ketua Penyelidik:* Dr. Rafidah Hanim Shueb

(ii) **School/Institute/Centre/Unit:**  
*Pusat Pengajian /Institut/Pusat/Unit:* Pusat Pengajian Sains Perubatan

(iii) **Research Platform:**  
*Pelantar Penyelidikan:* Clinical Sciences

**SUMMARY OF ASSESSMENT**

*(Tick (✓) the appropriate box. Also, provide additional comments in Section F)*

Inadequate

Acceptable

Very Good

1

2

3

4

5

1. Achievement of Project Objectives






2. Quality of Output






3. Quality of Impacts






4. Technology Transfer / Commercialization Potential






5. Quality and Intensity of Collaboration






6. Overall Financial Expenditure






7. Overall Assessment of Benefits

**ACTION TO BE TAKEN** (Tick (✓) the appropriate boxes)

Project file to be closed. (For financial and administration purposes):

Project to be Reviewed Once Additional Information Has Been Obtained by the Project Leader  
(Please see section E)

Forward to Innovation Office for Consideration:

Patent

Commercialisation

Technology Transfer

Others (Please specify): \_\_\_\_\_

Forward to Division of Industry & Community Network (DICN)

Others (Please specify): \_\_\_\_\_  
(E.g.: Formations of teas or cluster etc.)

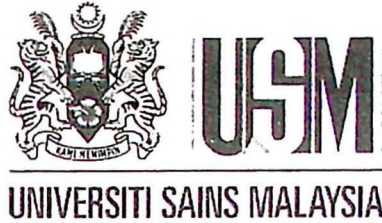
Additional information to be provided by the Project Leader:

Result of specific objective no. 2.  
(To determine the specific HIV-1  
subtypes in specific risk group  
in Kelantan)

Endorsement & Comments/Suggestions of Evaluator:

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## **LAPORAN AKHIR**



*Molecular Epidemiology and Reverse Transcriptase  
(RT) and Protease Inhibitors (PR) Resistance  
Genotyping of Human Immunodeficiency Virus (HIV)  
in Kelantan”  
(1001/PPSP/812029*



**PENYELIDIK:**

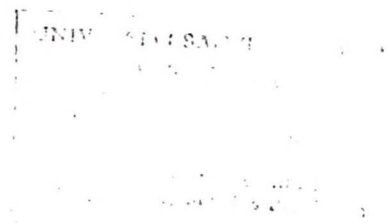
**Dr Rafidah Hanim Shueb**

**PM Dr Zakuan Zainy Deris**

**Dr Mahiran Mustafa**

**Dr Nik Khairulddin Yusof**

**PM Dr Wan Zahiruddin Wan Muhamad**



**D. Duration of this research :**  
*Tempoh masa penyelidikan ini :*

**\*Duration :** ...30 months.....  
*Tempoh :*

**From :** ..... 15 Mac 2009      **To :** ..... 14 Sept 2011  
*Dari:* .....      *Ke :* .....

**E. 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 Annual 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)

The wide use of antiretroviral (ARV) therapy has greatly reduced the rate of morbidity and mortality among Human immunodeficiency virus type-1 (HIV-1) infected patients. However, high mutation and recombination rates of HIV-1 lead to the emergence of various subtypes and drug-resistance viruses, rendering ARV-therapy ineffective in many patients. This study was undertaken to determine for the first time the prevailing HIV-1 subtypes and the patterns of drug resistance mutations among 53 HIV-1-infected patients in Kelantan, Malaysia.

Blood samples from 53 HIV-1 infected patients (naive and treated) were collected from Hospital Raja Perempuan Zainab II, Kelantan, Malaysia from May 2009 to December 2010. *Protease* (PR) and *reverse transcriptase* (RT) genes were amplified from patient plasma, and then sequenced and analysed for mutations. Subtype determination was done using NCBI Genotyping Tool while ARV resistance mutations were analysed using Stanford HIV Drug Resistance Database.

**Abstrak Penyelidikan**

(Perlu disediakan di antara 100 - 200 perkataan di dalam **Bahasa Malaysia dan juga Bahasa Inggeris.**

Abstrak ini akan dimuatkan dalam Laporan Tahunan Bahagian Penyelidikan & Inovasi sebagai satu cara untuk menyampaikan dapatan projek tuan/puan kepada pihak Universiti & masyarakat luar).

Penggunaan terapi anti-retrovirus yang meluas telah menunjukkan penurunan yang ketara terhadap tahap kesihatan dan kadar kematian di kalangan pesakit penghidap HIV-1. Walau bagaimanapun, kadar rekombinasi dan mutasi HIV-1 yang tinggi menyebabkan kemunculan pelbagai subtaip dan virus yang rintang terhadap ubat, seterusnya mengakibatkan terapi antiretrovirus tidak berkesan terhadap kebanyakan pesakit. Kajian ini bertujuan menentukan buat pertama kalinya subtaip HIV dan corak mutasi akibat kerintangan terhadap ubat di kalangan 53 pesakit HIV di Kelantan, Malaysia.

Sampel darah daripada 53 pesakit HIV (pra dan pasca-rawatan) telah dikumpulkan daripada Hospital Raja Perempuan Zainab II, Kelantan, Malaysia bermula Mei 2009 sehingga Disember 2010. Gen protease (PR) dan reverse transcriptase (RT) diampflikasikan daripada plasma pesakit, seterusnya dilakukan penjujukan dan dianalisis bagi mengesan kehadiran mutasi. Penentuan subtaip dilakukan dengan *NCBI Genotyping Tool* manakala mutasi akibat kerintangan terhadap antiretrovirus dianalisis menggunakan *Stanford HIV Drug Resistance Database*.