ミャンマー消化器感染症研究プロジェクト
評価調査団報告書

平成２年８月

国際協力事業団

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序　　文

わが国は、ミャンマー（旧称：ビルマ）国における医学研究レベルの向上のため、これまでにも長期にわたり、技術協力を実施してきたところである。

同国政府は、これらの協力成果を更に発展させる観点から、肝臓および消化管のウイルス性疾患並びに寄生虫疾患に対する研究の質的向上を目的として、新たに「消化器感染症研究」に関するプロジェクト方式による技術協力を要請してきた。

これを受け、わが国は、昭和６０年２月に事前調査団を派遣し、要請内容および協力計画の確認を行った結果、実施の妥当性が認識されたことから、同年１２月に実施協議調査団を派遣し、本件プロジェクト協力を昭和６１年２月から４ケ年間に渡り実施しているところである。

本年は本件協力の最終年度に当たることから、これまでの技術協力の効果、協力内容の妥当性を評価するとともに今後のプロジェクト協力に資するため、平成２年１月に濱島義博京都女子大学学長を団長とする評価調査団を派遣した。

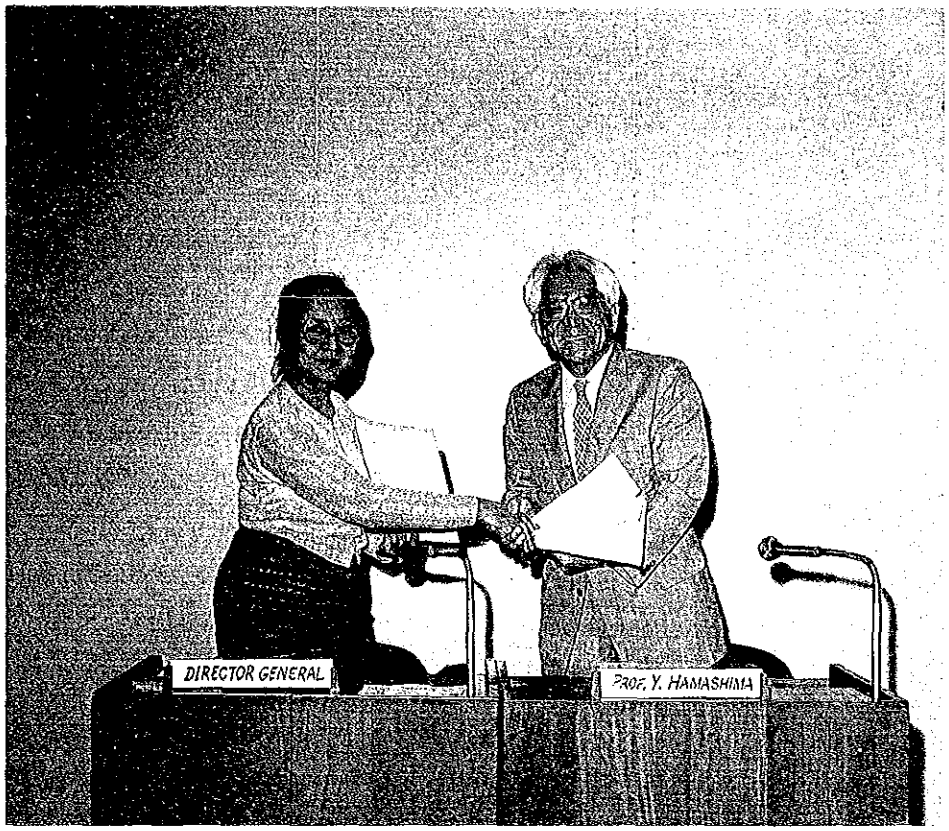
本報告書は、その調査結果を取り纏めたものであり、ここに調査団各位並びに同調査団派遣にご協力頂いた関係機関の方々に深甚なる謝意を表すものである。

また、同国に対する医療協力に関し、今後とも関係各位のご理解をお願いする次第である。

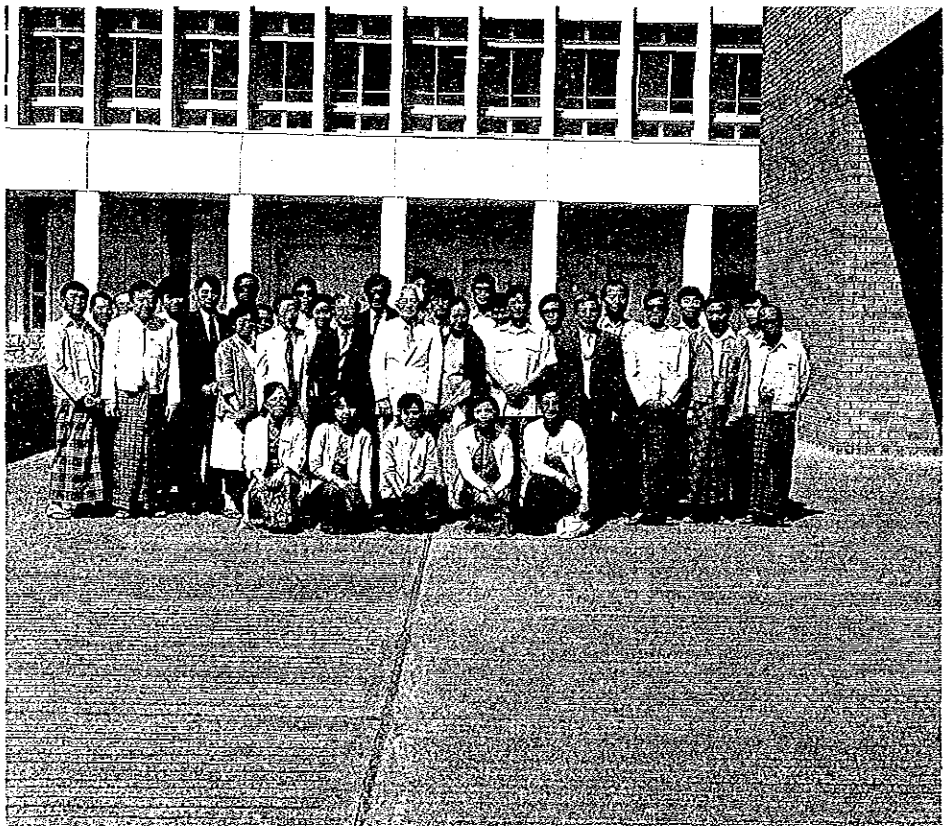
平成２年１月

国際協力事業団

理事　西野　世界

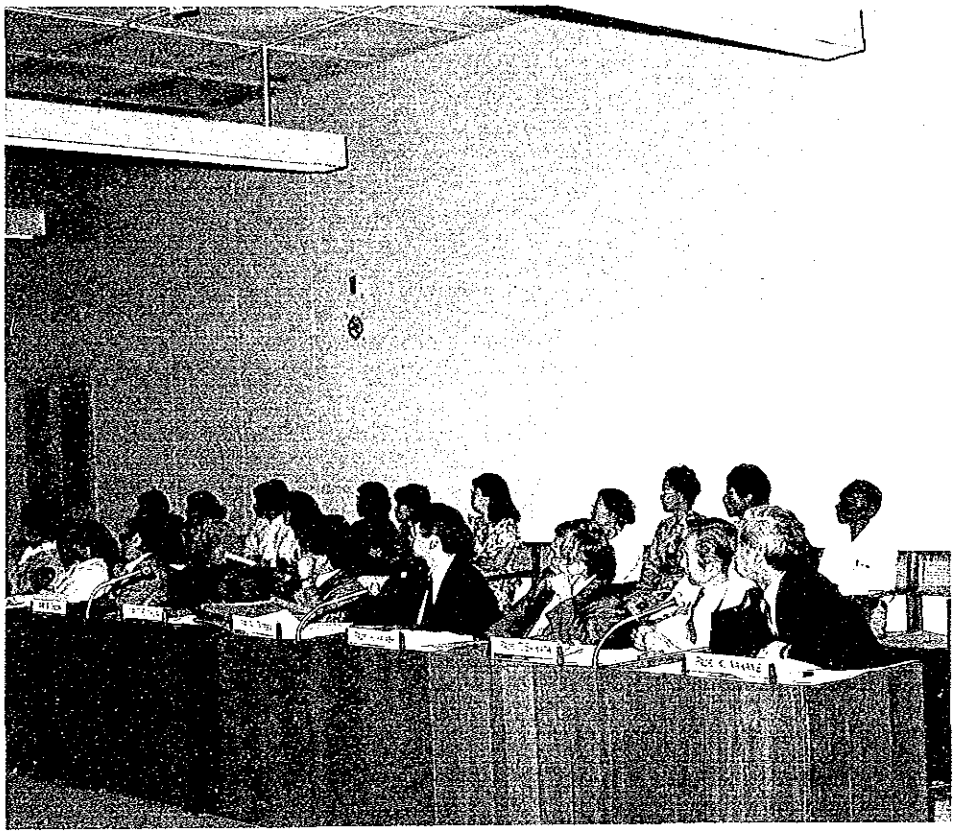


合同評価報告書署名後に握手をする濱島団長とメイメイ医学研究局長



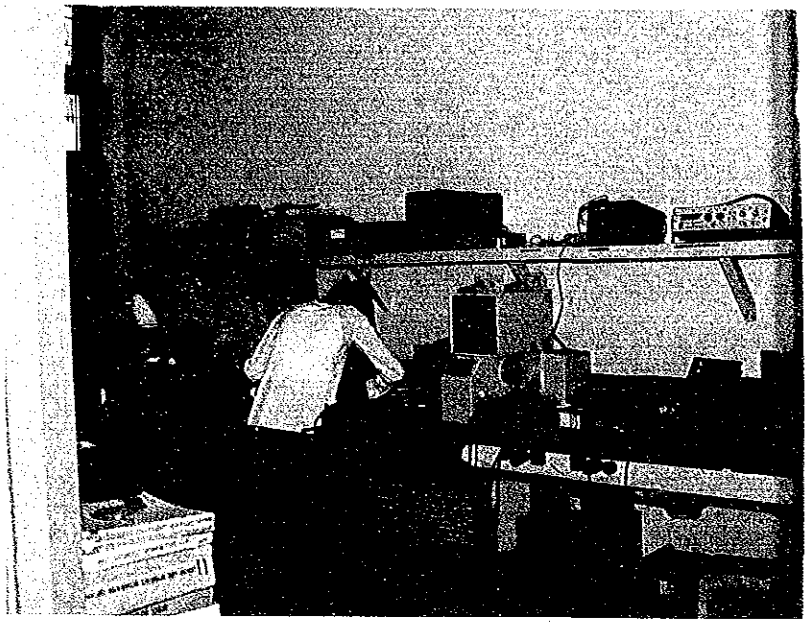
研究発表討論会後のＤＭＲスタッフ

主任クラスによる研究発表

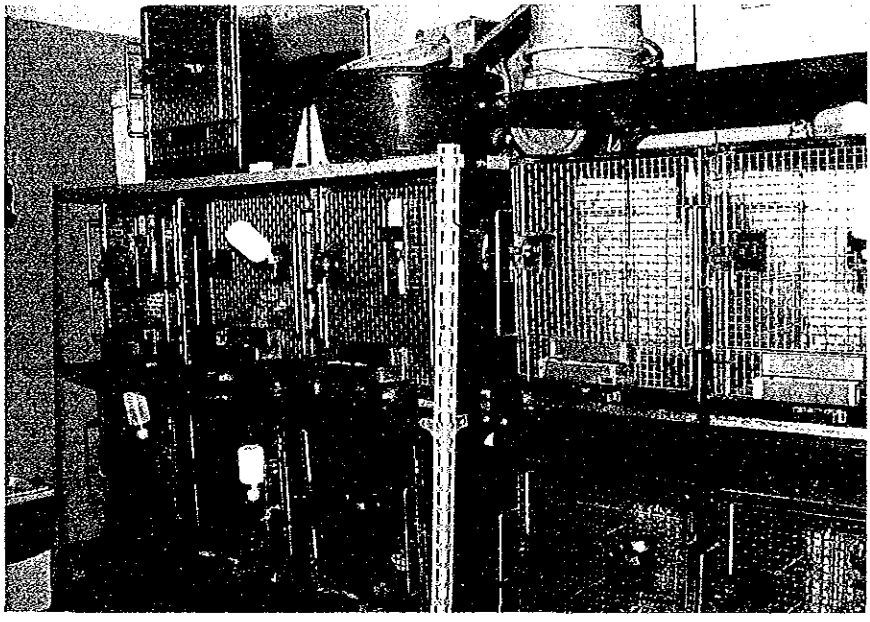


厳しい質問攻めをする評価調査チーム

日本での研修を終え帰国後の研究成果を発表するカウンターパート



供与された機器の保守に励むカウンターパート



清潔も保持されている実験動物用のケージ

目　　次

Ⅰ. 評価調査の経緯と目的

ミャンマー国政府は、昭和５９年４月に終了した「感染症対策プロジェクト」の成果を継続的に発展させる観点から、同年１１月にわが国に対し、「感染症研究プロジェクト」の技術協力要請を行なった。

これに対し、国際協力事業団は昭和６０年２月に事前調査団を派遣し要請の背景及び内容等を調査した結果日本側でも協力実施妥当性が確認され、協力方針等が固まったことから具体的な協力実施に必要な協議のため同年１２月に実施協議調査団を派遣した。

その結果、双方は本件プロジェクトを昭和６１年（１９８６年）３月１日より平成２年２月２８日までの４か年間実施することとなった。これを受け国際協力事業団は専門家の派遣、研修員の受け入れ、機材の供与を有機的に連係させ、それぞれの協力分野に置ける技術協力を実施してきたところである。

本年度は、本件プロジェクトの最終年度に当たるからミャンマー側関係者との意見交換をするとともに各協力分野の現状を把握し、これまでの研究成果も勘案し、協力内容がいかに定着され普及したか。また、当初設定した協力目的に対する達成度等を総合的に考慮しつつ、本件プロジェクト協力の効果を測定とともに、今後、当方が実施する同種プロジェクトの参考に資するため、平成２年１月１１日から同月１９日までの間に濱島義博京都女子大学学長を団長とする評価調査団を派遣した。

加えて、同国の政情不安により、昭和６３年８月から平成元年５月までプロジェクト活動が停止したことによる障害等をミャンマー側より詳しく聴取し、本評価調査の参考とすることとした。

Ⅱ. 調査団の編成及び調査日程

Ⅱ－1 調査団の編成

団長	（総括）	濱島義博	京都女子大学　学長
団員	（寄生虫）	中根一穂	長崎大学医学部　教授
〃	（ウイルス学）	林　英生	香川医科大学　教授
〃	（業務調整）	立場正夫	国際協力事業団医療協力部職員

Ⅱ－2 調査日程

平成２年１月１０日～同月１９日

月　日（曜）	時　　間	調　　査　　内　　容
		TG641
1月11日(木)	10:30～15:25	東　　京……→ バンコック
		TG305
	14:50～15:30	バンコック……→ ヤンゴン
		（D.M.R Mag Mag Yi 医学局長，藤村所長ら多数出迎え）
	17:15～	インヤレイクホテル　チェクイン
	18:00～19:00	日程打合せ
1月12日(金)	7:50～	ホテル出発
	8:00～ 8:30	ＪＩＣＡ事務所との打合せ
	9:00～ 9:30	日本大使館表敬（松本公使ほか）
	10:00～11:00	D.M.R Mag Mag Yi医学研究局長等との打合せ
		1)日程確認
		2)評価の目的及び方法を説明
	11:10～11:40	F.E.R.D. U Soe Thwin 局長表敬
	13:00～14:30	研究センター内参観
	15:00～16:00	Dr.Pe Thein 教育大臣表敬
1月13日(土)		資料整理
1月14日(日)		資料整理
1月15日(月)	8:50～	ホテル出発　　D.M.Rへ
	9:30～12:00	1)Mag Mag Yi医学研究局長よりこれまでのプロジェクト活動について報告
		2)濱島団長より、評価調査の目的につき説明
		3)Dr.Thang Sue 氏より本プロジェクト活動報告
	13:30～16:00	個別活動報告および質疑
		1）肝炎分野　　Dr.Khin Maung Win
		2）肝炎ウイルス　Dr.Soe Soe,Dr.Kyaw Moe
		3)) 病理学　　Daw Than Saw

月　日（曜）	時　　間	調　　査　　内　　容
	16:40 ～ 17:25	（志方専門家帰国　ヤンゴン……→バンコック……→東京） TG306　　TG740
1月16日(火)	8:50 ～	ホテル出発　　D.M.Rへ
	9:30 ～ 13:00	個別活動報告および質疑
		1）免疫学　　Dr.Tun Pe
		2）細菌学　　Dr.Mar Mar Nyein,Dr.Phyu Phyu Win
		Dr.Khin Nwe Oo
	13:30 ～ 16:30	各研究室にての活動状況を聴取
1月17日(水)	8:50 ～	ホテル出発　　D.M.Rへ
	9:30 ～ 12:00	合同評価報告の内容についての打合せ
	13:30 ～ 16:20	今後の方針についての打合せ
		評価報告書作成及び署名
		UB237
	14:00 ～ 19:15	（中根団員帰国　ヤンゴン……→バンコック）
		TG622
1月18日(木)	9:00 ～ 16:00	（中根団員帰国　バンコック……→東京）
	10:00 ～ 10:40	日本大使館報告
	11:00 ～ 11:30	D.M.R Dr.Mag Mag Yi 医学研究局長報告
		TG306
	17:45 ～ 18:25	ヤンゴン……→バンコック
1月19日(金)		TG740
	10:30 ～ 18:00	バンコック……→東京
		TG620
	10:40 ～ 19:55	バンコック……→大阪

Ⅱ－3　関係者氏名一覧

ミャンマー側

Pe Thein	Minister of Health and for Education
U Soe Thwin	Director General of Foreign Economic Relation Department
May May Yi	Director General of Department of Medical Reseach
Myint Lwin	Deputy Director of Department of Medical Reseach
U Hla Pe	Deputy Director of Department of Medical Reseach
Saw J Tha	Deputy Director of Department of Medical Reseach
Thein Hlaing	Deputy Director of Department of Medical Reseach
Than Swe	Deputy Director of Department of Medical Reseach

Bacteriology Division

Daw Tin Aye	Head
Daw Mar Mar Nyein	Senior Reseacher

Parasitology Division

U Myint Oo	Senior Reseacher

Virology Division

Soe Thein	Head
Kyaw Mor	Senior Reseacher

Immunology Division

Tun Pe	Head
Hla Shan Phyu	Senior Reseacher

日本側

日本大使館

松本　　和朗　公使

喜多見　信幸　一等書記官

ＪＩＣＡミャンマー事務所

藤村　建夫　　所長

池田　修一　　所員

プロジェクト専門家

飯田　芙佐江　肝炎分野　長期専門家

志方　俊夫　　肝炎分野　短期専門家

Ⅲ. プロジェクト計画

Ⅲ－1　プロジェクトの成立と経緯

ミャンマー国政府は、昭和５９年４月に終了した「感染症対策プロジェクト」の成果を継続的に発展させる観点から、同年１１月にわが国に対し、「感染症研究プロジェクト」の技術協力要請を行なった。

