

Cases scenario

รองศาสตราจารย์ กุลนภา ฟูเจริญ

ศูนย์วิจัยและพัฒนการตรวจวินิจฉัยทางห้องปฏิบัติการทางการแพทย์
คณะเทคนิคการแพทย์ มหาวิทยาลัยขอนแก่น

นำเสนอในการอบรมวิชาการเทคนิคการแพทย์

Current knowledge of thalassemia and abnormal Hb in Thailand
for medical diagnostic laboratory

วันที่ 29 กรกฎาคม 2558 ณ คณะเทคนิคการแพทย์ มหาวิทยาลัยสงขลานครินทร์

Part I

การประมวลผลการตรวจทางห้องปฏิบัติการ
เพื่อการคัดกรอง วินิจฉัย และประเมินความเสี่ยงโรคธาลัสซีเมีย

Part II

การประมวลผลการตรวจทางห้องปฏิบัติการเพื่อวินิจฉัย
ธาลัสซีเมียและฮีโมโกลบินผิดปกติ

Part I

การประมวลผลการตรวจทางห้องปฏิบัติการ
เพื่อการคัดกรอง วินิจฉัย และประเมินกลุ่มเสี่ยงโรคธาลัสซีเมีย

Prevention & Control severe thalassemia diseases in Thailand

- ☹ **Homozygous α -thalassemia 1**
(Hb Bart's hydrops fetalis)
- ☹ **Homozygous β^0 -thalassemia**
- ☹ **β^0 -thalassemia / Hb E**

Thalassemia carriers or non-diseases to be identified

-  **α -thalassemia 1**
-  **β^0 - thalassemia**
-  **Hb E**

Recommend screening strategy

1. OF + DCIP

OF and/or DCIP **positive**



Hb Typing

2. MCV , MCH + DCIP

MCV < 80 fl and/or MCH < 27 pg and/or DCIP **positive**



Hb Typing

Fucharoen G, et al. Bulletin WHO 2004; 82(5): 364-72.

Sanchaisuriya K, et al. Am J Clin Pathol 2005;123:113-8.

Interpretation

MCV/MCH, OF test	DCIP	Interpretations
$\geq 80 / \geq 27, -$	-	non-thal or non-clinically significant α -thal 2*
$< 80 / < 27, +$	-	suspected α -thal and / or β -thal
$\geq 80 / \geq 27, -$	+	suspected Hb E trait either with or without non-clinically significant α -thal 2*
$< 80 / < 27, +$	+	suspected Hb E either with or without α -thal and / or β -thal

* α -thal 2 : $\alpha^{3.7}, \alpha^{4.2}, \alpha^{\text{Con Sp}}, \alpha^{\text{Pakse}}$

α -thal : α -thal 1 or α -thal 2

β -thal : β^0 -thal or β^+ -thal

OF negative (-) = $MCV \geq 80$ fl or $MCH \geq 27$ pg

OF negative (+) = $MCV < 80$ fl or $MCH < 27$ pg

ผลการตรวจกรองในกลุ่มสมรสและโรคธาลัสซีเมียชนิดรุนแรงที่มีโอกาสเกิดขึ้นในบุตร

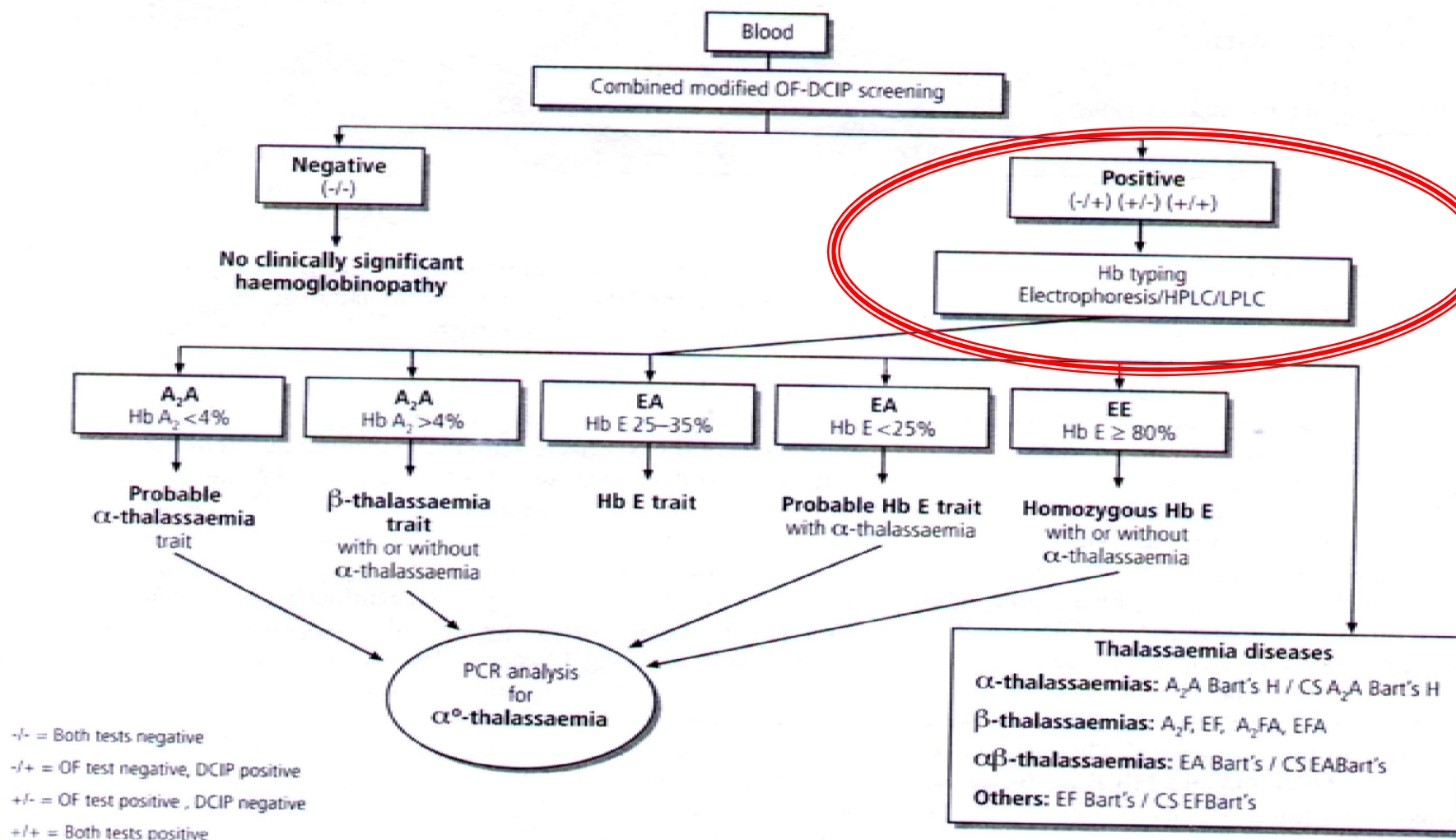
KKU-OF / KKU-DCIP		Possible severe thalassemia in fetus
Father	Mother	
+ / -	+ / -	α - thal 1 / α - thal 1 β - thal / β - thal
+ / - - / +	- / + + / -	β - thal / Hb E
+ / - + / +	+ / + + / -	β - thal / Hb E α - thal 1 / α - thal 1 β - thal / β - thal
+ / +	+ / +	β - thal / Hb E α - thal 1 / α - thal 1 β - thal / β - thal