これに対し、国際協力事業団は昭和６０年２月に事前調査団をまた同年８月に長期調査員を派遣し、要請の背景及び内容等を調査した結果、本件協力に係る実施の妥当性が確認され、協力方針等が固まったことから具体的な協力実施に必要な協議のため、同年１２月に実施協議調査団を派遣した。

その結果、双方は本件プロジェクトを昭和６１年（１９８６年）３月１日より平成２年２月２８日までの４か年間実施することとした。

これを受け、国際協力事業団は専門家の派遣、研修員の受け入れ、機材の供与を有機的に連係させ、それぞれの協力分野における技術協力を実施してきたところである。

これまでの主な経緯は次のとおりとなる。

昭和５４年１１月

日本国政府はミャンマー（旧称ビルマ）国政府の要請を受け、同国立医学研究局に対する無償資金協力を実施し、「生物医学研究センター」を開設した。

昭和５９年４月

わが国は同センターを基盤として感染症研究能力の向上を目指し、昭和５５年４月１０日から昭和５９年４月９日までの４カ年間に及ぶ「感染症対策プロジェクト」の技術協力を実施した。その終了時評価報告書において、今回の技術協力効果を継続的に発展させるため、引き続き強力な支援を必要とする旨提言した。

昭和５９年１１月

ミャンマー国政府は「感染症対策プロジェクト」協力効果を高く評価するとともにこれらの研究実績を更に向上させる観点から新たに肝炎研究を含む「消化器感染症研究プロジェクト」（Project of Treatment of Infectious Diseases of the Alimentary System）に関するプロジェクト方式よる技術協力を要請してきた。

昭和６０年２月

上記要請を受け、わが国は要請内容の確認および協力の妥当性を確認すべく、濱島義博京都大学医学部教授を団長とする事前調査団を派遣した。

その結果、本件の妥当性は認められるものの要請内容における肝炎分野の研究だけでも膨大なプロジェクトとなるので協力の効果を勘案し協力領域および内容を極力絞り込むよう指

摘した。

昭和６０年８月

事前調査の結果を踏まえ、相手側の研究能力を把握するとともに再度本件の要請内容を確認し、具体的な協力計画を協議するため、濱島義博京都大学医学部教授ならびに志方俊夫日本大学医学部教授の２名を長期調査員として派遣した。

昭和６０年１２月

これらの調査結果を基に本件プロジェクトに対する協力方針・内容が確定したのを受けて、協力実施上の基盤となるべき討議議事録（Record of Discussion）に関する協議および署名、ならびに暫定実施計画の協議・策定のため、濱島義博京都大学医学部教授を団長とする実施協議調査団を派遣した。

昭和６２年１月

本件協力開始後２カ年が経過したことからR／Dに規定されてる合同委員会において協力の成果をレビューし、併せて今後２カ年間の協力内容を協議するために濱島義博京都大学教授を団長とする巡回指導調査団を派遣した。

昭和６３年８月

ミャンマー国の政情不安ため、技術協力活動を一時停止し、派遣中の飯田芙佐枝専門家を本邦に帰国させる。

平成元年５月

同国の政情が安定したため、技術協力を再開するとともに肝炎分野の長期専門家として飯田芙佐枝氏を再派遣した。

平成２年１月

本件プロジェクト協力の最終年度に当たり、その協力効果および当初計画に対する達成度等を測定するため、濱島義博京都女子大学学長を団長とする評価調査団を派遣した。

Ⅲ－２　プロジェクト目的

近年、ミャンマー国においてはウィルス感染に伴う乳幼児重症下痢症の激増ならびに非A非B型肝炎の大流行の増加とそれに伴う肝硬変・肝癌患者の問題、加えてアメーバ赤痢の全国的蔓延などが同国保健医療分野における最重要課題である。

同国政府は、昭和５９年１１月、わが国が先に実施した「感染症対策プロジェクト」の成果を高く評価するとともにその成果を継続的に発展させ、特に肝臓ならびに消化管のウィルス性および寄生虫性感染症を中心に右疾患の診断・予防・治療の各方面に及ぶ技術の飛躍的発展を見ることを究極の目的として、研究・治療面での技術協力を要請した。

これらの状況を受けて、本件プロジェクトの協力目的は肝臓ならびに消化管の細菌性、ウィルス性、寄生虫性疾患の診断・治療のための研究技術向上を目指すものとしている。具体

的協力内容は次の４点から構成されている。

（１）非Ａ非Ｂ型ウィルスおよび非Ａ非Ｂ型肝炎に関する研究

（２）ロタウィルス等下痢症関連ウィルスに関する研究

（３）肝臓および腸のアメーバ赤痢症に関する研究

（４）上記研究を発展させるための新技術の開発

Ⅳ　プロジェクトの活動実績

日本側は専門家の派遣・研修員の受入れ・機材の供与を有機的に連係させてきた。加えてプロジェクト運営に関する協議等のため、それぞれの段階で調査団を派遣し、円滑な運営を行ってきたところである。

まず、上項で述べたと　　、プロジェクト開始前から事前調査団・長期調査員・実施協議調査団を派遣し、実施中には計画打合せ調査団および巡回指導調査団を派遣した。

また、専門家の派遣については長期専門家２名、短期専門家４２名を各分野別に派遣した。加えて、４分野のカウンターパートをのべ７名受入れ、１カ年間の技術指導を行った。機材供与面では超低温冷蔵庫、モンキーゲージ、超音波装置、クリーンベンチ、酵素試薬などの機材等を供与し、本年度には更に研究機材等を供与することとなっている。

具体的実績は次のとおりとなる。

（１）調査団派遣

事前調査団

昭和６０年２月１７日から同年３月１日まで

団長	濱島義博
（総括）	京都大学医学部教授
団員	畑中正一
（ウィルス学）	京都大学ウィルス研究所教授
団員	中根一穂
（細胞生物学）	東海大学医学部教授
団員	今井辰雄
（病院管理）	京都大学病院事務部長
団員	村田隆一
（業務調整）	国際協力事業団医療協力部職員

長期調査

昭和６０年８月１１日から同年８月２５日まで

調査員	濱島義博
	京都大学医学部教授
調査員	志方俊夫
	日本大学医学部教授

実施協議調査

昭和６０年１２月１５日から同年１２月２７日まで

団長	濱島義博

（総括）　京都大学医学部教授

団員　志方俊夫

（病理・肝炎）　日本大学医学部教授

団員　糸川嘉則

（疫学）　京都大学医学部教授

団員　福田義弘

（肝炎）　京都大学医学部助手

団員　柳沢香枝

（技術協力）　国際協力事業団医療協力部職員

巡回指導調査

昭和６３年１月１３日から同年１月２２日まで

団長　濱島義博

（総括）　京都女子大学教授

団員　志方俊夫

（ウィルス学）　日本大学医学部教授

団員　竹田美文

（細菌学）　東京大学医科学研究所教授

団員　船坂浩司

（業務調整）　国際協力事業団企画部職員

（２）専門家派遣

（英文資料）

（３）研修員受入れ

（英文資料）

（４）機材供与

（英文資料）

（５）両国の投入資金

（英文資料）

LIST OF JAPANESE EXPERTS DISPATCHED BY JICA

NO.	JAPANESE FISCAL YEAR	NAME	PERIOD	FILED
(LONG TERM EXPERTS)				
1.	1987~1988	Ms.FUSAE IIDA	87. 2.22~88.10.22	HEPATITIS
2.	1989~1990	Ms.FUSAE IIDA	88. 5.31~90. 5.30	HEPATITIS
(SHORT TERM EXPERTS)				
3.	1986~1987	DR.HIDEO HAYASHI	86. 6.18~86. 7.18	BACTERIOLOGY
4.		DR.TOSHIKAZU UCHIDA	86. 6.18~86. 7.18	HEPATITIS
5.		DR.TOSHIO SHIKATA	86. 7. 1~86. 7.13	HEPATITIS
6.		DR.YOKO SHIMIZU	86. 7. 1~86. 7.10	HEPATITIS
7.		MR.TOSHIYUKI SHIMADA	86. 7. 6~86. 7.15	ARCHITECTS
8.		DR.HIDEO HAYASHI	86.12. 7~87. 1.18	BACTERIOLOGY
9		DR.YOSHIHIRO HAMASHIMA	86.12.14~87. 2. 8	PATHOLOGY
10		DR.KAZUO NAKANE	86.12.14~87. 1.18	ELECTRON MICROSCOPE
11		DR.YOSHIYA KANEDA	86.12.14~87. 1.18	PARASITROLOGY
12		DR.YUU MIDORIKAWA	86.12.14~87. 1.18	IMMUNOLOGY
13		DR.TOSHIO SHIKATA	87. 1. 4~87. 1.11	HEPATITIS
14		DR.MASAKAZU HATAKENAKA	87. 1. 7~87. 1.18	VIROLOGY
15		MR.YUKIO YAMANO	87. 2. 1~87. 2.22	CONSTRUCTION
16		DR.TOSHIO SHIKATA	87. 2.22~87. 3. 1	HEPATITIS
17		MR.NOBORU YAMAURA	87. 2.22~87. 3.22	CONSTRUCTION
18.	1987~1988	MR.TADAKATU HORII	87. 4. 5~87. 4.15	MEDICAL EQUIPMENT
19.		MR.SHUZOU ISHIKAWA	87. 4.26~87. 5. 3	ELECTRO ENGINEERING
20.		DR.KENJI ABE	87. 6. 7~87. 6.26	HEPATITIS
21.		DR.YOSHIHIRO HAMASHIMA	87. 7.22~87. 9. 1	PATHOLOGY
22		DR.OSAMU MATSUSHITA	87. 7.22~87. 9.22	BACTERIOLOGY
23		DR.HIDEO HAYASHI	87. 7.22~87. 8. 7	BACTERIOLOGY
24.		DR.TOSHIO SHIKATA	87. 9.25~87.10. 6	HEPATITIS
25.		DR.YUTO YAMO	87.10. 4~87.10.13	HEPATITIS
26.		DR.KOYU SUZUKI	87.10.18~87.11. 1	HEPATITIS
27.		DR.TOMIO TADA	87.12.13~87.12.22	IMMUNOLOGY
28.		DR.KAZUO NAKANE	87.12.13~88. 1.12	PATHOLOGY
29.		DR.YOSHIO KANEDA	87.12.13~88. 1.12	PARASITROLOGY
30		DR.SHIGERU OKADA	87.12.13~88. 1.12	PATHOLOGY
31		DR.TAKEHIKO KOUJI	87.12.13~88. 1.11	PATHOLOGY
32		DR.TOMOO TANAKA	87.12.13~88. 3. 1	PARASITROLOGY
33		DR.YOSHINORI ITOKAWA	87.12.20~88. 1. 5	EPIDIMIOLOGY
34		DR.HIDEO HAYASHI	87.12.30~88. 1. 5	BACTERIOLOGY
35		DR.TOSHIKAZU UCHIDA	88. 1. 1~88. 1.10	HEPATITIS
36		DR.TEIZOU TSUKAMOTO	88. 1. 6~88. 2. 7	BACTERIOLOGY
37		DR.FUMIO TAKEDA	88. 1. 6~88. 1.17	BACTERIOLOGY
38		DR.YUICHI OKU	88. 1. 6~88. 2. 7	BACTERIOLOGY
39.	1988~1989	DR.TOMOO TANAKA	88. 7.24~88. 8.21	PARASITROLOGY
40.		DR.KOYUU SUZUKI	88. 7.24~88. 8.21	HEPATITIS
41.	1989~1990	DR.HIDEO HAYASHI	89.10.22~89.11. 5	BACTERIOLOGY
42		DR.TOSHIKAZU UCHIDA	89.10.22~89.10.31	HEPATITIS

LIST OF MYANMAR COUNTERPARTS SENT TO JAPAN

JAPANESE FISCAL YEAR	N A M E	TRAINING PERIOD	TRAINING FILED
1986-1987	1. MS. MI MI KHIN	87. 2. ～87. 8.	VIROLOGY
	2. DR. SOE SOE	86.10. 88.10.	PATHOLOGY
	3. DR. TUN PE	86. 9. 87. 9.	IMMUNOLOGY
1985-1986	4. MS. NAW ANGELINA	87. 2. ～89. 2.	VIROLOGY
	5. MS. CHO CHO HMAN	87. 2. ～89. 2.	PATHOLOGY
	6. MR. SAN WIN	87. 2. ～89. 2.	ANIMAL LABORATORY
	7. DR. SOE SOE	86.10. 88.10.	PATHOLOGY

PROVISION OF EQUIPMENT

JAPANESE FISCAL YEAR	ITEMS OF MAIN EQUIPMENT	AMOUNT C.I.F.:YEN
1986-1987	Chemicrete-E Deep Freezer Autoclve Momky Gage Operating Glovesstililized	¥15,196,000.-
1987-1988	Ultra-Low Freezer High Speed Refrigerated Centrifuge Refrigerator, 2door type Freezer, 4door type Autoclave Air-Driven Ultra-centrifuge Trinocular Microscope ELISA Reader EM Incubaor	¥79,610,000.-
1988-1989	Ultrasound Scannar Clean Bench Spectrophotometer UV monitor Fraction Collector	¥17,746,000.-
1989-1990 (PLAN)	Personal Computor Monkey Cages Osmometer,OSMOTORON-20 Microscope Photographic system Liquid Scintillation Counter Spare Parts for equipment already provided	¥50,000,000.-
	Total Amount	¥162,552,000.-

SUMMARY OF THE PROJECT COST

(unit: thousand yen)

JAPANESE FISCAL YEAR	1986/87	1987/88	1988/89	1989/90	TOTAL
COST OF DISPATCH OF EXPERTS	39883	80679	21787	10938	153287
COST OF PROVISION OF EQUIPMENT	15196	79610	17746	50000	162552
COST OF DISPATCH OF SURVEY TEAMS	2910	1179	0	2414	6503
COST FOR MIDDLE LEVEL STAFF TRAINING	0	0	0	0	0
OHTERS	301	762	230	262	1555
TOTAL	58290	162230	39763	63614	323897

Note: This table is as of January, 1990.

Japanese fiscal year is from April 1st to March 31th.

Cost of provision of equipment does not include transport charges

Cost of training of Myanmar counterpart personnel is not included in this table.

SOURCE OF DMR FUND 1986 - 1990

(Unit: Thousand Kyats)

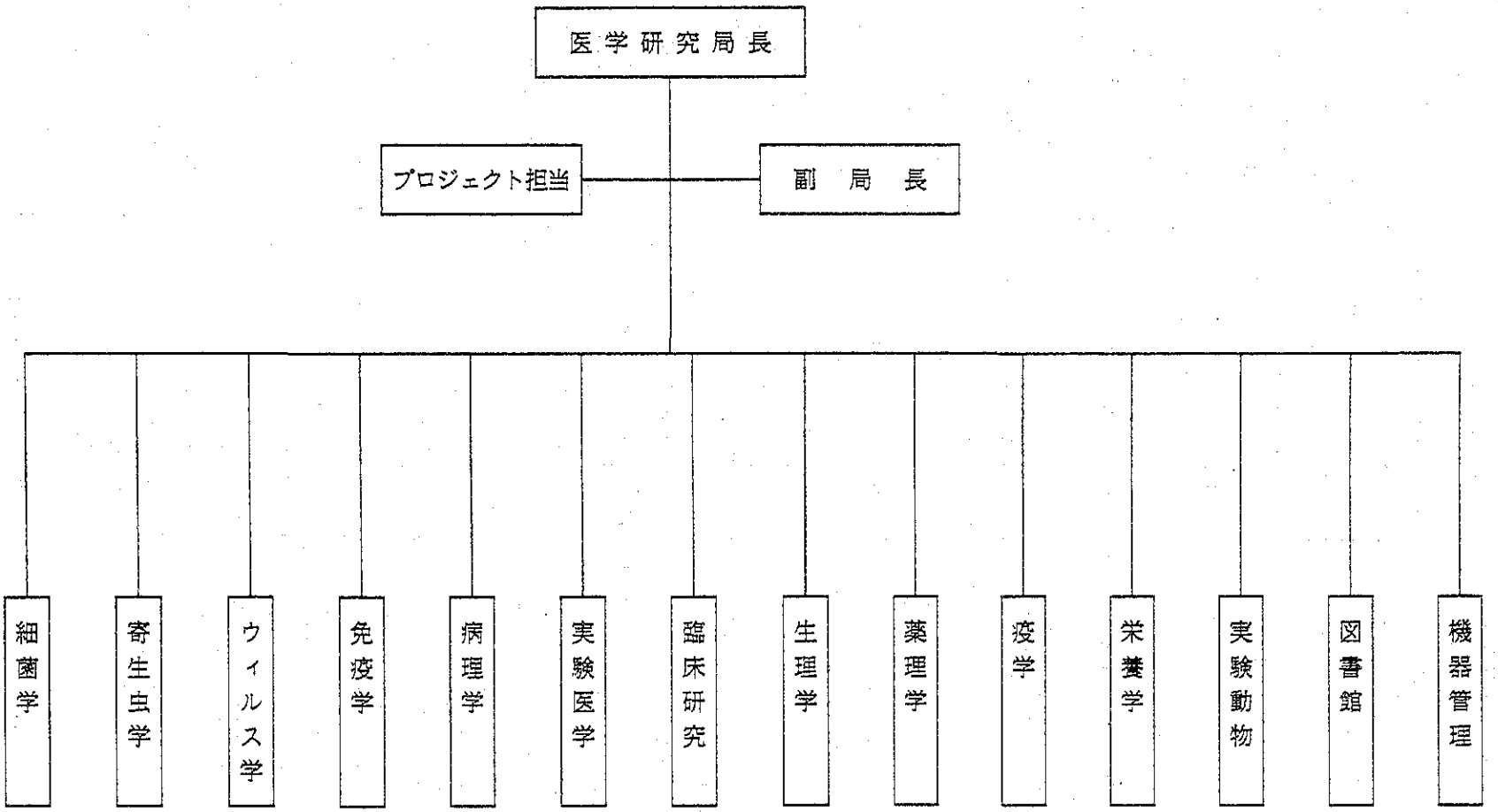
Y E A R SOURCE OF FUND	1986/1987	1987/1988	988/1989	1989/1990	TOTAL
GOVERNMENT BUDGET	2831.00	3405.00	4856.00	5380.55	16472.55
OTHER	---	---	---	---	---
FOREIGN AIDS	4645.00	5708.00	4698.00	*1717.95	16768.95
T O T A L	7476.00	9113.00	9554.00	7098.50	33241.50

* Up to 31-12-1989

V. 相手側実施機関

V－1　機構図

医学研究局機構図



V－2　カウンターパートの氏名一覧

研　究　室	氏　　名	職　　位
(Project Manager)	Dr.May May Yi Dr.Myint Lwin Dr.Myo Thein U Hla Pe Dr.Saw J Tha Dr.Thein Hlaing Dr.Than Swe	Director General Director Deputy Director(Admini.) Deputy Director(Research) Deputy Director(Research) Deputy Director(Research) Deputy Director(Research)
Bacteriology Division	Dr.Daw Tin Aye Daw Mar Mar Nyein Dr.Phu Phu Win Dr.Khin Nwe Oo	Head Senior Researcher Researcher Researcher
Parasitology Division	Dr.Myint Lwin Dr.Myint Oo Daw Than Saw Dr.Ye Htut	Head Senior Researcher Researcher Researcher
Virology Division	Dr.Soe THein Dr.Kyaw Moe Dr.May La Lin	Head Senior Researcher Researcher
Immunology Division	Dr.Tun Pe Dr.Hla Shan Phyu	Head Researcher
Pathology Division	Dr.Maung Maung Oo Dr.Soe Soe Dr.Khin Ei Han	Head Senior Researcher Researcher
Experimental Medicine Division	Dr.Khin Maung Win Dr.Khin Pyone Kyi	Head Senior Researcher
Clinical Research Division	Dr.Tin Nu Swe Dr.Tin Shwe U Aye Kyaw Dr.Myo Khin U Tin Oo	Head Senior Researcher Senior Researcher Researcher Researcher
Physiology Division	Dr.Soe Min Thein Dr.Tin Aung	Head Senior Researcher