ผลการตรวจคัดกรองในกลุ่มสตรีที่ไม่เสี่ยงต่อโรคธาลัสซีเมียชนิด



OF/DCIP		Possible type of thalassemia in fetus
Father	Mother	
-/-	-/-	hetero or homozygous α -thal 2
-/- -/+	-/+ -/-	heterozygous Hb E with/without α -thal 2
-/+	-/+	hetero or homozygous Hb E with/without α -thal 2
+/- -/-	-/- +/-	hetero or homozygous α -thal 2 heterozygous α -thal 1 compound heterozygous α -thal1/ α -thal 2 (Hb H disease)
+/+ -/-	-/- +/+	heterozygous Hb E with/without α -thal 2 hetero or homozygous α -thal 2 heterozygous α -thal 1 compound heterozygous α -thal1/ α -thal 2 (Hb H disease, EABart's disease)

11 แนวทางการตรวจวินิจฉัยธาลัสซีเมียและ Hb E ที่เริ่มจากการตรวจกรองด้วย KKU-OF / KKU-DCIP



WHO 04.27

Interpretation



Thalassemia non-diseases (ไม่มีอาการทางคลินิก)

OF/DCIP	Hb Typing	Interpretations
+ / -	A_2A (A_2 normal)	suspected α -thal @
+ / -	A_2A ($A_2 > 3.5 \%$)	β - thal trait either with or without α - thal @
- / +	EA (E 25 - 35 %)	Hb E trait either with or without α - thal 2
+ / +	EA (E < 25 %)	Hb E trait either with or without α - thal @
+ / +	EE (E > 75, F < 5 %) A_2FA , EFA A_2F , EF	Homo E either with or without α - thal @ Hereditary persistence of fetal hemoglobin (HPFH) $\delta\beta$ -thalassemia, mild β -thalassemia

α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2

β -thal : β^0 -thal or β^+ -thal

α -thal 2 : $\alpha^{3.7}$, $\alpha^{4.2}$, α^{ConSp} , α^{Pakse}

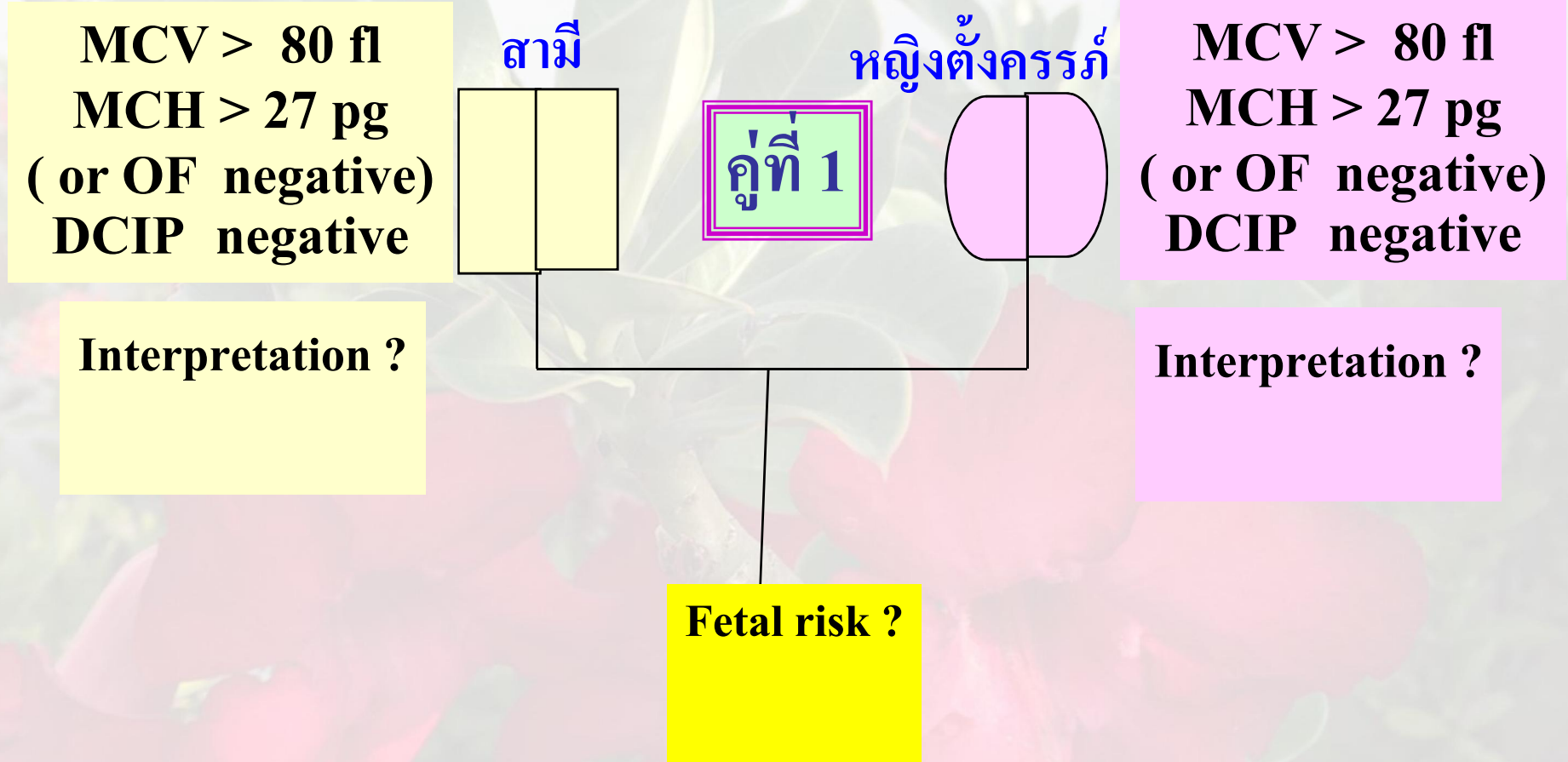
@ PCR for α -thal 1

Interpretation

Thalassemia diseases (มีอาการทางคลินิก ไม่เคยได้รับเลือด)

OF/DCIP	Hb Typing	Interpretations
+ / ±	A ₂ A Bart,s H	α -thal 1 / α -thal 2 (Hb H disease)
+ / ±	ConSpA ₂ A Bart,s H	α -thal 1 / α ^{ConSp} (Hb H disease)
+ / +	EABart's (E < 20 %)	Hb E trait with α -thal 1 / α -thal 2
+ / +	ConSpEABart's(E < 20 %)	Hb E trait with α -thal 1 / α ^{ConSp}
+ / -	A ₂ F , A ₂ FA	β ⁰ /β ⁰ , β ⁰ /β ⁺ either with or without α - thal @
+ / +	EF , EFA	β ⁰ /β ^E , β ⁺ /β ^E either with or without α - thal @

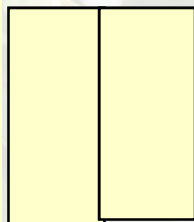
@ PCR for α -thal 1



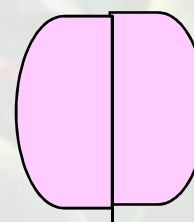
* α -thal 2 [$-\alpha^{3.7}$, $-\alpha^{4.2}$, α^{ConSp} , α^{Pakse}]

MCV > 80 fl
MCH > 27 pg
(or OF negative)
DCIP negative

สามี่



หญิงตั้งครรภ์



MCV > 80 fl
MCH > 27 pg
(or OF negative)
DCIP negative

non-thalassemia or
non-clinically significant thalassemia*

non-thalassemia or
non-clinically significant thalassemia*

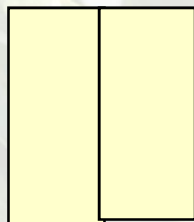
no risk for

- ❖ homozygous α -thal 1 (Hb Bart's hydrops fetalis)
- ❖ homozygous β^0 -thal
- ❖ β^0 -thal / Hb E

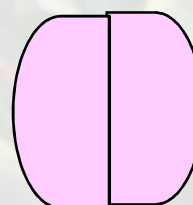
MCV > 80 fl
MCH > 27 pg
(or OF negative)
DCIP positive

Interpretation ?