研　究　室	氏　　名	職　　位
Pharmacology Division	Daw Mya Bwin	Head
	Daw Aye Than	Researcher
	U Win Myint	Researcher
Entamology Division	U A.A. Sebastian	Senior Researcher
	U Htay Aung	Researcher
Epidemiology Division	Dr.Myint Myint Soe	Senior Researcher
	Dr.W.Htun Lin	Senior Researcher
	Dr.Aung Myo Han	Senior Researcher
	Dr.Myat Lay Kyin	Senior Researcher
	Dr.Sann Shwe	Researcher
	Dr.Le'Le' Win	Researcher
Nutrition Division	Daw Tin Tin Oo	Head
	Dr.Maung Maung Cho	Senior Researcher
	Dr.Moe Moe Sun	Researcher
Laboratory Animal Division	U Myint Oo	Head
	U San Win	Researcher
Library Division	U Kyi Thaung	Senior Researcher
	Daw Khin Lay Yi	Researcher
	Daw Nyunt Nyunt Swe	Researcher
	U Aung Myo Min	Researcher
Instrumentation Division	U Soe Myint	Head
	U Htay Aung	Senior Researcher
	U Hla Shein	Researcher
	U Maung Maung Gyi	Researcher
	U Tial Ling	Researcher
	U Thein Yu	Researcher
	U Kyaw Ko	Researcher
	U Tun Thant Sin	Researcher

JAPANESE EXPERTS & MISSION

	3/1 1986 2/28	3/1 1987 2/28	3/1 1988 2/28	3/1 1989 2/28
1) Assignment of Expert Hepatitis Unit	6/18 ～7/18 (UCHIDA) 7/1～7/10 (SHIKATA) 7/1～7/13 (SHIKATA) 1/4 ～1/11 (SHIKATA) 2/22～3/1 (〃) 2/22	9/25 ～10/6 (SHIKATA) 10/4 ～10/13 (YANO) 10/18～11/1 (SUZUKI) 1/1 ～1/10 (UCHIDA)	(IIDA) 10/22 12/7～12/21	10/22 ～10/30 (UCHIDA) 5/31 ――― 90/5/30
Aminal Facility Unit (*:Consultant or Supervisor)	7/6～7/15 (SHIMADA) * 2/1 ～2/22 (YAMANO) * 2/22～3/22 (YAMANO)	4/5～4/15 (HORII) * 4/26～5/3 (ISHIKAWA) * 6/7 ～6/26 (ABE)		
Pathology EM Unit	12/14 ～1/18 (NAKANE)	12/13～1/12 (NAKANE) 12/13～1/12 (KOJI) 12/13～1/12 (OKADA)		
Immunology Unit		12/13～12/22 (TADA)		
Nucleic Acid Unit	1/7 ～1/18 (HATANAKA)			
Epidemiology Unit	12/14 ～1/18 (MIDORIKAWA)	12/20～1/5 (ITOKAWA)		
Pathology Unit	12/14 ～2/3 (HAMASHIMA) 7/22～9/1 (HAMASHIMA)			
Parasitology Unit	12/14 ～1/18 (KANEDA)	12/13～1/12 (KANEDA) 12/13～3/1 (TANAKA)	7/24～8/24 (TANAKA)	
Bacteriology Unit	6/18～7/18 (HAYASHI) 12/7 ～1/18 (HAYASHI)	7/22 ～8/7 (HAYASHI) 12/30 ～1/5 (HAYASHI) 7/22 ～9/22 (MATSUSHITA) 1/6 ～1/17 (TAKEDA) 1/6 ～2/7 (TSUKAMOTO) 1/6 ～2/7 (OKU)		10/22～11/5 (HAYASHI)
Others				
		Advisory Survey Team 1/13 ～1/22		Evaluation Team 1/10～1/19

Ⅵ. 評価総括

Ⅵ－1　要約

本プロジェクトに対するわが国の協力については協力開始の前半は肝炎研究においてカニクイザルを用いての流行性非A非B型肝炎感染実験で第二世代への継代、感染したサルの胆汁からのウィルス様粒子の検出、Avidin Biotin酵素免疫アッセイ法による下痢便からのロタウィルスの検出、Entamoeba Histolyticaの培養技術の習得とそれぞれの分野において順調な進展を見せた。しかし、協力後期ではミャンマー国の政情不安のため、これらの技術協力活動を約1カ年間に及ぶ間、全面的に停止せざるをえず、全体計画が遅延した。

したがって、肝炎分野を除くほとんどの協力項目は残念ながら当初設定した到達目標を達成できなかったものと判断する。

しかしながら、今回の評価調査において本プロジェクトの成果として（1）非A非B型肝炎ウィルスを検出し、国際学会にて共同発表し、同国内外の注目を受けた。（2）WHOなどの国際機関と共同研究および論文発表が行えるようになった。（3）国内の同種研究機関に対し、これらの研究成果を発表し、情報の提供・学術交流による技術普及に努めている。

以上のことを勘案すれば、本件技術協力は同国の研究能力の向上に寄与するばかりでなく、同国内の保健医療事業に少なからずの成果をはたしたものと判断でき、本件協力は有効であったと考えられる。

今後の協力については上記のとおり約1年間におよぶ技術協力停止にともなう実施計画遅延分野に対する補強を行う必要がある。

各協力内容に関する評価の要約は次のとおりとなる。

(1) 非A非B型ウィルスおよび非A非B型肝炎に関する研究についてはこの経口感染する非A非B型肝炎の感染実験モデルを確立し、継代感染実験にも成功し、起因ウィルスを発見した。またウィルスが胆汁中に大量に排泄されることを明らかにした。日本での研究ではこのウィルス遺伝子のプライマーを使用して感染した猿の血液中のごく微量ウィルス核酸をPCR法で測定する遺伝子工学的なアッセイ系を確立し、潜伏期に血中にウィルスが流れていることを明らかにした。現在この技術をカウンターパートに移転中である。これが確立できれば肝炎診断のための血清免疫学的診断法あるいは核酸による診断法を同国にて確立できる。

相対的に到達目標の80～90％は達成されたと考えられる。

(2) ロタウィルス等下痢症関連ウィルスに関する研究に関してはウィルスのAvidin Biotin Immunoassey によるELISA法での便よりの検出可能となり、さらに下痢便由来のウィルス抗原と細菌培養株由来のウィルス抗原の両者を家兎に免疫してそれぞれの抗血清を獲得することに成功している。しかし、Biotin Succinimide EsterおよびAvi-

din Enzyme Conjugate を使用した免疫アッセイ法の確立・この技術定着を更に進める必要がある。

(3) 同国では4％の高率でEntamoeba Histolytica のCyst型のものが肝臓・消化管内に認められる。よって病原性のものと非病原性のものとを的確に区別できるよう、Entamoeba Histolytica の細胞培養から着手した。培養方法を3段階に区分し、Polyxennic CultureからMonoxenic Culture に、次いでAxenic Culture へと発展させることとした。右の手法に添って赤痢様患者の下痢便より集められたサンプルからTrophozoites型およびCystic型を証明できるようになった。Entamoeba Histolytica の証明されたサンプルについてPolyxenic Culture をこころみ活性のあるTrophozoites型を証明した。加えて、次段階であるMonoxenic Culture（Diamouel法１９７８）にのせることが可能となった。一方モノクローナル抗体を用いたＥＬＩＳＡ法により検体の鑑別・同定を実施中である。

この分野ではまだ上記培養研究が独自で行える程度まできていないこと、Axenic Culture、ＥＬＩＳＡ法の鑑別技法が十分でないことから、今後更に指導する必要がある。

(4) 新技術の開発分野ではハイブリドーマ技術の確立、志賀赤痢菌毒素純化の研究、各株の毒素原性大腸菌に対する抗血清の作製、Vero-toxin の精製・純化、下痢要因の大腸菌のプラスミド分析の継続、下痢病原体の分離と同定、大腸菌内毒素の病原性ならびにウィルス性ＤＮＡ・ＲＮＡのサザン　ブロッテング法による決定などの技術移転が上記研究を通じて行われているが現在は初期の段階であるため、さらにこれらの技術を深く定着させる必要がある。

個 別 報 告 書

林団員・志方専門家

月日 曜日	内　　容
1．7　日	ＴＧ６４０便で成田よりバンコックへ バンコック一泊
1．8　月	ＴＧ３０５便でバンコックからヤンゴーンへ ＪＩＣＡの池田さん、大使館の木谷さん、飯田専門家、 ＤＭＲのDr.Khin Maung Winが空港にむかえにきてくれる。 ホテル　インヤレイク着 夕方　６時３０分　日本大使館の新年宴会に出席 大鷹大使に挨拶、肝炎のプロジェクトについて話
1．9　火	８時３０分　ＪＩＣＡ事務所訪問　藤村所長、池田さん、 飯田専門家とプロジェクトの現状の分析と将来構想を相談 ９時３０分　大使館に松本公使を訪問。プロジェクト特に 肝炎プロジェクトの重要性を説明 １０時３０分　ＤＭＲ訪問　ＤＧのProf.May May Yiと会談 特に研究所の将来計画について意見交換 １１時　Experimental Medicine Divisionで肝炎プロジェクト の現状分析 午後も打ち合せ続行
1．10水	ＤＭＲにて午前Experimental Medicine DivisionでDR.Khin Maung Winと将来計画の打ち合せ 午後Pathology DivisionでDr.Soe Soeと肝炎プロジェクトの 今後の計画について打ち合せ ２時３０分　大使館の医務官の横内ドクターが見え、ミャンマー 側の病院などとの協力に関して、橋渡しの依頼を受けた。
1．11木	１０時　DR.Khin Maung Win及びプロジェクトマネジャーのDr. Than Sweからプロジェクトの将来計画の相談を受ける。 夕方、エバリュエーションチーム到着 午後６時３０分　夕食をとりながらエバリュエーションのやり方 を相談。　出席者：濱島、中根、林、志方とＪＩＣＡの藤村所長、 池田さん、立場さん、飯田専門家。
1．12金	８時３０分　エバリュエーションチームの一員としてＪＩＣＡ 事務所訪問。藤村所長、池田さん、濱島、中根、林、志方、 飯田専門家と立場さん。エバリュエーションの方法相談。

9時　大使館訪問　松本公使に挨拶

１０時　ＤＭＲにＤＧ　Prof. May May Yi 訪問

１１時　ＦＥＲＤ（ Foreign Economic Relation Department ）にＤＧ　のU Soe Thwin を訪問

１１時３０分　動物舎と猿の感染実験施設を視察

午後1時　ＤＭＲのスタッフとエバチームでエバリュエーションのやり方を討論

午後1時３０分より１時間　各部門の設備の稼動状態を視察

午後3時　Minister for Health and for Education に保健衛生大臣　Dr.Pe Thein を訪問、挨拶。

夕方6時３０分よりインヤレークホテルで保健衛生大臣の招宴

１．１３土　昼　プロジェクトマネジャーのDr.Than Swe 及びDr.Soe Soe と昼食をとりながら将来計画の相談

夜　6時３０分　松本公使邸　招宴

１．１４日　朝7時　ＤＭＲのＤＧによるHlawga Wildlife Park への招待

１．１５月　9時　ＤＭＲにＤＧ単独訪問。　研究所の将来計画への意見を求められる。

9時３０分　エバリュエーションのヒヤリング。

午後4時３０分　ＴＧ３０６便でMingaladon 空港離陸。飯田専門家　見送り。

１．１６火　ＴＧ７５０便にて帰国

日本大学医学部病理　志方俊夫

今回のミャンマー訪問はミャンマー消化器感染症研究プロジェクトの専門家として研究指導に携わると共に、若干、訪ミャンマーの期間がずれるものの、同じ時期にミャンマーを訪れるこのプロジェクトのエバリュエーションチームの一員としてエバリュエーションに参加することの二つの目的があった。

消化器感染症プロジェクトの内、非Ａ非Ｂ型肝炎の研究領域は日本大学医学部から飯田専門家がＤＭＲに常駐している関係もあり、１年近いブランクにもかかわらずきわめて順調に進展している。もう一つこの非Ａ非Ｂ型肝炎の研究は単なる技術の移転ではなく、未知の疾患の解明にミャンマーと日本が協力してあたり、その成果は世界のこの方面の研究のトップクラスの業績になるという特徴がある。

既にこの経口感染する非Ａ非Ｂ型肝炎の感染実験モデルを確立し、継代感染実験にも成功し、起因ウィルスを発見し、またこのウィルスが胆汁中に大量に排泄されることを明か

にした。又日本での研究ではこのウィルス遺伝子のプライマーを使用して、感染した猿の血液中のごくわずかなウィルスの核酸をＰＣＲ法で測定する遺伝子工学的なアッセイ系を確立し、潜伏期に血中にウィルスが流れていることを明かにした。このプロジェクトの出発当初、ミャンマーのかにくいざる、あかげざるが本当にこの肝炎ウィルスに感受性があるかないかわからない状態で、大きな賭として、猿の感染実験施設の工事に入ったときの不安など殆ど忘れてしまうほどの成功といわなければならない。この成果は平成元年９月、志方が組織し東京で大成功の内に終った非Ａ非Ｂ型肝炎の国際シンポジウムでも発表され、多大の注目を集めたのである。

この経口感染する非Ａ非Ｂ型肝炎の研究の残された問題は、１．この肝炎診断のための血清免疫学的診断法、あるいは核酸による診断法を確立すること。２．それによりミャンマーのみでなく世界でのこの肝炎の血清疫学を明かにすること。３．培養細胞でこのウィルスの増殖をこころみること。４．それにより最終的にワクチンを作りこの肝炎の撲滅をはかることである。

最終的なワクチンの開発にはもちろん１年間のプロジェクトの延長ではとても無理な話である。この肝炎は日本では少なく、ワクチン開発などによる利益を受ける日本人は必ずしも多くない。恐らくインド、ミャンマー、アフガニスタン、パキスタンなどへの旅行者、或はこれらの国に常駐しようとする人がワクチンを接種するのみであろう。ただミャンマーの人々にとってはきわめて重要なワクチンである。ミャンマーの研究者のみではワクチン開発の能力はないし、日本の研究者の協力によるＪＩＣＡのプロジェクトとしてはきわめて適切なものと考えられる。

更に１年のプロジェクトの延長でこれらの残された問題のどの部分が解決されるか、Dr.Khin Maung Win 及び飯田専門家と種々の検討を試みた。幸いに Experimental Medicine Division にＥＬＩＳＡによるアッセイ系確立を専門にＣＤＣで習ってきたテンポラリードクターが配属された。また抗体アッセイのための抗原のソウスとしては次の四つの可能性が考えられた。

１．流行時の初期の患者糞便、２．感染した猿の胆汁、３．培養で増やしたウィルス、４．遺伝子工学的に発現させたウィルス蛋白。　２は沢山の猿の実験を行えば可能であるが、３はまだうまく行くかどうかわからない。４は日本でやるよりしかたない。しかし何れにしても、ここ１年ぐらいで抗体のアッセイ系確立は可能と考えられるという結論にたっした。

プロジェクトの中の非Ａ非Ｂ型肝炎関係の成果の評価に関しては、既に多くの日本サイドの人々に認識されているように、予期された成果の８０から９０％は達成されたと考えられた。ただこれは飯田専門家の努力によるところがきわめて大きい。学問的な業績のみならず、猿の感染実験などの技術移転も十分になされたと考えられる。カウンターパート

のDr.Khin Maung Winはミャンマーには珍しいくらい優れた研究能力を持っている。

問題の一つは日本に招請したビルマの研究者に、更に高度の技術を教えたにもかかわらず、それは単にその人個人の知識として残ったのみでＤＭＲの他の研究者に全く伝えられていないという様なことがある。これは前からあるＤＭＲのセクショナリズムの問題でもある。例えば、Dr.Mi Mi Khinに１９８７年遺伝子工学の初歩的な技術、例えばサザンブロット法、ノザンブロット法などを教えた。年を取った彼女が本当のこれらの技術を自分のものにし得たかどうかも問題であるし、ミャンマー人特有の技術の独占の問題もある。彼女はミャンマーにかえってから少なくとも1年半くらいはＤＭＲに在籍したにもかかわらず遺伝子工学的研究はスタートしていないし、またこの技術をＤＭＲの他の人に伝えてもいない。Dr.Mi Mi Khinのような年をとった研究者を呼ぶことは当時も問題にしていたが今後決してこのような事はやるべきではない。

研究所全体に関していうならば、ＤＭＲの設備、研究のやり方は既にかなり時代遅れである。少なくともVirology, Immunology, Bacteriology, Chemistry, PathologyのDivisionではmoleculer biologyのテクニークを取り入れなければならないし、独立したMoleculer biologyのdivisionを作ってもよい。むしろルチーンワークのない研究所では既にPathological Divisionは不用であるので、Pathological Divisionをつぶして Molecular biological Divisionを作るのがよいと思う。

細菌学・ウィルス学、寄生虫学におけるプロジェクト達成度の評価

香川医科大学　林　英生

本プロジェクトの達成状況の詳細は別表のごとくであるが、ＤＭＲにおける研究活動状況は１９８０年来継続的に行なわれているのでこの観点から、Bacteriology, Virology, Parasitology Divisionの現状評価と課題について概述する。

(1)　細菌学

腸管感染症を起こす主要な細菌の分離・同定に必要な技術は、Bacteriology DivisionのHeadからLaboratory attendantにいたる全てのレベルで確実に習得された。さらに、分離菌の病原性因子・・・例えば毒素産生性、細胞侵入性等・・・についても、生物学的測定法（培養細胞による測定、乳呑みマウスによる測定など）と免疫学的測定法（酸素抗体法、ゲル内沈降法、受身凝集法など）による同定技術が、カウンターパートの研究者により習得された。これにより、本研究所から報告される腸内感染症の原因菌に関する研究・あるいは疫学報告は、国際的に承認されることになるであろう。

細菌の血清型を決定することは、疫学的に重要であるが、そのために必要な抗血清は、極めて高価であり、供与を継続することは不可能である。そこで、大腸菌を手始めとして、現在大腸菌２４種類の抗Ｏ：Ｋ血清をカウンターパート側で作成し始めている。そのため

には清潔に飼育された家兎が大量に必要である。この点に関しては、なお長期にかつ確実に進展させることが必要であり、充分な動物供給を促しつつ、専門家の指導と品質検定を受けながら継続する必要がある。この技術の継続・進展は、ミャンマーにおける菌株・リファレンスセンターの確立をも目指しており、基本的かつ重要な活動である。

幼児及び成人下痢症から、病原性因子不明な大腸菌・サルモネラ菌などの細菌種が分離されている。この病原性因子の決定には高度な技術と能力が必要であるが、日本人専門家との共同研究の形で進展しつつある。この分野の研究を加速するために、研究者をもう1名日本に派遣する必要があり、プロジェクトを延長された場合には派遣研修員の一人は、ぜひこれに当てられなければならない。

細菌学診断のための遺伝子解析技術は、今後、益々普及されると思われ、この観点から細菌のプラスミド、ＤＮＡ，ＲＮＡの取扱についての基本的技術の指導がなされた。分子生物学・遺伝子解析技術は、単に細菌学分野のみならず、病理学、ウィルス学、寄生虫学、生化学等においても必須の技術であるため、それらの研究者も加えたワーク・ショップが開催された。このワーク・ショップは参加者及びＤＭＲから高く評価され、再度開催することを強く要望されている。当地の細菌学にかげるこの技術の普及度はなお少なく、かつ経験不足であり、習得達成度は低いが、継続して技術伝達を行なわなければならない。

総合的には、当初の目標の達成率は約８０％であるが、基本的技術の向上はめざましく、腸内細菌に関する診断技術と研究に必要な基本的技術は、さらに1年間の延長でほぼ到達されるであろう。今後の問題は、真に独創的アイデアによる研究の進展にあるが、やや人材不足（特に若い世代のＭＤ）で、不安ではある。この点については、DG，Project manager に率直に伝え、今後の改善を約束している。

結核、癩、連鎖球菌、破傷風、ペスト等の感染症が依然として多く、その実態調査・確実な診断・有効な治療方策の確立が急務である。

このために、さらに継続的に「感染症」の研究プロジェクトの実施が必須であり、ミャンマー側も保健省の総力を挙げて、日本側の援助を強く要請している。

(2) ウィルス学

主としてカウンターパートの人材的問題により、当初の目標の達成率に課題が残っている。政治的騒乱の影響を最も大きく受けているといえるが、Deputy Director,Senior research officer の転出で、研究活動も低下している。

ロタウィルスの診断・検出のために酵素抗体法を試作しているが、現在、試みている方法（Avidin-biotin 法）は感度が悪く、正しい診断のためには、より感度の良い方法が望まれる（Avidin-biotin 法では 10^6 コのウィルス粒子を検出できるが、実際的には、10^4 コのウィルス粒子が検出できなければ利用できない）。しかし、酵素抗体法の技術習得のためには、試行することも有意であると判断され、継続して実施することにした。

ＮＡＢＡウィルスの培養細胞への感染・増殖実験は、チンパンジーの肝細胞のプライマリカリチャーと肝癌細胞の培養株を用いて試みられているが、まだ、成功していない。ただ、手技的に陽性コントロール実験をやっていないので不明であるが、継続して指導の必要があるとおもわれる。また、他の培養細胞系を用いた試行もされておらず、研究者の取り組みの熱意が感じられなかった。この点は強く指導コメントし、さらに人材を投入して実施するよう指導した。但し、ＮＡＢＡの細胞感染は、このウィルスが細胞変性効果を示さず、またウィルスの測定法も確立していないため、成果については多くは期待できない。

本プロジェクトとはべつに、Virology Division ではロタウィルスのワクチン試行（ＷＨＯ）やハシカワクチンの実施効果の測定（ＵＮＤＰ）のプロジェクトを実施しているが、人力に問題があり、この点の改善については、DG, Project Manager に強く申し入れをし、同意を得た。

(3) 寄生虫学

腸管・肝のアメーバー感染症研究については、当初の目標はほぼ達成されている。すなわち、赤痢アメーバーの培養技術は、純系株の継代法においても臨床材料からの分離株においても実施可能になっている。分離株のアイソザイム測定による同定法も、経験数は少ないが、技術は習得していると思われる。しかし、アメーバーの病原性である組織侵入性の性状の同定技術は、アイソザイム測定技術の習得のみでは不足であり、ＤＮＡプローブによる診断技術の習得が必要である。この目的のために、研修員１名を８９年度予算内で日本へ派遣することになっている。また不在中のカウンターパートには、Parasitology Ovision Head が責任を以て当たることを約束した。

赤痢アメーバー感染症の疫学調査も実施され、実態把握が可能になっている。注目すべきは、いわゆる「赤痢」のうち、９０％がアメーバー性であるということであり、約１,２００人を対象にした調査では、アメーバー保有者は約８％程度であることがわかった。これは、今後の防御対策に貴重なデータとして利用されると思われた。

Research on Non-A Non-B hepatitis - (1)

Objective	Responsible Division	Output	achievement (%)	Remarks	Impact and Effectiveness
A-a. Collection of samples	Exp. Med.	644 of stool specimens have been collected from hepatitis patients.	100		E type hepatitis virus was found and identified for the first time in the world. The papers were published in international journals and recieved high reputation
-b. Suply of monkies and the maintenance		Locally available rhesus monkies have been well kept without any accidental death or infection.	100		
-c. Maintenance of experimental monkey house		Well maintained to be clean and sanitary	100		The division of DMR become as a research and reference center in Myanmar and has been requested frequently to inspect endemmic, spoladic or epidemic cases of hepatitis from many regions in Myanmar.
B-a. Infection of monkey by patient stool		38 monkies were infected to be hepatitis.	100		The division has been refered from other institutions in the world regarding to NANB hepatitis
-b. Detection of virus in stool samples or in the infected monkey		128 stool samples were examined to detected virus with EM using convalescent patients sera, but all were negative. 25 stool samples were examined with EM using acute phase patients sera. virus like particles were found in 5 samples.	100		Playing an important role in the education for the regional doctors as well as health workers, by presenting papers at Medical Science Congress and at many other meetings
-c. Isolation of virus	Exp. Med. Virology Pathology	Numerous virus paticles were detected in the bile of infected monkies. Virus were isolated from the bile of infected monkey.	50	Still insufficient amount for raising antibody in experimental animal	
-d. Identification of virus		Identified by Japanese expert side.		The amount of virus particles was too scanty to examine at the counterpart site.	
-e. Animal transmission	Exp. Med.	Serial passage transmission was established in rhesus monkey	100		
-f. Propagation and detection of NANB virus in cell culture	Virology	Chimpanzee liver and primary liver carcinoma cell lines were subjected to the infection by the infected monkey stools, but has not been succeeded.	100	Need extensive effort	
-g. Clinical features of NANA hepatis and those with pregnancy	Exp. Med.	644 cases were NANB out of 1452 cases of acute viral hepatitis. Clinical features were not different from other types of acute viral hepatitis, but did not develope to chronic sequelae.	100	Should differenciate C-virus infection from E-virus one.	

A: Basic technology B: Advanced or special technology C: Application

Objective	Responsible Division	Output	achievement (%)	Remarks	Impact and Effectiveness
C-a. Pathological features of the virus infected liver of human	Pathology	17 liver biopsies from patients with the hepatitis were examined histologically and ultrastructurally. No characteristic feature nor virus particles was observed.	50	May need more case studies	
-b. Pathological features of the infected monkey liver and other organs.	Pathology	Some monkeies infected with virus were subjected to morbied natomical examination No characteristic changes have been recognized.	50	Need more case studies. A counterpart was trained in Japan and is prepareing for the further studies in Myanmar.	
-c. Antibody productionh against NANB virus	Exp. Med. Pathology	Neither polyclonal nor monoclonal antibody has been successfully produced as yet.	0	Need enough amount of the virus particles.	
-d. Detection of virus in the infected liver by immune electron microscope method	Pathology	Has not done because of the difficulties in the production of antibody against virus.	0		

A: Basic technology B: Advanced or special technology C: Application

Research on rotavirus and other diarrhea associated viruses

Objective	Responsible Division	Output	achievement (%)	Remarks	Impact and Effectiveness
A-a. Cell culture and maintenance of virus strains	Virology	Routinely maintained and some were frozen to stock in liquid N_2 or at -80°C.	100		Can supply cell lines to other division when it was required.
B-a. Development of avidin-biotin enzyme immunoassay for the diagnosis		Immunoglobulin fraction containing polychronal antibodies against rota virus have been produced and labeled by biotin.	30	The specificity, accuracy, and sensitivity should be evaluated compareing with the established methods. Because of the parsonal reorganization, the activities on the research objects inicially planned, have been interrupted. More efforts shold have played on the subject by the counterparts.	

A: Basic technology B: Advanced or special technology C: Application

Research on amoebic infections of the gut and liver

Objective	Responsible Division	Output	achievement (%)	Remarks	Impact and Effectiveness
A-a. Culture media	Parasitology	It can be prepared at the site.	100		Enable counterparts to implement E. histolytica reserach works independently. The division is recognized as a sole laboratory where the diagnosis and culture of the amaeba can be done in Myanmar. From the endenic study, it was found that 90 % of dysenteric patients were infected by E. histolytica.
b. Establishment of culture		Standard strains and clinical isolates of E.histolytica were cultured and maintained polyxenically as well as monixenically	100		
c. Endemic status 1989		More than 1,600 specimens were examined and analyzed epidemiologically.	100		
B-a. Development of axenic culture		Have been established	100		
-b. Isonzyme characterization of E. histolytica		10 strains of E. histolytica were examined for 4 enzymes and the patterns were analysed to be invasive type.	80	More strains should be examined.	
-c. Detection of antigen and antibody of E. histolytica		Detection of E. histolytica antigen in 148 stool samples by monoclonal antibody and detection of serum antibody against E. histolytica in 61 patients by ELISA method have ibeen carried out.	80	Control examination should be established to evaluate the data significantly.	To be published in international journal
C-a. Morphological variation and changes of E. histolytica		Optical and fluorescence microscopic observations have been done.	70	May need more experiences	Photopictures were taken and printed by counterparts

A: Basic technology B: Advanced or special technology C: Application

Further development of technology and other services necessary for the researches - (1)

Objective	Responsible Division	Output	achievement (%)	Remarks	Impact and Effectiveness
A-a. Identification of enteric bacteria	Bacteriology	Over 10,000 stool samples and environmental samples (ie water) have been handled and organisms have been accurately identified.	100		Published 3 papers in international journals. 5 papers in local jounals. Recognized as the most dependable laboratory in Myanmar.
-b. Cell culture and toxin purification	Bacteriology	Have purified LT of E. coli and Shiga toxin of Shigella	100		LT and Shigatoxin assay system was deceloped at the size by immunological methods.
-c. Specimen procession for microscopic observation	Pathology	Establishing a routine procedure for the microscopic diagnosis	80	Need improvement in the technics of technicians	
-d. This section technic for EM observation	Pathology	Samples of malaria have been well studies but other kind of tissue samples have not been well examined under EM.	50	May need more exercised and common technics among reserachers.	
-e. Maintenance of EM	Pathology	Become poor in resolving power		Regular check-up by expert technicians from the marker have been requested, but have not implementated yet.	
-f. Maintenance of animal house	Animal C.	Cross infection among rabbits Dust and stains on floor, wall and ceiling.		Because of reorganization of staff. Instructor or advisor for the staff education is requested.	Have been recognized as a sole center for the supply of experimental animals in Myanmar. Made possible to communicate or exchang of informations with other departments out of DHR by exchanging and supplying animals.
-g. Supply of experimental animals	Animal C.	Ref. Annex 9.			

A: Basic technology B: Advanced or special technology C: Application

Further development of technologyn and other services necessary for the researches -(2)

Objective	Responsible Division	Output	achievement (%)	Remarks	Impact and Effectiveness
B-a. Production of type-specific antisera against Entero-pathogenic E. coli	Bacteriology	OK type specific anti-sera from 23 standard strains have been produced.	60	Poor suply of rabbits. The sera should be evaluated by expert on their specificity, accuracy and sensitivity.	Recognized as reference center for E. coli in Myanmar
-b. Identification of virulence factors of E. coli	Bacteriology	Heat labile enterotoxin(LT), heat stable enterotoxin(ST), vero toxins(VT_1,VT_2) and adhesiveness to HEp-2 cell have been examined and identified in clinical isolates.		Need confirmation by reference institution in Japan.	The data were presented at WHO meeting and Myanmar Medical Science Congress. Going to be published.
-c. Properties and virulence of Shiga-toxin	Bacteriology	Partial purification and biological assay of the toxin	70	Although the properties have internationally already elucidated, the technic development in the laboratory is neccessary.	
-d. Plasmid analysis and genetic recombinant technology	Bacteriology	Plasmids of E. coli and Shigella were analysed by agarose gel electrophoresis.	50	Work shop course of DNA handling and analysis was operated in Bacteriology together with attentants from Biochem, Pathol, Exp. Med iec. It seemed to be benificial for junior roserachers, but has not come up with research data as yet. Need more manpower in this field.	
-e. Development of hybridoma technology	Immnology	A hybridoma clone that seems to produce monoclonal antibody against Russell's venom was established. Effects of the antibody on the biological activity of the venom were examined in rats.	50	Regents and equipments necessary for the work have not arrived at the site. More efforts should have put on the work by the responsible counterpart.	

A: Basic technology B: Advanced or special technology C: Application

Further development of technologyn and other services necessary for the researches -(3)

Objective	Responsible Division	Output	achievement (%)	Remarks	Impact and Effectiveness
C-a. Research on unidentified diarrheagenic bacterial agents	Bacteriology	E. coli and Salmonella without any know virulence factors have been isolated from diarrhea patients. About 50 of those isolates have been accumulated.		Need further analysis with co-operation with a certain established institution in Japan.	Stimulating research activities of not only the counterparts but other department and hospitals and enbable those researchers to co-operated with the project in Myanmar.
-b. Analysis of the mode of transmission of diarrheagenic bacteria	Bacteriology	Contamination of bacteria in drinking water (well,pipe-water, shallow water etc) was examined. Contamination of bacteria in the hands after defecation was surveyed using toilet paper and paper towel.		Made clear that there were numesous contamination of bacteria both in the water and the hands.	Avoidances of those contamination were strongly suggested to the public.
-c. Pathology of ceveral malaria	Pathology	Characteristic binding of parasite to capillary endotheial cell has been found and the microbleeding mechanism in cereberum was made clear		Need more survey works and further analysis on the data	Published in international journals as well as local journals. Presented at Medical Science Congress in Myanmar and at international meeting and recieved high reputation.

Ⅶ. 教訓および提言

本件のような研究プロジェクトでは世界的にトップクラスの業績にも成り得る研究活動を行う可能性を秘めている。例えば本プロジェクト活動中非A非B型肝炎ウィルスを発見し、日本側ならびにミャンマー側双方の共同研究の形で国際シンポジウムにおいて発表している。この分野が更に継続的に発展すれば国際的学術交流を深め、その成果を同国内外に広く普及させる必要がある。

しかるに、その際、開発途上国ではその経費を負担できないケースが多く見受けられ、貴重な機会を逸してしまうことも考えられるところ、今後幅広い視野に立った支援方法を考える必要があろう。

Ⅷ. 今後の協力に関するもの

本プロジェクトは協力期間中においてミャンマー国の政情不安により、約1年の間、専門家派遣・機材供与の見合せ等技術協力活動を全面的に停止せざる得なかったことは極めて残念なことである。

このことがプロジェクトの進捗に与えた影響は大きく、研究試薬・機材の欠乏によりミャンマー側自体の研究活動も停止し、本協力計画全体を大幅に遅延させる結果となった。今後の協力においては遅延した分野への速やかな対応を行ないつつ、当面の間、協力規模を従来に増し強化すべきであろう。

今回の評価調査時にミャンマー側はそのための協力を1カ年間延長したいとしているがこれは上記事情に鑑み、妥当な期間と思料される。

また、協力の規模としては別表とおりを要望している。

Ⅸ. 付属資料および関係資料

Ⅸ－1　合同評価報告書

Ⅸ－2　ミャンマー側総合報告書

Ⅸ－3　研究論文概要一覧

Ⅸ－4　協力延長に伴うミニッツ

Ⅸ－1　合同評価報告書

JOINT EVALUATION REPORT

ON

THE TECHNICAL COOPERATION

FOR

THE RESEARCH PROJECT ON TREATMENT OF INFECTIOUS DISEASES

OF

THE ALIMENTARY SYSTEM

IN

THE UNION OF MYANMAR

January 17, 1990
Yangon,
The Union of Myanmar

Mutually attested and submitted

to all concerned

January 17, 1990
Yangon,
The Union of Myanmar

Dr. Yoshihiro Hamashima
Leader,
Evaluation Team,
Japan International Cooperation Agency,
Japan.

Dr. May May Yi
Director General,
Department of Medical Research
Ministry of Health,
The Union of Myanmar

A series of discussion meetings between the Evaluation Team of Japan International Cooperation Agency and Department of Medical Research, Ministry of Health, the Union of Myanmar on the evaluation of technical cooperation for the Research Project on the Treatment of Infectious Diseases of the Alimentary System was held as follows:

Date : January 12 - January 17, 1990
Place : Department of Medical Research, Ministry of Health, Yangon, The Union of Myanmar
Attendance :

JAPANESE PANEL

EVALUATION TEAM

Dr. Yoshihiro Hamashima	Leader
Dr. Kazuo Nakane	Member
Dr. Hideo Hayashi	Member
Dr. Masao Tateba	Member

EMBASSY OF JAPAN

Mr. Nobuyuki Kitani	First Secretary
Mr. Tatsuo Fujimura	Head Technical Cooperation Section
Mr. Shuichi Ikeda	Administrative & Technical Staff Technical Cooperation Section

MYANMAR PANEL

Dr. Daw May May Yi	Director General, Department of Medical Research, Ministry of Health.
Dr. Myint Lwin	Director
Dr. Than Swe	Deputy Director & Project Manager
U Hla Pe	Deputy Director (Research)
Dr. Myo Thein	Deputy Director (Admin)
Dr. Thein Hlaing	Deputy Director (Research)
Dr. Saw J. Tha	Deputy Director (Research)

EVALUATION REPORT

I. INTRODUCTION

The Evaluation Team (hereinafter referred to as " the TEAM " organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Dr. Yoshihiro Hamashima visited the Union of Myanmar from January 11 to January 18, 1990 in order to evaluate jointly with the Myanmar authorities concerned the past achievements and future prospects of technical cooperation for the Research Project on Treatment of Infectious Diseases of the Alimentary System (hereinafter referred to as " the PROJECT ") on the basis of the Record of Discussions signed on December 26, 1985.

During its stay in the Union of Myanmar, the TEAM discussed and studied together with the Myanmar counterpart personnel on a number of aspects regarding the progress, performance, commitments and achievements of the PROJECT. Through careful studies and discussions, both sides summarized their findings and observations as described in the following chapters.

II METHODOLOGY OF EVALUATION

1. Materials used as reference

In order to evaluate the past performance and achievements both quantitatively and qualitatively, the following material was used as reference:

(1) The Record of Discussions (R/D)
(2) The Tentative Schedule of Implementation
(3) The Official requests made by the Government of the Union of Myanmar with respect to dispatch of Japanese experts, Myanmar counterpart personnel training in Japan and provision of equipment by means of Technical Cooperation Forms A-1, A-2, A-3, and A-4 respectively
(4) The Minutes of Discussions agreed in the course of the implementation of the PROJECT
(5) Annual reports of the PROJECT
(6) Original and Review papers concerning the PROJECT
(7) Other publications concerning the PROJECT

2. Discussion and Observation

The TEAM discussed various aspects of the PROJECT and the state of the buildings, machineries, equipments, facilities and utilities made available for the PROJECT.