สามี



หญิงตั้งครรภ์



MCV > 80 fl
MCH > 27 pg
(or OF negative)
DCIP positive

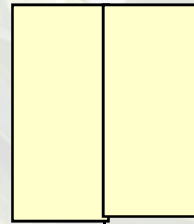
Interpretation ?

Fetal risk ?

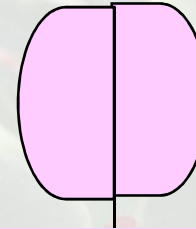
* α -thal 2 [$-\alpha^{3.7}$, $-\alpha^{4.2}$, α^{ConSp} , α^{Pakse}]

MCV > 80 fl
MCH > 27 pg
(or OF negative)
DCIP positive

สามี่



หญิงตั้งครรภ์



MCV > 80 fl
MCH > 27 pg
(or OF negative)
DCIP positive

Hb E trait
either with or without α - thal 2

Hb E trait
either with or without α - thal 2

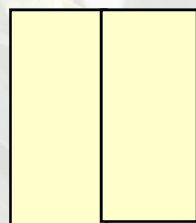
no risk for

- ❖ homozygous α -thal 1 (Hb Bart's hydrops fetalis)
- ❖ homozygous β^0 -thal
- ❖ β^0 -thal / Hb E

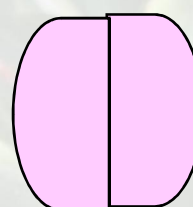
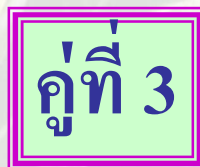
$MCV < 80 \text{ fl}$
 $MCH < 27 \text{ pg}$
 (or OF positive)
 DCIP negative

Interpretation ?

สามมี



หญิงตั้งครรภ์



$MCV < 80 \text{ fl}$
 $MCH < 27 \text{ pg}$
 (or OF positive)
 DCIP negative

Interpretation ?

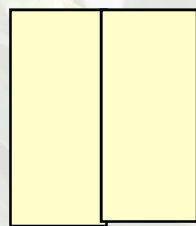
Fetal risk ?

* α -thal : α -thal 1, α -thal 2

@ β -thal : β^0 -thal, β^+ -thal

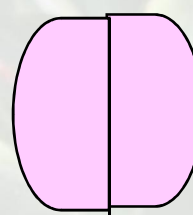
MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP negative

สามี่



คู่มือที่ 3

หญิงตั้งครรภ์



MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP negative

suspected α -thal* and/or β -thal@

suspected α -thal* and/or β -thal@

risk for

❖ homozygous α -thal 1 (Hb Bart's hydrops fetalis)

❖ homozygous β^0 -thal

20



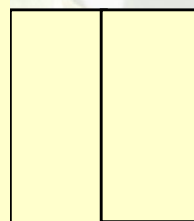
OF : + , DCIP : -

MCV	63.8	fl
MCH	21.4	pg
Hb	15.1	g/dl
Hct	44.9	%
RBC	7.0 x 10 ¹² /L	
MCHC	33.6	g/dl
RDW	16.4	%

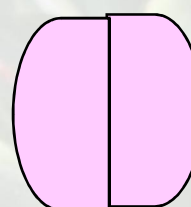
Hb Type A₂AHb A₂ 2.5 %

Hb F < 0.5 %

สามี



หญิงตั้งครรภ์



คู่มือ 3

Interpretation ?

Fetal risk ?

OF : + , DCIP : -

MCV	69.9	fl
MCH	23.5	pg
Hb	11.5	g/dl
Hct	34.2	%
RBC	4.9 x 10 ¹² /L	
MCHC	33.6	g/dl
RDW	14.9	%

Hb Type A₂AHb A₂ 6.4 %

Hb F < 0.5 %

Interpretation ?