The TEAM had discussions with Myanmar counterpart personnels who were trained in Japan on the efficiency of the training and the impact on the PROJECT.

III. RESULT OF EVALUATION

1. FACILITIES

Upon signing of the Record of Discussions on December 26, 1985, facilities and equipments which were provided in November, 1979 by the Grant Aid Programme of the Government of Japan were made available for the PROJECT in addition to some new facilities and equipments provided by this PROJECT. Facilities such as electricity, gas, water and sewerage systems, telephones and furnitures were expected to be provided by the Government of the Union of Myanmar.

It was found that the majority of equipments were found in good order however, some i.e. electron microscope, air-conditioning and distilled water apparatus, require some updating and maintenance repair.

(Remarks)

The Japanese side highly appreciated the effort made by the Government of the Union of Myanmar for the provision of equipment, offices, laboratories, etc.

2. STAFFING

Myanmar counterpart personnel have been assigned to the PROJECT for the effective implementation and successful transfer of technology.

It was found that some unusually high turn over with personal was noticed and have appeared to effected the continuity of the day to day performance.

The list of the Myanmar counterpart personnel in the PROJECT up to January, 1990 is shown in ANNEX 1.

3. MANAGEMENT AND ADMINISTRATION

Administrative and managerial services which are necessary for smooth implementation of the PROJECT have been provided by the Myanmar counterpart personnel.

The meetings of the Coordinating Committee which consists of following members were held at least once a year to facilitate smooth implementation of the Project.

Composition

1) Chairman : Director General, Department of Medical Research, Ministry of Health

2) Members :

Myanmar side :

a. Director of the Department of Medical Research, Ministry of Health
b. Deputy Director(s)
c. Project manager of the PROJECT
d. Head and researchers in the Divisions mentioned in R/D of ANNEX III.5

3) Japanese side

a. Team Leader
b. Experts
c. Resident Representative of JICA Office in Myanmar
d. Members of teams to be dispatched by JICA, as necessary

4. JAPANESE EXPERTS

JICA has dispatched two (2) long-term experts and forty (40) short-term experts. Their names and specialities are listed in ANNEX 2.

5. MYANMAR COUNTERPART PERSONNEL TRAINING IN JAPAN

Seven (7) Myanmar counterpart personnels were sent to Japan to get higher technical training up to the present. Their names are listed in ANNEX 3.

The Myanmar counterpart personnel in all fields as agreed in the Record of Discussions were trained in JICA's technical training courses which were found to be very effective.

6. EQUIPMENT

From 1986 to 1990, the equipment worth about 163 million yen was donated by the Government of Japan. The major equipments and machineries are listed in ANNEX 4.

(Remarks)

The above mentioned equipments for the PROJECT provided by the Government of Japan have been used efficiently for the activities of the PROJECT. However, it is observed that spare parts are required for maintenance and repair of the equipment and machinery.

7. BUDGET

A summary of the expenditures for the PROJECT spent by Japanese and Myanmar sides is in ANNEX 5, ANNEX 6 respectively.

(Remarks)

Both sides have been made the best effort to secure the budget necessary for the implementation of the PROJECT.

8. SCOPE OF WORK AND ACCOMPLISHMENT

Level of accomplishment in pursuance of the objectives set out in the Record of Discussions is shown in ANNEX 7, the planned schedule being indicated by dotted lines and the actual date of implementation by solid lines, respectively.

The purposes of the PROJECT and activities of technical cooperation are mentioned below.

(1) Purpose of the PROJECT

According to the Record of Discussions signed on December 26, 1985, the purpose of the PROJECT is to upgrade the level of techniques for laboratory diagnosis and research ability in the fields of infectious diseases in Myanmar.

(2) Activities

In order to accomplish the above-mentioned purpose, the following activities were to be carried out under the PROJECT Type Technical Cooperation Scheme of Japan through dispatch of Japanese experts, acceptance of Myanmar counterpart personnel for technical training in Japan and provision of equipments. Due to unavoidable circumstances in 1988, some of the above was not fulfilled which retarded some project activity.

In concert with Japanese experts, the Myanmar counterpart continue to be productive and maintained the momentum for the pursuit of the below listed research objectives.

(a) Research on NANB (non A, non B) virus, NANB hepatitis and its sequelae
(b) Research on rotavirus and other diarrhoea-associated viruses and infectious diseases caused by these agents
(c) Research on amoebic infections of the gut and liver
(d) And further development of technology and other services necessary for these researches

(Remarks)

It is observed that some activities (i.e. (2)-(a)) are close to reaching their targets and attained international fame. Some off shoots of the project, such as the studies on entero pathogenic bacteria also received international recognition.

Others such as (2)-(b), (c) and (d) are in progress by the Myanmar side and it appears that JICA's further cooperation for these are necessary in order to attain the PROJECT objectives.

IV. CONCLUSION AND RECOMMENDATION

As the result of the joint evaluation and discussions, the both sides reached the following conclusions:

1. As mentioned in the above remarks, the activities on NANB hepatitis and amoebic infection are close to attaining their targets. However, it is also observed that research on Bacteriology, Virology, Pathology, and Immunology remain to be pursued.

2. In accordance with the above evaluation, it is, therefore, suggested that the PROJECT should be continued for a further period of one (1) year from March 1, 1990.

ANNEX 1

LIST OF PERSONNEL INVOLVED IN THE DMR JICA PROJECT

" TREATMENT OF INFECTIOUS DISEASES OF THE ALIMENTARY SYSTEM "

DIVISION	PREVIOUS SCIENTIST	EXISTING SCIENTIST	DESIGNATION
	Dr. Aung Than Batu (till 1987)	Dr. May May Yi (1989 onwards)	Director General
	Dr. Khin Maung Tin (till 1988)		
	Dr. Maung Maung Lay (till 1989)		
	Dr. Pe Than Myint (1988 - 1989)	Dr. Myint Lwin (1989 onwards)	Director
	Dr. Hla Tun (1988 - 1989)		
Admin Division	Dr. Kywe Thein (till 1987)	Dr. Myo Thein (1989 onwards)	Deputy Director
Project Manager	Dr. Mi Mi Khin (till 1989)	Dr. Than Swe (1989 onwards)	Deputy Director
Virology Division	U Thet Win (till 1989)	Dr. Kyaw Moe	Sr. Researcher
		Dr. May La Linn	Research Officer
		Naw Anglina	Technician
Bacteriology Division		Daw Mar Mar Nyein	Sr. Researcher
		Dr. Pyu Pyu Win	Researcher
		Dr. Khin Nwe Oo	Researcher
		Khin San Aung	Technician
		Ko Swe Tint	Technician
Immunology Division		Dr. Tun Pe	Head
		Myint Myint Than	Technician
Pathology Division	Dr. Than Than (till 1989)	Dr. Maung Maung Oo	Head
		Dr. Soe Soe	Sr. Researcher
	Wynn Wynn Kyaw (till 1988)		Technician
		Aye Myint Swe	Technician
		Nwe Nwe Yin	Technician
Parasitology Division		Daw Than Saw	Researcher
		Tin Tin Aye	Technician

Experimental Medicine Division	Dr. Hla Myint (till 1989)	Dr. Khin Maung Win	Head
		Dr. Khin Pyone Kyi	Sr. Researcher
	U Tun Khin (till 1989)		Researcher
		Mar Yi Than	Technician
		Khin Khin Yi	Technician
		San San Oo	Technician
		Cho Cho Hman	Technician
Epidimology Division		Dr. Aung Myo Han	Sr. Researcher
		Dr. San Shwe	Researcher
Laboratory Animal Service (Service Division)	U Khin Maung Zaw (till 1989)	U Myint Oo	Sr. Researcher
		U San Win	Technician
		U Po Lone	Technician
Instrumentation Division (Service Division)	U Myint Soe (till 1989)	U Soe Myint	Head
		U Htay Aung	Sr. Researcher
		U Hla Shein	Researcher
		U Maung Maung Gyi	Researcher
		U Tial Ling	Researcher
		U Thein Yu	Researcher
		U Kyaw Ko	Researcher
		U Tun Thant Sin	Researcher
Library (Service Division)	Daw Hla Kyi (till 1989)		Head
		U Kyi Thaung	Sr. Researcher
		Khin Lay Yi	Researcher
		Nyunt Nyunt Swe	Researcher
		Aung Myo Min	Researcher

ANNEX 2

LIST OF JAPANESE EXPERTS DISPATCHED BY JICA

NO.	JAPANESE FISCAL YEAR	NAME	PERIOD	FILED
(LONG TERM EXPERTS)				
1.	1987~1988	Ms.FUSAE IIDA	87. 2.22~88.10.22	HEPATITIS
2.	1989~1990	Ms.FUSAE IIDA	88. 5.31~90. 5.30	HEPATITIS
(SHORT TERM EXPERTS)				
3.	1986~1987	DR.HIDEO HAYASHI	86. 6.18~86. 7.18	BACTERIOLOGY
4.		DR.TOSHIKAZU UCHIDA	86. 6.18~86. 7.18	HEPATITIS
5.		DR.TOSHIO SHIKATA	86. 7. 1~86. 7.13	HEPATITIS
6.		DR.YOKO SHIMIZU	86. 7. 1~86. 7.10	HEPATITIS
7.		MR.TOSHIYUKI SHIMADA	86. 7. 6~86. 7.15	ARCHITECTS
8.		DR.HIDEO HAYASHI	86.12. 7~87. 1.18	BACTERIOLOGY
9		DR.YOSHIHIRO HAMASHIMA	86.12.14~87. 2. 8	PATHOLOGY
10		DR.KAZUO NAKANE	86.12.14~87. 1.18	ELECTRON MICROSCOPE
11		DR.YOSHIYA KANEDA	86.12.14~87. 1.18	PARASITROLOGY
12		DR.YUU MIDORIKAWA	86.12.14~87. 1.18	IMMUNOLOGY
13		DR.TOSHIO SHIKATA	87. 1. 4~87. 1.11	HEPATITIS
14		DR.MASAKAZU HATAKENAKA	87. 1. 7~87. 1.18	VIROLOGY
15		MR.YUKIO YAMANO	87. 2. 1~87. 2.22	CONSTRUCTION
16		DR.TOSHIO SHIKATA	87. 2.22~87. 3. 1	HEPATITIS
17		MR.NOBORU YAMAURA	87. 2.22~87. 3.22	CONSTRUCTION
18.	1987~1988	MR.TADAKATU HORII	87. 4. 5~87. 4.15	MEDICAL EQUIPMENT
19.		MR.SHUZOU ISHIKAWA	87. 4.26~87. 5. 3	ELECTRO ENGINEERING
20.		DR.KENJI ABE	87. 6. 7~87. 6.26	HEPATITIS
21.		DR.YOSHIHIRO HAMASHIMA	87. 7.22~87. 9. 1	PATHOLOGY
22		DR.OSAMU MATSUSHITA	87. 7.22~87. 9.22	BACTERIOLOGY
23		DR.HIDEO HAYASHI	87. 7.22~87. 8. 7	BACTERIOLOGY
24.		DR.TOSHIO SHIKATA	87. 9.25~87.10. 6	HEPATITIS
25.		DR.YUTO YAMO	87.10. 4~87.10.13	HEPATITIS
26.		DR.KOYU SUZUKI	87.10.18~87.11. 1	HEPATITIS
27.		DR.TOMIO TADA	87.12.13~87.12.22	IMMUNOLOGY
28.		DR.KAZUO NAKANE	87.12.13~88. 1.12	PATHOLOGY
29.		DR.YOSHIO KANEDA	87.12.13~88. 1.12	PARASITROLOGY
30		DR.SHIGERU OKADA	87.12.13~88. 1.12	PATHOLOGY
31		DR.TAKEHIKO KOUJI	87.12.13~88. 1.11	PATHOLOGY
32		DR.TOMOO TANAKA	87.12.13~88. 3. 1	PARASITROLOGY
33		DR.YOSHINORI ITOKAWA	87.12.20~88. 1. 5	EPIDIMIOLOGY
34		DR.HIDEO HAYASHI	87.12.30~88. 1. 5	BACTERIOLOGY
35		DR.TOSHIKAZU UCHIDA	88. 1. 1~88. 1.10	HEPATITIS
36		DR.TEIZOU TSUKAMOTO	88. 1. 6~88. 2. 7	BACTERIOLOGY
37		DR.FUMIO TAKEDA	88. 1. 6~88. 1.17	BACTERIOLOGY
38		DR.YUICHI OKU	88. 1. 6~88. 2. 7	BACTERIOLOGY
39.	1988~1989	DR.TOMOO TANAKA	88. 7.24~88. 8.21	PARASITROLOGY
40.		DR.KOYUU SUZUKI	88. 7.24~88. 8.21	HEPATITIS
41.	1989~1990	DR.HIDEO HAYASHI	89.10.22~89.11. 5	BACTERIOLOGY
42		DR.TOSHIKAZU UCHIDA´	89.10.22~89.10.31	HEPATITIS

ANNEX 3

LIST OF MYANMAR COUNTERPARTS SENT TO JAPAN

JAPANESE FISCAL YEAR	N A M E	TRAINING PERIOD	TRAINING FILED
1986-1987	1. MS. MI MI KHIN	87. 2. ～87. 8.	VIROLOGY
	2. DR. SOE SOE	86.10. 88.10.	PATHOLOGY
	3. DR. TUN PE	86. 9. 87. 9.	IMMUNOLOGY
1985-1986	4. MS. NAW ANGELINA	87. 2. ～89. 2.	VIROLOGY
	5. MS. CHO CHO HMAN	87. 2. ～89. 2.	PATHOLOGY
	6. MR. SAN WIN	87. 2. ～89. 2.	ANIMAL LABORATORY
	7. DR. SOE SOE	86.10. 88.10.	PATHOLOGY

ANNEX 4 PROVISION OF EQUIPMENT

JAPANESE FISCAL YEAR	ITEMS OF MAIN EQUIPMENT	AMOUNT C.I.F.:YEN
1986-1987	Chemicrete-E Deep Freezer Autoclve Momky Gage Operating Glovesstillized	¥15,196,000.-
1987-1988	Ultra-Low Freezer High Speed Refrigerated Centrifuge Refrigerator, 2door type Freezer, 4door type Autoclave Air-Driven Ultra-centrifuge Trinocular Microscope ELISA Reader EM Incubaor	¥79,610,000.-
1988-1989	Ultrasound Scannar Clean Bench Spectrophotometer UV monitor Fraction Collector	¥17,746,000.-
1989-1990 (PLAN)	Personal Computor Monkey Cages Osmometer,OSMOTORON-20 Microscope Photographic system Liquid Scintillation Counter Spare Parts for equipment already provided	¥50,000,000.-
	Total Amount	¥162,552,000.-

SUMMARY OF THE PROJECT COST

(unit: thousand yen)

JAPANESE FISCAL YEAR	1986/87	1987/88	1988/89	1989/90	TOTAL
COST OF DISPATCH OF EXPERTS	39883	80679	21787	10938	153287
COST OF PROVISION OF EQUIPMENT	15196	79610	17746	50000	162552
COST OF DISPATCH OF SURVEY TEAMS	2910	1179	0	2414	6503
COST FOR MIDDLE LEVEL STAFF TRAINING	0	0	0	0	0
OHTERS	301	762	230	262	1555
TOTAL	58290	162230	39763	63614	323897

Note: This table is as of January, 1990.
Japanese fiscal year is from April 1st to March 31th.
Cost of provision of equipment does not include transport charges
Cost of training of Myanmar counterpart personnel is not included in this table.

SOURCE OF DMR FUND 1986 - 1990

(Unit: Thousand Kyats)

Y E A R SOURCE OF FUND	1986/1987	1987/1988	988/1989	1989/1990	TOTAL
GOVERNMENT BUDGET	2831.00	3405.00	4856.00	5380.55	16472.55
OTHER	---	---	---	---	---
FOREIGN AIDS	4645.00	5708.00	4698.00	*1717.95	16768.95
T O T A L	7476.00	9113.00	9554.00	7098.50	33241.50

* Up to 31-12-1989

ANNEX 7

JAPANESE EXPERTS & MISSION

	3/1 1986 2/28	3/1 1987 2/28	3/1 1988 2/28	3/1 1989 2/28
1) Assignment of Expert Hepatitis Unit	6/18 ——7/18 (UCHIDA) 7/1——7/10 (SHIKATA) 7/1——7/13 (SHIKATA) 1/4 ——1/11 (SHIKATA) 2/22——3/1 (〃) 2/22	9/25 ——10/6 (SHIKATA) 10/4 ——10/13 (YANO) 10/18——11/1 (SUZUKI) 1/1 ——1/10 (UCHIDA)	——(IIDA) 10/22 12/7—12/21	10/22 —10/30 (UCHIDA) 5/31———— '90/5/30
2) Aminal Facility Unit (*:Consultant or Supervisor)	7/6——7/15 (SHIMADA) * 2/1 ——2/22 (YAMANO) * 2/22——3/22 (YAMANO)	4/5——4/15 (HORII) * 4/26——5/3 (ISHIKAWA) * 6/7 ——6/26 (ABE)		
3) Pathology EM Unit	12/14 ——1/18 (NAKANE)	12/13——1/12 (NAKANE) 12/13——1/12 (KOUJI) 12/13——1/12 (OKADA)		
4) Immunology Unit		12/13——12/22 (TADA)		
5) Nucleic Acid Unit	1/7 ——1/18 (HATANAKA)			
6) Epidemiology Unit	12/14 ——1/18 (MIDORIKAWA)	12/20——1/5 (ITOKAWA)		
7) Pathology Unit	12/14 —2/8 (HAMASHIMA)	7/22—9/1 (HAMASHIMA)		
8) Parasitology Unit	12/14 —1/18 (KANEDA)	12/13—1/12 (KANEDA) 12/13—3/1 (TANAKA)	7/24—8/24 (TANAKA)	
9) Bacteriology Unit	6/18—7/18 (HAYASHI) 12/7 —1/18 (HAYASHI)	7/22 —8/7 (HAYASHI) 12/30 —1/5 (HAYASHI) 7/22 —9/22 (MATSUSHITA) 1/6 —1/17 (TAKEDA) 1/6 —2/7 (TSUKAMOTO) 1/6 —2/7 (OKU)		10/22—11/5 (HAYASHI)
Others				
		Advisory Survey Team 1/13 —1/22		Evaluation Team 1/10—1/19

JAPAN INTERNATIONAL COOPERATION AGENCY PROJECT REPORT

1986 - 1990

DEPARTMENT OF MEDICAL RESEARCH, YANGON

(11th - 18th January 1990)

Ⅸ－3　研究論文概要一覧

CONTENTS

1. INTRODUCTION

The technical cooperation between the Department of Medical Research (DMR) and Japan International Cooperation Agency (JICA) commenced in 1966. After the construction of fully equipped Biomedical Research Centre, Biomedical Library, Laboratory Animal House and Electricity Transformer Station, the research momentum progressed in a fast pace.

The research programme on "Major Arboviral Diseases, Bacterial Diseases and Application of its results for the control of these diseases" was supported by JICA from 1980-1984. After this, the current ongoing programme entitled "Research on Treatment of Infectious Diseases of the Alimentary System" was funded in March 1986 and is ending in February 1990.