21

OF : + , DCIP : -

MCV	63.8	fl
MCH	21.4	pg
Hb	15.1	g/dl
Hct	44.9	%
RBC	7.0 x 10 ¹² /L	
MCHC	33.6	g/dl
RDW	16.4	%
Hb Type	A ₂ A	
Hb A ₂	2.5	%
Hb F	< 0.5	%

* α -thal : α -thal 1, α -thal 2

สามี

หญิงตั้งครรภ์

คู่ที่ 3

OF : + , DCIP : -

MCV	69.9	fl
MCH	23.5	pg
Hb	11.5	g/dl
Hct	34.2	%
RBC	4.9 x 10 ¹² /L	
MCHC	33.6	g/dl
RDW	14.9	%
Hb Type	A ₂ A	
Hb A ₂	6.4	%
Hb F	<0.5	%

suspected α -thal* traitpositive α -thal 1 (SEA deletion)heterozygous α -thal 1
(SEA deletion) β -thal[@] trait (with/without α -thal*)positive β^{17} , positive α -thal 1(SEA)Double heterozygous β^{17} , α -thal 1(SEA)

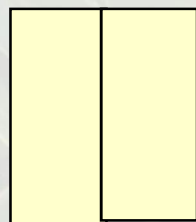
risk for

❖ homozygous α -thal 1 (Hb Bart's hydrops fetalis)

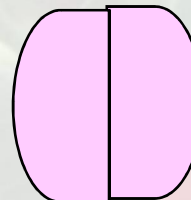
MCV > 80 fl
MCH > 27 pg
(or OF negative)
DCIP positive

Interpretation ?

สามี



หญิงตั้งครรภ์



คู่มือที่ 4

MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP negative

Interpretation ?

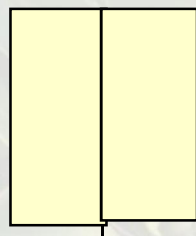
Fetal risk ?

* α -thal : α -thal 1, α -thal 2

@ β -thal : β^0 -thal , β^+ -thal

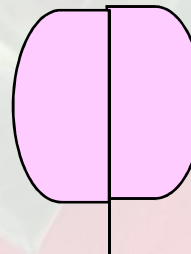
MCV > 80 fl
MCH > 27 pg
(or OF negative)
DCIP positive

สามี่



คู่มือที่ 4

หญิงตั้งครรภ์



MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP negative

suspected Hb E trait
either with or without α -thal 2

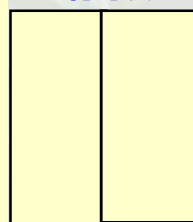
suspected α -thal* and/or β -thal@

risk for
❖ β -thal / Hb E

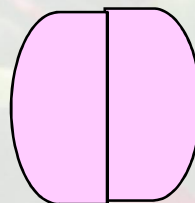
OF : - , DCIP : +

MCV	78.3	fl
MCH	26.1	pg
Hb	13.2	g/dl
Hct	39.6	%
RBC	$5.1 \times 10^{12}/L$	
MCHC	33.3	g/dl
RDW	14.9	%
Hb Type	EA	
Hb E	32.2	%
Hb F	1.1	%

สามี



หญิงตั้งครรภ์



คู่มือ 4

OF : + , DCIP : -

MCV	60.1	fl
MCH	20.0	pg
Hb	9.5	g/dl
Hct	28.6	%
RBC	$4.8 \times 10^{12}/L$	
MCHC	33.2	g/dl
RDW	17.4	%
Hb Type	A ₂ A	
Hb A ₂	6.3	%
Hb F	1.7	%

Interpretation ?

Interpretation ?

Fetal risk ?