Due to unavoidable circumstances occurring in 1988, some of the projects under the programme are still incomplete and a request has been made to extent the period of research for one year, till February 1991.

The following report is on the last JICA funded programme (1986-1990) and research activities for the extension period.

2. GENERAL ACHIEVEMENTS

2.1. Academic:

Because of up-to-date facilities and training provided by JICA, DMR scientists are able to do many activities.

2.1.1. Research papers published

Between March 1986 and December 1989, there were a total of 54 research papers published; 40 in the international and 14 in the local journals respectively. These papers were published by

scientists who were engaged in the JICA projects. (Annex I)

2.1.2. Meetings/Workshops/Seminars

DMR is able to held the Medical Research Congress annually with an average of 60 research papers presented. In 1989 Medical Research Congress, a total of 63 medical research papers were presented; 30% of the papers were read by DMR scientists.

Altogether 32 scientists engaged in JICA projects have participated in international and local meetings/workshops/seminars within the last four years.

2.1.3. Educational activities

The scientists from DMR are not only involved in research, but also take an active participation in educational activities relating to health services. DMR scientists regularly give lectures and practical training to postgraduate medical students. They are also engaged in the supervision of the postgraduate research activities of both medical and non-medical candidates of the Medical Institutes and Universities respectively. They also act as examiners for the undergraduate and postgraduate medical and dental examinations. Moreover, the scientists are also examiners for the M.Sc. examinations at the Yangon University.

The scientists from DMR returning from fellowships, study tours, seminars and meetings abroad give scientific talks at DMR to disseminate and impart their recently acquired knowledge and experiences to fellow scientists.

Inservice training and workshops concerning laboratory technology and instrumentation were held in DMR for personnels from the Department of Health, the Department of Health Man-power Development and the Directorate of Medical Services, Ministry of Defence.

Due to the high level of expertise attained by DMR scientists and the availability of resources and high technology, universities from foreign countries (Queensland University of Technology, Brisbane, Australia, University of New South Wales, Sydney, Australia and University of London, London, United Kingdom) have accepted scientists from DMR to do doctorate degrees as external candidates. Two candidates have already obtained their doctorates. Furthermore, undergraduates and postgraduates from some foreign Universities (Four students from the University of New South Wales and one from University of Tokyo) also spend two months to one year in DMR and performed research projects as partial fulfilment of their educational requirements.

Utilizing the facilities provided by JICA, 44 candidates have successfully completed their theses or dissertations at DMR for their postgraduate degrees or diplomas within the last four years. Among these, 15 were from the Institutes of Medicine and the remaining 29 were non-medical graduates from Yangon University. Out of 44, 6 were postgraduate medical diplomas, 9 were Master of Medical Science degrees, 28 were Master of Science in Zoology and one was Master of Science in Botany. (Annex 2).

2.1.4. Consultants

A total of 26 Japanese experts in Pathology, Bacteriology, Parasitology, Experimental transmission work and Virology have come to DMR under JICA project according to the needs. (Annex 3)

A total of 40 short term consultants have come to DMR according to the needs of non-JICA projects utilizing the facilities provided by JICA. (Annex 4)

2.1.5. Fellowships

Three scientists and three technicians have been trained in Japan under the JICA projects. One scientist and two technicians are going to be trained in Japan very soon, (Annex 5).

2.1.6. International linkages

Nihon University, Tokyo collaborating with DMR for Non-A Non-B hepatitis study

Nagasaki Chou Hospital, Japan collaborating with DMR for Non-A Non-B hepatitis study

National Health in Medical Research Council (NHMRC), Australia for postgraduate training in Australia

University of New South Wales, Australia for undergraduate and postgraduate trainings in DMR

International Development Research Centre, Canada for upgrading of Library, Publication Division and Snake-bite research Unit

Hammersmith Hospital, London, United Kingdom for the study of Glucose-6-phosphate dehydrogenase deficiency in patients with falciparum malaria

National Institute for Medical Research, MRC, United Kingdom for the study of essential enzymes in the process of malaria merozoites invasion into erythrocyte

Instiute of Pathology, Case Western Reserve University, Cleveland, Ohio, USA has been collaborating with DMR for studies on pathology of compliaated malaria

Dr. D.A. Warell, Professor of Internal Medicine, Oxford University collaborated with DMR for snake bite research

Queensland University of Tehhnology, Brisbane, Australia for undergoing under-graduate and postgraduate trainings

University of London, London, United Kingdom for undergoing postgraduate training

Center for Disease Control (CDC) collaborating with DMR for hepatitis B vaccine study

Pasteur Vaccine France collaborating with DMR for study of mammalian cell derived DNA hepatitis B vaccine

2.2. FACILITIES UTILIZATION

2.2.1. Central Biomedical Library

The Central Biomedical Library of Department of Medical Researhh (CBL/DMR) is located at the new building donated by JICA. It provides Current Awareness Service, Photocopying Service, Readers Service, Loan Service and Bibliographic Service. There are library cooperation among the CBL/DMR and biomedical libraries under the Ministry of Health and also with the WHO/HELLIS network. CBL/DMR is the leading library as the National Focal Point. The library provides free MEDLINE Bibliographies, reprints and biomedical articles whihh are not available in the country by WHO/SEARO as the HELLIS activities.

Not only DMR scientists, but also personnel from different ministries utilize the available services. Personnel from Institutes of Medicine, Dental Medicine, Department of Health Services, Department of Health Manpower Development, Postgraduate students and scientists from Yangon University, Burma Pharmaceutical Industry, Development Centre for Pharmaceutical Technology, Central Researhh Organization and doctors from Defense Services General Hospital I and II utilize the library services provided by CBL/DMR. (Annex 6).

2.2.2 Conference Room

The conference room was donated by JICA in 1980. It is one of the most up-to-date conference room in Myanmar. Not only DMR, but also different departments from various Ministries and also International Agencies utilize the room. From September 1989 to December 1989 the conference room was used (7) times, details are shown. (Annex 7).

2.2.3. Instrumentation Division

The division is strengthened by providing counterpart training in Japan, equipment and spare parts under JICA project. Not only to DMR, services are given to National Health Laboratory. Institutes of Medicine I and II, Defense Services Hospital I and II, Worker's Hospital, Children Hospital, Pathology Division, Radioisotope Division and Physical Medicine Division of Yangon General Hospital. Institute of Animal Husbandry and Veterinary Science, Ministry of Education and test laboratory, Foodstuff and General Merchandise Trade Corporation, Ministry of Trade. (Annex 8).

2.2.4. Laboratory Animal Services Division

The division was established after building the animal house and training of staff in Japan under JICA project. The division has been able to breed and supply a sufficient number of animals towards the needs of scientists from 14 different institutions/hospitals apart from DMR. A total number of 27,963 small laboratory animals of different species has been supplied from 1986 to 1989. Detail list of animals supplied and the list of institutions/hospitals that utilise the service are summarised. (Annex 9).

2.2.5. Projects that utilized the facilities provided by JICA (Non-JICA Projects)

Because of the up-to-date facilities provided by JICA, scientists from DMR are not only able to do JICA projects but also many other projects funded by International Agencies. From 1986 to 1989 there were 43 non-JICA projects which utilized the facilities provided by JICA, 18 were DMR projects, 22 were WHO projects and 1 each from IDRC, PATH and USAID respectively. Moreover, scientists from Institute of Medicine I and Yangon University use the available facilities in DMR for their research work. (Annex 10).

3. CONTRIBUTION

3.1. Japan International Cooperation Agency

In addition to consultants and fellowships, a total of 3807 thousand kyats worth of equipment, supplies and chemicals was provided by JICA from 1986 to 1989. Another 30-50 million yen worth of equipment, supplies and chemicals for 1989-1990 will be received soon.

3.2. Myanmar Government

Input of Myanmar Government was 3000 thousand kyats for the year 1986 to 1989. The inputs were in terms of personnel, local utilities, etc.

4. IMPACT ON GENERAL POPULATION AND SPECIFIC POPULATION

The infectious diseases of the alimentary tract are included in the top ten priority diseases that occur in Myanmar. The JICA project in these diseases is very much appropriate and benefited not only the health personnel but also the general population. Due to the implementation of this project, we came to know the aetiology. pathophysiology, complication and mode of transmission of Non-A, Non-B hepatitis and the pathogenesis of bacterial infections of the gastrointestianl tract; serological diagnosis of amoebiasis was established and the preparation of specific antisera against some enteric bacteria was achieved. Dissemination of these findings to health workers, not only help in the treatment of these diseases but also in implementing preventive measures. Ultimately, the general population benefited immensely from the JICA aid.

Many other projects also utilized the facilities provided by JICA. Some of the output of these projects namely snake-bite and malaria research projects also directly benefit the general population.

Conference room, Biomedical Library, Laboratory Animal Services Division and Instrumentation Division were donated by JICA.

These facilities are utilized not only by DMR but also by personnel from different departments of different ministries as mentioned in the "Facilities Utilization" section.

Because of the JICA project, DMR is now able to produce specific antisera of some enteric bacteria. This is one of the important achievements, as it will save foreign exchange.

In conclusion we can be assured that general population receives the most benefit from this JICA aid.

5. Research on Treatment of Infectious Diseases of the Alimentary System Project

5.1. Sub-title: Research on Non-A Non-B Hepatitis

Obejectives: (1) To identify, isolate and characterize the faeco-oral NANB hepatitis virus present in Myanmar.

(2) To study clinical and pathophysiology of NANB hepatitis especially in pregnancy with NANB hepatitis.

(3) To conduct animal transmission studies of NANB hepatitis virus with the locally available rhesus monkeys.

Duration: (4 years) (1986-1989)

Findings: (1) Identification, isolation and characterization of NANB hepatitis virus

From 1986 to 1989 a total of 528 stool samples were collected from acute NANB hepatitis patients. 129 stool suspensions were examined by Immune Electron Microscopy technique using convalescent patients sera as antisera up to 1988 and virus like particles were not found. Since then acute phase patients sera were used for IEM examination and out of 25 stool samples Virus Like Particles (VLPs) were found in 5 stool samples. But the particles were very scanty and mostly empty ones. Virus containing stool samples were pooled and fractionated for the isolation of the virus. Fourteen fractions were obtained and IEM examination of each fraction did not reveal any VLPs.

(3) Animal Transmission Studies

Serial passage transmission of the NANB hepatitis virus in the locally available rhesus monkeys were conducted since 1987. In the experiment No. 1, using three monkeys inoculated with pooled stool of acute NANB hepatitis patients of Yangon, the monkeys were successfully infected as shown by enzyme elevation coinciding with liver histology changes. During the second experiment, using five monkeys where inocula were infected monkey stool, the most exciting and important result was achieved i.e., finding of numerous virus like particles in the bile of one of the infected monkeys. Since then serial passage experiments were going on using different inocula without any interruption to the present time. The present experiment is number X and since the beginning of this study 28 monkeys have been used. The findings of these experiments were already presented at Research Paper Reading Sessions of D.M.R., Myanmar Medical Association Annual Meeting and International Symposium on NANB hepatitis held at Tokyo, from different aspects.

Comment

At the beginning of this project the exphasis was on the IEM study of stool of patients and infected monkeys for the purification and isolation of the virus. However, as the project went on, it became clear that VLPs were

(2) Study of Clinical and pathophysiology of NANB hepatitis especially with emphasis on pregnancy with hepatitis

A total of 1452 cases of acute viral hepatitis cases admitted into Infectious Disease Hospital were examined and stool samples were taken. Clinical findings were recorded and analysed. Serology testing showed that out of 1452 patients, 644 cases were NANB hepatitis. Clinical features of NANB hepatitis were not different from other types of acute viral hepatitis. Follow up studies did not reveal any features of chronic sequelae.

Regarding the study on the NANB hepatitis in pregnancy, clinical and other factors responsible for the higher mortality did not reveal any significant findings. However, disturbed carbohydrate metabolism was suspected as a factor which could have adverse effect on pregnancy during hepatitis. Therefore glucose and insulin profiles before and after 75 gm of glucose load were studied in 15 pregnant women with viral hepatitis and 26 apparently normal male, female and pregnant subjects. The fasting glucose levels were found to be inversely correlated with SGOT and SGPT levels in viral hepatitis patients with pregnancy.

very few in the stool and not in sufficient quantity for the isolation and characterisation study. At the same time numerous VLPs were detected in the bile and which were found to be infectious. Therefore, it was decided to use bile as antigen source. Moreover with the great advancement in molecular biology techniques, traditional methods for the antigen antibody purification techniques became rather obsolete for the detection of this elusive virus. Therefore, starting from 1988, the whole strategy for the study of NANB hepatitis virus was changed. The project is now concentrating mainly on the collection of bile with VLPs as much as possible.

Operational Issues

Regular supply of viral marker test kits are very important for prompt identification of type of hepatitis so that further studies like stool collection and liver biopsy taking can be proceeded.

Activities during the extension period

Up to now no test system is available as yet for the Enterically Transmitted NANB hepatitis. All the Centres are competing for the successful development of the test system. Current works in our research programme are very satisfactory and very promising for the test system development. If D.M.R. Scientists continue harvesting of bile containing VLPs and Nihon University Scientists conduct molecular cloning techniques it is expected that test system will be developed within the next one year.

Another scientific experiment that needs to be carried out is development of another strain of NANB hepatitis virus. Present animal experiments using infected specimens of patients of Yangon area have established one NANB hepatitis virus strain that can be called Myanmar strain I.

Another strain, Myanmar strain II should be developed from the specimens of upper Myanmar. A preliminary survey trip has already been done by Dr. Khin Maung Win and Japanese Scientist Miss F. Iida recently for the collection of specimens. After establishing Myanmar strain II, corss-challenge studies should be conducted. The data coming out of these experiments will be very useful for the vaccine development and epidemiological study programmes.

As there are no NANB epidemics during the last five years, present studies can only be conducted as acute sporadic non A non B hepatitis. Recently there was a small Non-A Non-B hepatitis in a confined locally in Yangon and blood and stool samples of these patients were obtained. Therefore, epidemic Non-A Non-B hepatitis viral strain should also be developed and studied as mentioned above for Myanmar strain II.

In summary it is extremely important to extend this project for another one year to be able to accomplish the above mentioned important research works.

5.2. Subtitle : 1. Research on non-A, non-B virus(es) and non-A, non-B hepatitis.

Duration : 4 years (1986-1989)

Objective 1. To study the morphological characteristic of human NANB infected liver tissues and to look for virus(es).

Findings : A total of 17 liver biopsies from patients with acute viral hepatitis were studied histologically and ultrastructurally. No characteristic morphological changes were seen. virus particles were not visualized.

Activities during the extension period: Because of small sample size more samples will be collected and continue the study.

Objective 2: To transmit NANB hepatitis to locally available primates and to study morphological changes of experimentally infected monkeys' livers and to find virus(es).

Findings : Transmission of NANB hepatitis to cynomolgus and rhesus monkeys have been successfully accomplished in collaboration with the Experimental Medicine Division. Morphological changes of the liver tissues obtained from first and second passage animals were studied. VLPs were found inside hepatocytes. The findings were published in Liver journal in 1988, December.

Objective 3: To perform immunological studies of sera and liver tissues, to detect serological markers and to localize virus of viral antigens.

Findings: For the identification of serological markers of NANB hepatitis, the affinity of IgG from preinoculated and

convalescent sera of second passage animals to their respective liver tissues at the height of enzyme elevation were examined using avidin biotin system. There was no positive result.

For the localization of virus or viral antigens, indirect immunoperoxidase and immunoflorescent stainings were done on NANB infected monkeys' livers using both acute and convalescent sera from patients as well as animals. There was no positive staining. The stainings were repeated using monoclonal antibodies produced from hybridoma technique after sensitizing mice with VLPs obtained from bile. Positive reaction was detected inside hepatocytes. To confirm that the reaction was directed against VLPs immune electronmicroscopy was carried out. At the ultrastructural level the positivity was not against VLPs.

Activities during the extension period: IEM studies of NANB infected liver and other tissues will be reported when specific antibodies to NANB virus are developed.

Objective 4: To detect VLPs from serum, liver homogenate, stool and bile.

Findings: VLPs were searched in acute serum of animal under EM after concentration. VLPs were not detected. Liver tissues from infected animals were homogenized, sonicated, ultracentrifuged and examined. VLPs were not found. Liver homogenates were reacted with acute and convalescent sera and examined. VLPs were not seen. Stools from infected monkeys were prepared for virus suspensions, reacted with acute and convalescent sera and examined. Aggregated VLPs were visualized. Bile from infected animals were examined. Naturally aggregated VLPs were seen.

Objective 5: To study the mechanism of virulence of NANB hepatitis in pregnancy.

Findings: Coagulation parameters including screening tests, some coagulation factors and FDPs were assayed in pregnant women with hepatitis A, B and NANB. Mild to moderate degree of DIC was found in pregnancy with hepatitis.

Subtitle 2: Research capability strengthening

Objective 1: To establish an animal model of NANB hepatitis.

Achievement: An animal model of NANB hepatitis had been established.

Objective 2: To establish immunoperoxidase and immunoflorescent techniques.

Achievement: Immunoperoxidase and immunoflorescent techniques had been established.

Objective 3: To upgrade the interpretation of histological and ultrastructural features of NANB infected liver biopsy.

Achievement: A scientist was trained in Nihon University School of Medicine.

Objective 4: To establish immune electronmicroscopy and methods to detect viral DNA/RNA (Hybridization techniques).

Achievement: Immune electronmicroscopy and hybridization techniques had not been completed.

Activities during the extension period: Immune electronmicroscopy and hybridization techniques will be completed in the extension period provided that experts and necessary supplies arrive in time.

Objective 5: To establish method for detection of circulating immune complexes.

Achievement: C1q binding assay method was attempted for the detection of circulating immune complexes. In the C1q purification step a high efficiency ultracentrifuge was needed. Because of lack of a high efficiency ultracentrifuge the assay can not be completed.

Operational issue: **We received a damaged ultracentrifuge.**

Activities during the extension period: C1q binding assay will be completed if the ultracentrifuge is repaired in time.

5.3. Sub-title 1: Propagation and detection of Non-A, Non-B hepatitis virus in cell culture

Duration: (2) years 1988-1989

Objectives: To obtain a local strain of NANB hepatitis virus for physical, chemical and biological characterization of the virus and for development of an immunoassay system

Findings: Faecal extracts from monkeys experimentally infected with NANB hepatitis virus were treated with trypsin and inoculated into cell culture systems namely, chimpanzee liver and primary liver carcinoma cell lines. The inoculated cell cultures were incubated at different temperatures. So far, NANB hepatitis virus had not been isolated in cell culture.

Activities during extension period:

Further attempts will be made to isolate and propagate NANB hepatitis virus in cell culture during the extension period, 1990-1991.

Subtitle 2: Avidin-biotin enzyme immunoassay for the diagnosis of rotavirus infection

Duration: (4) years 1986-1989

Objectives:

To develop a sensitive and rapid assay for the detection of rotavirus to be employed in the epidemiological and clinical studies of rotavirus diarrhoea

Findings:

Among the diagnostic tests available for the detection of rotavirus, RIA and ELISA are the most sensitive. RIA requires the use of radioisotopes with their attendant cost, hazard and disposal problems. ELISA has none of these disadvantages, but generally, ELISA sensitivity has been reported to be less than or equal to that attained with a microtitre solid-phase radioimmunoassay. In an attempt to increase the sensitivity of the ELISA, the biotin/avidin system which was originally described for immunochemical staining of tissues has been incorporated. In a biotin/avidin ELISA the biotinylated antibody is used for specific interaction with antigen inconcert with enzyme conjugated avidin as a detection probe.

Rotavirus antisera was raised in rabbits using stool-derived as well as cell culture-derived rotavirus as immunogens. Antisera obtained has a satisfactory titre of rotavirus-specific antibody when tested by the conventional ELISA and by the indirect immunofluorescent technique. This antisera was fractionated into antirotavirus immunoglobulin by salt fractionation and ion exchange chromatography. Biotinyl-N-hydroxysuccinimide was used to covalently bind biotin to antirotavirus immunoglobulin by a procedure described by Yolken et al. (1983). Optimal working dilutions of the reagents were determined by

checkerboard titrations.

Activities during extension period:

The checkerboard titrations are in progress and when optimal working dilutions of the reagents to be used in the assay have been determined, the accuracy, specificity and sensitivity of the avidin-biotin enzyme immunoassay will be evaluated compared to a reference conventional ELISA using a panel of rotavirus positive and negative stool samples. The study will be completed during the extension period, 1990-1991.

5.4. Sub Title: Research on Entamoeba histolytica and amoebic infection of the liver and gut.

Duration

4 years (1986-1989)

Objectives

(1) to establish polyxenic and monoxenic cultures.

(2) to study the enzyme pattern of E. histolytica by isoenzyme characterisation.

(3) to culture E. histolytica axenically.

(4) to establish immunodiagnostic tests for detection of Antigen and Antibody.

Findings

- We were able to establish polyxenic and monoxenic cultures during the first year (1986-1987).
- Characterisation of E. histolytica by isoenzyme electrophoresis was performed according to the method of (Mathews et al., 1983), on 10 isolates of E. histolytica obtained from patients in Myanmar. The indicating enzymes used were GPI, (glucose phosphate isomerase), PGM (Phospho gluco mutase) HK, hexokinase & ME (Maleic). Taking migration distance of control HK-9 band, 10 isolates were found to be invasive type.
- Axenic culture method was established.
- Detection of E. histolytica antigen in (148) stool samples using monoclonal antibodies was completed. 68.24 percent was found to be positive by Microscopy, gave OD values ranging from 0.08, 0.86. 31.75 percent found to be negative by microscopy gave the range of OD values 0.08, 1.05.

- Detection of serum antibody against E. histolytica in 61 patients by ELISA method was also completed. Out of 61 patients, 75.4 percent was found to be positive by microscopy giving OD values with the range of 0.02 to 1.4.
- Identification of amoeba like organism isolated from knee aspirate was done, and the organism was found to be E. histolytica by cultural ELISA and Immunoperoxidase staining methods.
- From the one year study (1987-1988) on the prevalence of parasitoses in gastroenteritis patients from 4 different hospitals, it was found that the prevalence rate of E. histolytica infection in dysenteric patients was 89.22 percent.
- Operational issues

  Control strains of E. histolytica were not able to obtained during the year (1988-1989).
- Activities during the extension period.

  We need to do studies on more isolates obtained from asymptomatic cases. About 10 more cases of asymptomatic patients have to be studied during the extension period. This can be completed during the extension period.

  The present methods of ELISA using polyclonal or monoclonal antibodies or isoenzyme electrophoresis do not give sure index of differentiation between the invasive and non-invasive amoeba; The recent methods of DNA dot blot hybridization may need to be carried out during the extension year to fulfil the main objective.

Subtitle: Development of hybridoma technology

Duration: (4) years 1986-1989

Objectives: To develop hybridoma technology at the Immunology Research Division

Findings: With the present available facilities, fusion between spleen cells of Balb/c mice immunized with Russell's viper venom and myeloma cells, ℵ 63.Ag8.1214 were attempted and resultant hybridomas were cloned. Ascitic fluids from pristane primed Balb/c mice injected with hybrids were tested for neutralisation of biological properties of venom. Since pure antigens are not available yet, proof for monoclonality and identification of immunoglobulin subclass could not be done because of lack of facilities and reagents.

Since most of the equipments and reagents required for hybridoma work did not arrive yet, characterization of the antigen and antibody could not be done and introduction of hybridoma technology will be delayed.

Activities during extension period:

If the duration of the project is extended for a period of a year, it is expected that this technology will be established in the Department of Medical Research provided the equipments and reagents arrive in time.

1.6. Sub Title.1: Development of Technology for study of enteric bacteria

1. The production of antisera against important Escherichia coli serogroups and serotypes.
2. The plasmid analysis of E. coli causing diarrhoea in Myanmar.
3. Isolation and identification of diarrhoeagenic bacteria and the pathogenesis.
4. Pathogenicity of enterotoxin from E. coli.

Duration: 4 years (1-1-86 to 31-12-89)

Objectives:
1. To obtain the specific antisera with high quality for a rapid diagnosis and to establish a serodiagnosis laboratory.
2. To apply the advance technology for the detection of pathogenic E. coli strains.
3. To know the distribution of E. coli and other pathogenic bacteria among the population.
4. To know the pathogenicity of E. coli enterotoxins

Findings

1. The production of antisera against important E. coli serogroups and serotypes

34 rabbits were used for raising E. coli antisera and the following antisera were obtained.

OK antisera

0 26 K69 H31lb	0119 K69 W 34
044 K74 H702	0125 K70 Canioni
055 K59 Su3912/41	0127 K63 Ewing 4932-53
0111 K58 Stoke W	0142 K+ C771

01 K 51 U5/41	06 K15 Bi7458/41
086 K61 H35	08 K40 G3404/41
086 K62 DENKA	025 K+ E47a
0114 K90 W26	027 K+ F9884/41
0126 K71 E611	078 K80 E38
0128 K67 Cigleris (56-54)	0148 K+ E519-66
0146 K89 2950/54	0159 K+ E2476-72
0157 K+ A2	

2. The plasmid analysis of E. coli causing diarrhoea in Myanmar

A course on recombinent DNA techniques by a Japanese expert was conducted. 12 staff from various Divisions as Bacteriology, Biochemistry, Entomology, Experimental Medicine, Parasitology and Pathology were attended. Isolation of LT gene fragment responsible for pathogenicity of E. coli was also done using pJYL 2299 strain.

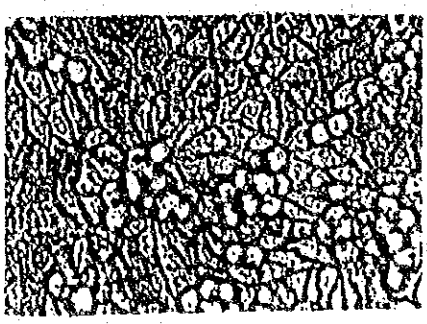
3. Isolation and identification of diarrhoeagenic bacteria and the pathogenesis.

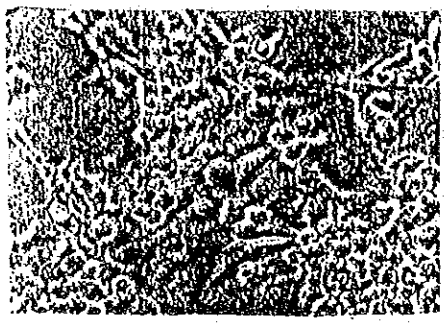
A total of 562 stool samples were tested conventionally by routine bacteriological examination. The organisms isolated were Salmonella, Shigella, Aeromonas, Pleisiomonas, Vibrios and Escherichia coli.

Simultaneously, 390 stool samples were tested for possessing of LT, VT1 and VT2 toxins by rapid Bead ELISA method and found that 13.8 per cent possessed either one two or all three toxins tested.

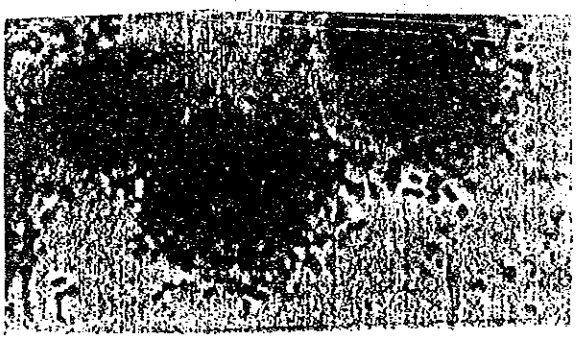
Strains isolated were stocked in Nutrient Agar and then proceededcfor serology and for pathogenesis.

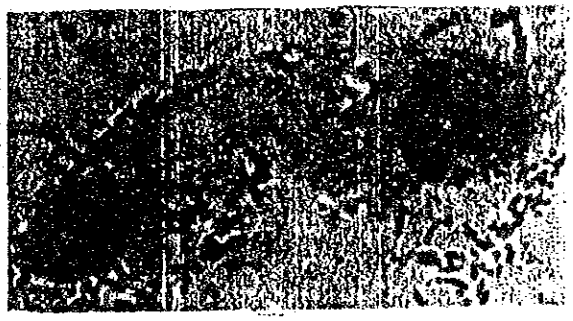
4. Pathogenicity of enterotoxin from E. coli





A. Vero cell cytotoxicity of E. coli toxins was established and 586 strains of E. coli were tested and reported previously. Recently, another 80 strains of E. coli were tested and still under study.





B. Enteroadhesive factor of E. coli on Hep-2 cells was also established. During the past 2 years of duration 300 strains of E. coli were tested and still under study to know the relationship between adhesive factor, vero cell cytotoxicity and serotypes.

Operation issues

1. Production of antisera against important Escherichia coli serogroups and serotypes.

   Due to shortage of untimely arrival of standard antisera from Japan, the experiments are still underway.

2. Isolation and identification of diarrhoeagenic bacteria and the pathogenesis.

   Due to the shortage of coated beads, conjugates and standard toxins of VT1 and VT2, the bacteria isolated could not be detected whether they produced toxins or not.

3. Pathogenicity of enterotoxin from E. coli

   Hep-2 and vero cells which are maintained in this laboratory are becoming aged and sometimes difficult to grow monolayers within a short period and due to the shortage of LabTek chamber slides the experiments are not easily carried out.

Activity during extension period

In summary, we are expected to finish the above 3 projects in the extension period, provided that the antisera, coated beads, conjugates known toxins and other important items as LabTek and vials are arrive in time.

Sub-title: 2 Research on Biochemical Characters of Shiga Toxin

Objectives : (1) In order to isolate and purify the subunits of Shiga toxin

(2) To find out their biological effects and pathogenicity.

Duration : 3 years (1986-1988)

Findings : In order to isolate and purify the subunits of shiga toxin and to find out their biological effects and pathogenicity, shiga toxin was purified from both the culture supernatant and cell lysate of Shigella dysenteriae type 1 strain. Purified toxin showed biological properties like cytotoxicity and enterotoxicity when studied by tissue culture assay (Gentry & Dalrymple, 1980) and rabbit ileal loop assay (Formal et al., 1961) respectively. (Data had been reported to JICA Evaluation team in 1988).

Activities during the extension period: Characterization and determination of molecular size and further purification of shiga toxin are necessary to be conducted as the toxin is still at the partially purified state. This will be completed within the extension period.

Sub-title - 1 Contamination of drinking water during collection and storage.

This study was verbally requested by Prof. H. Hayashi. This paper was published in Tropical and Geographical Medicine in Feb. 10, 1989.

Duration (one month) June 1987

Objectives: To determine the contamination points in the drinking water collection process.

Findings: Increasing contamination during water collection from the source to home storage, was found in all the studied households using 4 different types of drinking water.

Sub-title - 2 Toilet paper and paper towel use after defecation and hand contamination.

This study was verbally requested by Prof. T. Takeda.

Duration (12 months) December 1988 to January 1989

Objectives: To determine if hand contamination can be prevented by using toilet paper and paper towels for personal toilet after defecation.

Findings: Toilet paper as well as paper towels were found to be effective in preventing faecal contamination of hands during defaecation.

5.7. Research activities for extension peric . (1990-1991)

Continuation of " the Treatment of Infectious Diseases of Alimentary System"

1. Research on Non-A Non-B Hepatitis (NANB)

1.1. Development of diagnostic test system of NANB hepatitis by Experiemntal Medicine Division

1.2. Propagation and detection of NANB hepa titis virus in cell culture by Virology Research Division

1.3. IEM of theNANB infected liver and other tissues: If specific monoclonal antibody against NANB virus is available by Pathology Research Division

1.4. Detection of NANB related immune complexes in NANB infected patients and animals sera provided high efficiency ultra centrifuge is available by Pathology Research Division

1.5. Continuation of morphological characterization of NANB infected livers from patients by Pathology Research Division

2. Research on Rota virus (RV)

2.1. Avidin biotin enzyme immunoassay for the diagnosis of rotavirus infection by Virology Research Division

3. Research on Entamoeba histolytica

3.1. To differentiate between the invasive and non-invasive strains of E. histolytica by using DNA technology by Parasitology Research Division

4. Development of technology

4.1. Development of hybridoma technology by Immunology Research Division on arrival of necessary supplies and reagents

4.2. Cytotoxins production from Shigella and E. coli strains by Bacteriology Research Division

4.3. Pathogenesis of E. coli by Bacteriology Research Division

4.4. Continuation of antiserum preparation by Bacteriology Research Division

4.5. In situ hybridization of liver and other tissues by Pathology Research Division

5. Promotion and upgrading of loboratory facilities for disease control of laboratory animals by Laboratory Animal Services Division

3.8. JAPANESE EXPERTS REQUESTED FOR EXTENSION PERIOD

Bacteriology Research Division

1. Prof. Hayashi	---	one month
2. Prof. Takeda	---	one month
3. Prof. Ito	---	one month

Immunology Research Division

1. Dr. Keiko Mosikawa	---	one month

Parasitology Research Division

1. Prof. Y. Kaneda	---	one month (Feb. 1991)

Experimental Medicine Division

1. Prof. Toshio Shikata	---	two weeks
2. Dr. Toshikazu Uchida	---	two weeks
3. Prof. Michitemi Yan	---	two weeks
4. Dr. Koyu Suzuki	---	two weeks

Pathology Research Division

1. Dr. Fujioka (For Electron Microscope)	---	two weeks
2. Dr. Kojima	---	one month
3. Dr. Moriko Esumi	---	three months

Laboratory Animal Service Division

1. Prof. T. Nakagawa (NIH)	---	three months
2. F. Iida	---	one year

* Electron Microscope has been using for more than ten years without proper servicing. Now the alignments are not perfect as before. EM expert is needed urgently.

3.9. Counterpart training in Japan for extension period 1990 - 1991.

1. Bacteriology
2. Animal house
3. Nutrition
4. Physiology

3.10. Fund requested for extension period (1990-1991)

A total amount of 30 to 50 million yen worth of laboratory equipments, spares, supplies and chemicals are requested for the extension period 1990-91.

6. LABORATORY ANIMAL SERVICES DIVISION REPORT

Functions/Objectives:

(1) To provide good quality laboratory animals to all research divisions of Department of Medical Research as well as other scientists from various institutions.

(2) To do research on breeding performance, growth and development of laboratory animals.

(3) To hybridize local wild rabbits with pure strains of imported rabbits to have better hybrids which are more resistant to changing of environmental conditions.

(4) To maintain stocks and biological data of the following animals which are ensured for genetic purity and free from certain pathogens.

The following animals are housed in the Animal Services Division:-

Mouse - Out-bred strains (DDY, icr)
In-bred strains (CBA, BALB/c, A, AKR, C57BL/6J, C3H/He, Nu/Nu, Nude+, DBA2)

Rat - Wistar (Japan)
OFA (France)

Guinea-pig - Hartley (Albino)
Local (Stripe)

Rabbit - Japanese White
New Zealand White
Hamalayan
Wild rabbit (Myanmar)
Hybrids (JW/M, NZW/M, H/M)

Utilization

The division has been able to breed and supply a sufficient number of animals towards the needs of scientists from various institutions upto national level.

The following national institutions have utilized various kinds of laboratory animals for their research purposes.

1. Ministry of Health
   (1) Department of Medical Research
   (2) Institute of Medicine (1), Yangon
   (3) Institute of Medicine (2), Yangon
   (4) Institute of Medicine, Mandalay
   (5) National Health Laboratory, Yangon
   (6) General Hospital, Yangon
   (7) Children Hospital, Yangon
   (8) Eye, Ear, Nose and Throat Hospital, Yangon
   (9) Rodent Control Unit, Yangon
2. Ministry of Education
   (1) Arts and Science University, Yangon
   (2) Veterinary Research Institute, Yangon
3. Ministry of Industry
   (1) Burma Pharmaceutical Industry, Yangon
4. Ministry of Agriculture and Forest
   (1) Zoological Garden, Yangon

Research Activities:

The following research activities have been acheived during 1986 to 1989.

(1) Hybridization of rabbit colony under laboratory condition
(2) The role of environmental and space factors on the breeding performance of laboratory mice
(3) A comparative study on various strains of laboratory inbred mice
(4) Descriptive analysis on growth and development of laboratory rats in relation to some haematological and parasitological parameters.

The above research findings revealed that there are some unwanted protozoal and helminthic infestations in small laboratory animals. Therefore, we come to realized that there is an urgent need for establishment of laboratory facilities to have disease control measures in laboratory animals.

We, therefore propose that the establishment of laboratory be considered during the extension period.

ANNEX 1.

List of papers published

Paper published in International Journals.

1. Aung Myo Han, Khin Nwe Oo, Tin Aye and Thein Hlaing (1986) Personal toliet after defaecation and the degree of hand contamination according to different methods used. J. Trop. Med. Hyg. 89, 237-241.

2. Khin Maung U, Tin Aye, Myo Khin, Nyunt Nyunt Wai, Thane Toe (1986) Composition and contamination of oral rehydration solutions prepared from well water by village mothers. Trans. Roy. Soc. Trop. Med. Hyg.

3. Bundo.K., Torres.C.A., Chanyasanha,C., May La Linn and Igarashi,A. (1986). Antibody response in Japanese encephalitis and dengue haemorrhagic fever patients measured by indirect ELISA. Trop. Med.28, 101-114

4. Bundo,K., Chayasanha,C., May La Linn. Torres,C.A. and Igarashi,A. (1986). IgM capture ELISA for serodiagnosis of Japanese encephalitis and its differentiation from dengue virus infection. JE & HFRS Bull.1,27-35

5. Hori,H., May La Linn and Igarashi,A.(1986). RNA fingerprint analysis of dengue serotypes 3 and 4 virus isolated in South East Asia. Trop. Med. 28, 261-268.

6. Nakamura,T., Good,R.A., Yasumizu,R., Inoue, S., Maung Maung Oo, Hamashima,Y. and Ikehara,S.(1986). Successful liver allografts in mice by combination with allogenic bone marrow transplantation. Proc. Natl. Acad. Sci. 83. 4529-4532.

7. Aikawa,M., Maung Maung Oo and Igarashi, I.(1986). Human cerebral malaria: a pathological study. International Symp. on Malaria. Mem. Inst. Oswaldo Cruz, Rio de Janeir, Vol. 81, Suppl. 11, 191-198.

8. Tun Pe and Khin Aung Cho (1986). Amount of venom injected by Russell's viper (V. russelli). Toxicon. 24, 730-733.

9. DMR Working Group on Clinical Trial of RV Venoid (1986).Trial of Russell's viper venoid. i. Immunization of monkeys with venoids. Trans. Roy. Soc. Trop. Med. Hyg. 80, 420-422.

10. DMR Working Group on Clinical Trial of RV Venoid (1986). Trial of Russell's viper venoid. ii. Human immunization with venoids. Trans. Roy. Soc. Trop. Med. Hyg. 80. 423-425

11. Myint Oo (1986). Isoenzyme variation in harvested schizonts of P. vivax from Burma. Trans. Roy Soc. Trop. Med. Hyg. 80. 1-4

12. Han, A.M, Aye, T and Hlaing, T. (1987). An outbreak of dysentry due to shigella dysenteriae type 1 in Rangoon. J. Diar. Dis. Res 5, 1.6.
13. Khin Maung U, Myo Khin, Tin Aye, Myo Min Aung, Soe Soe Aye, Thane Oke Kyaw Myint and Khin Than Nu (1987). Clinical features including haemolytic-uraemic syndrome in Shigella dysenteriae type 1 infection in children of Rangoon. J. Diar. Dis. Res. 5, 175-177.
14. Thet Win and Thein Than (1987). Rapid and sensitive detection of dengueviral antigen using immunogold in light microscopy and solid phase gold immunoassay. Microbiol Immunol 31, 183.
15. Maung Maung Oo, Aikawa, A, Than Than, Tin Maung Aye, Pe Than Myint, Igarashi, I and Schoene, W.C. (1987). Human cerebral malaria: a pathological study. J. Neuropathol Exp Neurol. 46, 223-231.
16. Igarashi 1, Maung Maung Oo, Stanely H, Reese, R and Aikawa, A.(1987). Knob antigen deposition in cerebral malaria. Am. J. Trop. Med. Hyg 37, 511-515.
17. Than Than, Khin Ei Han, Hutton. R.A, Myint Lwin, Tin Nu Swe, Phillips. R.E, and Warrell.D.A. (1987). Evolution of coagulation abnormalities following Russell's viper bite in Burma. Brit. J.Haematol. 65, 193-198.
18. Khin Ei Han, Than Than, Soe Soe and Hutton.R.A. (1987). In vitro studies of Russell's viper venom on blood coagulation and fibrinolysis. Thrombosis Res. 46, 363-369.
19. Tun Pe, Tin Nu Swe, Myint Lwin, Warrell.D.A, and Than Win(1987). The efficacy of tourniquets as a first aid measure for Russell's viper bite in Burma. Trans. Roy. Soc. Trop. Med. Hyg. 81. 403-405
20. Tun Pe, Warrell. D.A , Tin Nu Swe, Phillips. R. E, More. R. A, Myint Lwin and Burke. C.W (1987). Acute and chronic pituitary failure resembling Sheehan's Syndrome following Russell's viper bite in Burma. Lancet. ii, 763-767.
21. Aung Myo Han, Thein Hlaing, Myat Lay Kyin and Than Saw (1987). Hand washing intervention to reduce ascariasis in children. Trans. Roy Soc. Trop Med. Hyg 81, 153.
22. Myint Lwin, Kyaw Win, Ye Htut, Ye Thwe, Tin Thein Lwin and Khin Win (1987). The use of immunofluorescence to evaluate the efficacy of malaria chemoprophylaxis. Trans. Roy Soc Trop Med Hyg. 81, 896.
23. Myint Lwin, Targett. G.A.T and Doenhoff. M. J. (1987). Reduced efficacy of chemotherapy of plasmodium chabandi in T cell deprived mice. Trans. Roy Soc. Trop. Med. Hyg 81, 899.

24. Thein Hlaing, Than Saw and Myint Lwin (1987). Reinfection of people with Ascaris Lumbricoides following single 6 month and 12 month interval mass chemotherapy in Okpo village, rural Myanmar. Trans Roy Soc Trop Med Hyg 81, 140-146.

25. Pe Than Myint, Tin Shwe and Myint Oo (1987). CSF lactate in falciparum malaria patients. Lancet i, 330

26. Soe Thein, Htay Aung and Sebastian. A. A. (1988). Study of vector, amplifier and human infection with Japanese encephalitis virus in a Rangoon community. Am. J. Epidemiol. 128, 1376-1382.

27. Soe Thein (1988). Comparison of intracerebral and intrathoracic routes of mosquito inoculation for the isolation of dengue viruses. Mosquito Borne Diseases Bull 5, 15-17.

28. Than Than, Hutton.R.A, Myint Lwin, Khin Ei Han, Soe Soe, Tin Nu Swe, Phillips. R. E. and Warrell. D. A (1988). Haemostatic disturbances in patients bitten by Russell's viper. Brit. J. Haematol 69, 513-520

29. Pe Than Myint, Tin Shwe and Myint Oo (1988). Clinical significance of blood and CSF lactate in falciparum malaria patients. Trop Biomed, 5, 57-63.

30. Aung Myo Han, Khin Nwe Oo, Midorikawa. Y and San Shwe (1989). Contamination of drinking water during collection and storage. Trop Geograph Med. 41, 138-140.

31. Khin Nwe Oo, Phyu Phyu Win, Aung Myo Han and Tin Aye (1989). Contamination of currency notes with enteric bacterial pathogens. J. Diarrh. Dis. Res. 7, 246-248.

32. Wachsmuth. K, Stroekhine. N. A, Aye T, Cook. W.L, Barrett.T.J, Sack. D and Wells. J. G. (1989). DNA probes for enteric bacterial pathogens. In Rapid Methods and Automation in Microbiology and Immunology. pp 412-415.

33. Flewett. T.H, Arias.C. F, Ghafoors. A, Mathan. M. M, Mendis. L, Moe K, and Bishop. R. F. (1989). Comparative evaluation of the WHO and DAKOPATTS enzyme-linked immunoassay kits for rotavirus detection. Bull. WHO 67, 369-374.

34. Than Than, Francis. N, Tin Nu Swe, Myint Lwin, Tun Pe, Soe Soe, Maung Maung Oo, Phillips. R.E, and Warrell. D.A (1989). Contribution of focal haemorrhage and microvascular fivring deposition to fatal envenoming by Russell's viper (Vipera russelli siamensis) in Burma. Acta Tropica. 46,23-38.

35. Myint Lwin, Tin Nu Swe, Myint Aye Mu, Than Than and Tun Pe (1989). Heparin therapy in Russell's viper bite vectims with impending DIC (a controlled trial). SEA J. Trop. Med. Pub Hlth 20, 265-269

36. Soe Soe, Uchida. T, Suzuki. K, Komatsu.K, Shikata. T, Rikihisa. T, Mizuno.K, Khin Maung Win and Khin Maung Tin (1989). Enterically transmitted non-A. non-B hepatitis in cynomolgus monkeys: Morphology and probable mechanism

of hepatocellular necrosis. Liver 9, 135-145
37. Maung Maung Oo and Than Than (1989). Pathogenesis of ring hemmorrhage in cerebral malaria. Ann. Trop. Med. Parasitol. 83, 555-557
38. Muso. E, Tun Pe, Kudo. T and Yoshida. H (1989). Specific binding to methylated polynucleotides in monoclonal antipoly (dT) antibodies from autoimmune mice. Clin. Immunol. Immunopathol. 50, 298-306
39. Thein Than, Tin Tun, Warrell.D.A, Phillips. R. E, Myint Lwin and Tin Nu Swe (1989). Development of renal function abnormalities following Russell's viper (Vipera russelli) bite in Myanmar. Am. J. Trop. Med. Hyg (in press)
40. Soe Soe, Than Than and Khin Ei Han (1990). The nephrotoxic action of Russell's viper venom (Vipera russelli siamensis). Toxicon (in press).

Papers Published in Local Journals

1. Kyaw Win and Maung Maung Oo (1987). Pathophysiology of human cerebral malaria. Bur. Med. J .33, 31-36
2. Khin Nwe Oo, Sebastian. A. A and Tin Aye (1989). Carriage of enteric bacterial pathogens by house flies in Yangon, Myanmar. J. Diarrh. Dis. Res. 7, 258-262.
3. Phyu Phyu Win and Tin Aye (1989). Application of modified ELISA test for detection of Shigella and enteroinvasive E. coli strains. Myan. Hlth. Sc. Res. J. 1(1). 24-28
4. Khin Nwe Oo, Myint Lwin and Aung Mon (1989). Isolation of salmonellas from stool, foods, flies and currency notes. Myan. Hlth. Sc. Res. J 1. (2), 48-50.
5. Maung Maung Oo, Ikehara. S and Hamashima. Y. (1989). Immune mechanisms in mouse malaria (1): Period of survival correlates with immune deficient status, but not with antibody titres and immune complex levels. Myan .Hlth Sc. Res. J. 1(2), 1-8
6. Than Than, Soe Soe and Khin Ei Han (1989). Heparin trial on experimenttallly envenomated animals. Myan. Hlth Sc. Res. J. 1(3)(in presw).
7. Myint Oo, Cho Cho Oo. Myint Lwin, Wai Wai Naing and Maung Mon (1989). The relationship between the intensity of malaria infections and diffrent types of G6PD deficiency in children. Myan. Hlth. Sc. Res. J.1(1),1-8
8. Myint Oo and Khin Ohn Lwin (1989). Some observations on the effects of berberine against trichomoniasis in burmese women. Myan. Hlth. Sc. Res. J.1(1). 29-34
9. Kyaw Win, Ye Thwe, Aung Khaw Zaw, Yin Yin Htun. Khin Maung Thwin and Myint Lwin (1989). Monitoring the efficacy of mefloquine, quinine and amodiaquine by in vivo and in vitro studies in uncomplicated falciparum malaria. Myan. Hlth. Sc. Res. J.1(1), 41-44

10. Myint Oo and Sein Min (1989). Isoenzyme Variation in gametocytes of Plasmodium falciparum is isolates from Myanmar. Myan. Hlth. Sc. Res. J. 1(2), 15-20.

11. Myint Oo and Omerod, W.E. (1989). Experimental amoebiasis in mice immunosuppressed with cyclophosphamide injection and whole body irradiation. Myan. Hlth. Sc. Res. J.1(2). 27-32.

12. Tin Shwe, Khin Soe Mu, Pe Than Myint, Lin Soe, Win Myint and Ye Htut (1989). The effect of artemether (Qinghaosu derivative)oon the development of Plasmodium falciparum trophozoites. Myan. Hlth. Sc. Res. J.1.(2).45-47.

13. Myint Oo (1989). Influence of pH on the growth rates of Entamoeba histolytica in cultures. Myan. Hlth. Sc. Res. J.1(3)(in press)

14. Thein Than, Tin win and Hla Pe (1989). Studies on reddishbrown stained urine excreted in rats after Viper russelli (Russell's viper) Myan. Hlth. Sc. Res. J1(1), 48-51

Annex 2

Candidates who have done their thesis/dissertation at DMR utilizing facilities provided by JICA

Department	Number of candidate	Institute/University	Thesis/ Dissertati
Bacteriology Research Division	2	Instutute of Medicine(1) (Yangon)	D.Bact.
	1	Yangon University	M.Sc.(Bot)
	7	Yangon University	M.Sc.(Zool
Biochemistry Research Division	4	Institute of Medicine (Mandalay)	M.Med.Sc. (Biochem)
Experimental Medicine Research Division	2	Institute of Medicine(1) (Yangon)	M.Med.Sc.
	1	Institute of Medicine (Mandalay)	M.Med.Sc.
Immunology Research Division	1	Yangon University	M.Sc.(Zool
Laboratory Animal Service Division	4	Yangon University	M.Sc.(Zool
Parasitology Research Division	1	Institute of Medicine(1) (Yangon)	D.Bact.
	1	Institute of Medicine (Mandalay)	M.Med.Sc.
	1	Institute of Medicine(1) (Yangon)	M.Med.Sc.
	11	Yangon University	M.Sc.(Zool
Virology Research Division	3	Institute of Medicine(1) (Yangon)	D.Bact.
	4	Yangon University	M.Sc.(Zool
Pathology Research Division	4	Yangon University	M.Sc.(Zool

Annex 3

JAPANESE CONSULTANTS

Year	Name	Subject	Related projects
1986	Prof.Y.Kaneda	Amoeba project	JICA
	Prof.H.Hayashi	Bacteriology	JICA
	Prof.H.Hayashi	Bacteriology	JICA
	Dr.Uchida	Hepatitis	JICA
	Dr.Y.Shimizu	Hepatitis	JICA
	Dr.T.Shikata	Hepatitis	JICA
1987	Dr.Shigeru Okada	Pathology	JICA
	Prof.Y.Kaneda	Amoeba project	JICA
	Dr.T.Tanaka	Parasitology	JICA
	Prof.H.Hayashi	Bacteriology	JICA
	Prof.T.Tada	Immunology	JICA
	Dr.Kenji Abe	Hepatitis	JICA
	Prof.T.Shikata	Hepatitis	JICA
	Dr.Fusae Iida	Hepatitis	JICA
	Dr.K.Suzuki	Hepatitis	JICA
	Dr.M.Yano	Hepatitis	JICA
	Dr.Uchida	Hepatitis	JICA
1988	Dr.T.Tanaka	Parasitology	JICA
	Prof.H.Hayashi	Bacteriology	JICA
	Prof.Y.Takeda	Amoeba project	JICA
	Dr.T.Tsukamoto	Bacteriology	JICA
	Dr.K.Suzuki	Hepatitis	JICA
1989	Prof.H.Hayashi	Bacteriology	JICA
	Dr,Uchida	Hepatitis	JICA
	Dr.F.Iida	Hepatitis	JICA
	Prof.Y.Hamashima	Head of JICA Project	JICA

Annex 4

Consultants(non-JICA projects utilizing facilities provided by JICA)

Year	Name	Subject	Related projects
1986	1.Dr.R.Bishop(Australia)	Rotavirus	WHO rotavirus vaccine project
	2.Dr.John Aaskov (Auatralia)	Chikungunya	WHO Chikungunya project
	3.Dr.M.Aikawa(USA)	Cerebral malaria	WHO short term consultant
	4.M.W.Rooney(USA)	In vitro drug resistant monitoring	WHO
	5.Prof.G.A.T.Targett(UK)	Immunology of malaria	WHO
	6.Dr.I.K.Wachsmuth(USA)	Microbial genetics	USAID
	7.Dr.D.A.Sack(USA)	"	"
	8.Dr.D.A.Sack(USA)	"	"
	9.Mr.Lcis E.Britt(USA)	"	"
	10.Dr.D.A.Sack(USA)	"	"
	11.Dr.Leonard W.Mayer(USA)	"	"
1987	1.Dr.C.Lanata(Peru)	Rotavirus	WHO rotavirus vaocine project
	2.Dr.M.Aikawa(USA)	Cerebral malaria	WHO short term consultant
	3.Dr.Chev Kidson(Australia)	Immuno-biochemistry of malaria	QIMR
	4.Dr.Roger New(UK)	Immunochemistry	
	5.Dr.I.K.Wachmuth(USA)	Microbial genetics	USAID
	6.Dr.D.Sack(USA)	"	"
	7.Dr.D.Sack(USA)	"	"
	8.Dr.D.Sack(USA)	"	"

Annex 4
contd

Year	Name	Subject	Related projects
	9.Dr.H.A.Fields	Immunology	WHO/UNDP
	10.Dr.E.Zajai		WHO
	11.Dr.Pattanayak		WHO
	12.Dr.F.Tron	Hepatitis	Pasteur vaccine
	13.Dr.J.E.Mayard	Hepatitis	International task force
	14.Dr.D.Dhumeur	Hepatitis	Pasteur vaccine
1988	1.Dr.A.Z.Kapikian(USA)	Rotavirus	WHO rotavirus vaccine project
	2.Dr.Tom Burkot (Australia)	Sporozoite ELISA technique of malaria	QIMR
	3.Dr.J.E.Mayard	Hepatitis	International task force
1989	1.Prof.W.J'sullivan (Australia)	Biochemistry of Crug resistant malaria	WHO
	2.Prof.G.A.T.Targett(UK)	Malaria Immunology	WHO
	3.Dr.J.G.Asskov(Australia)	Dengue	WHO DHF complement & prostaglandin project
	4.Dr.M.Aikawa(USA)	Cerebral malaria	WHO
	5.Dr.D.A.Sack(USA)	Microbial genetics	USAID
	6.Prof.F.M.Water(UK)	Leprosy	WHo
	7.Dr.A.G.Andjaparatze	Hepatitis	WHo
	8.Dr.K.B.Shama	Hepatitis	WHO/UNDP(Immuno-diagnostic)
	9.Dr.Catly	Hepatitis	WHO/UNDP(Immuno-diagnostic)

Annex 4
contd

Year	Name	Subject	Related projects
	10. Dr. D. Douglas	Hepatitis	PATH(Yeast vaccine)
	11. Dr. J. E. Maynard	Hepatitis	International task force
	12. Dr. A. M. Prince	Hepatitis	International task force

Counterpart training in Japan(JICA fellowship)

Year	Name	Subject	Related project
1986	1.Dr.Soe Soe	Pathology of NANB hepatitis	JICA
	2.Dr.Tun Pe	Hybridoma technology	JICA
1987	1.Dr.Mi Mi Khin	DNA technology & HAV virology	JICA
1988	1.Naw Angelina	HAV virology & DNA technology	JICA
	2.U San Win	Animal breeding & maintenance	JICA
	3.Daw Cho Cho Hman	IEM technology Immunohistochemistry	JICA

Annex 6

LIBRARY STATISTICS

	1986-87	1987-88	1988-89	1989-90 (up to Dec 1989)
Library collections				
Books	331	575	242	453
Bound periodicals	650	165	450	463
Fugitive literature	24	11	13	48
Total	1005	751	705	964
Periodical titles	166	164	254	192
Photocopying service				
No. of pages	47866	48672	35904	60318
Loan statistics				
Books	437	1260	560	437
Periodicals	1235	2596	1866	1156
Total	1672	3856	2426	1593
Readers	3300	2314	1680	2033

Meetings/Conferences held at DMR Auditorium from September to December 1989

Sr. no.	Name of Meeting	Sponsoring Agency	Period	Type of participants	Remarks
1.	Seminar on Prevention and management of snake bite	Ministry of Health, The government of Union of Myanmar	26 Sept 1989	Physicians from Dept of Health, Dept of Health Manpower, Researchers from DMR snake-bite gp.	
2.	Workshop on the role of Physiological Research in Priority Health Problems in the Union of Myanmar	The Department of Medical Research, Ministry of Health	7th Nov 89	Physiologists from DMR, DOH and DMP	
3.	National Workshop on Laboratory Diagnosis of Hepatitis B	UNDP/WHO	8-9 Nov 89	Technicians from DMR, DoH and DSGH	
4.	Mid-term Review of the Fifth Country Programme	Government of Myanmar, UNDP	15-16	Director generals from various Departments and Ministry of Health	
5.	Third Workshop on Project Design Monitoring and Evaluation	FERD/UNDP	4-8 Dec 89	Persons from FERD, UNDP, DOH, IMR	

To be contd.