25

OF : - , DCIP : +

MCV	78.3	fl
MCH	26.1	pg
Hb	13.2	g/dl
Hct	39.6	%
RBC	5.1 x 10 ¹² /L	
MCHC	33.3	g/dl
RDW	14.9	%
Hb Type	EA	
Hb E	32.2	%
Hb F	1.1	%

@ β^0 -thal or β^+ -thal* α -thal 1 or α -thal 2

สามี

หญิงตั้งครรภ์

คู่ที่ 4

OF : + , DCIP : -

MCV	60.1	fl
MCH	20.0	pg
Hb	9.5	g/dl
Hct	28.6	%
RBC	4.8 x 10 ¹² /L	
MCHC	33.2	g/dl
RDW	17.4	%
Hb Type	A ₂ A	
Hb A ₂	6.3	%
Hb F	1.7	%

Hb E trait (with/without α -thal 2) β -thal[@] trait (with/without α -thal*)

risk for
❖ β^0 -thal / Hb E

26 OF : - , DCIP : +

MCV	78.3	fl
MCH	26.1	pg
Hb	13.2	g/dl
Hct	39.6	%
RBC	5.1 x 10 ¹² /L	
MCHC	33.3	g/dl
RDW	14.9	%
Hb Type	EA	
Hb E	32.2	%
Hb F	1.1	%

@ β^0 -thal or β^+ -thal

* α -thal 1 or α -thal 2

สามี่

หญิงตั้งครรภ์

คู่ที่ 4

OF : + , DCIP : -

MCV	60.1	fl
MCH	20.0	pg
Hb	9.5	g/dl
Hct	28.6	%
RBC	4.8 x 10 ¹² /L	
MCHC	33.2	g/dl
RDW	17.4	%
Hb Type	A ₂ A	
Hb A ₂	6.3	%
Hb F	1.7	%

Hb E trait (with/without α -thal 2)

β -thal[@] trait (with/without α -thal*)

positive β -thal^{41/42}

negative
 α -thal 1

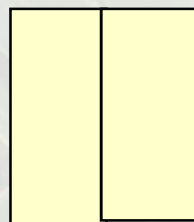
heterozygous β -thal^{41/42}

risk for
❖ β^0 -thal / Hb E

MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP positive

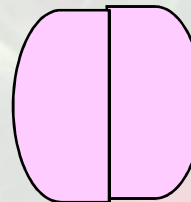
Interpretation ?

สามี



หญิงตั้งครรภ์

คู่มือที่ 5



MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP negative

Interpretation ?

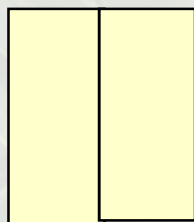
Fetal risk ?

* α -thal : α -thal 1, α -thal 2

@ β -thal : β^0 -thal , β^+ -thal

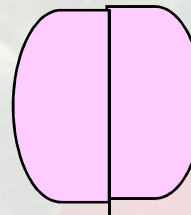
MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP positive

สามี



หญิงตั้งครรภ์

คู่ที่ 5



MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP negative

suspected Hb E

either with or without

α -thal* and/or β -thal@

suspected

α -thal* and/or β -thal@

risk for

❖ homozygous α -thal 1 (Hb Bart's hydrops fetalis)

❖ homozygous β^0 -thal

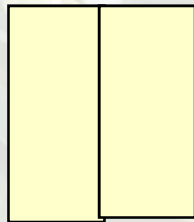
❖ β^0 -thal / Hb E

2 OF : + , DCIP : +

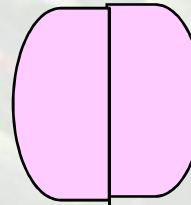
MCV	63.0	fl
MCH	22.1	pg
Hb	15.1	g/dl
Hct	43.1	%
RBC	5.1 x 10 ¹² /L	
MCHC	35.0	g/dl
RDW	18.4	%
Hb Type	EE	
Hb E	86.7	%
Hb F	<0.5	%

Interpretation ?

สามี



หญิงตั้งครรภ์



คู่ที่ 5

Fetal risk ?

OF : + , DCIP : -

MCV	69.7	fl
MCH	22.1	pg
Hb	10.0	g/dl
Hct	31.5	%
RBC	4.5 x 10 ¹² /L	
MCHC	31.7	g/dl
RDW	15.1	%
Hb Type	A ₂ A	
Hb A ₂	2.6	%
Hb F	< 0.5	%

Interpretation ?

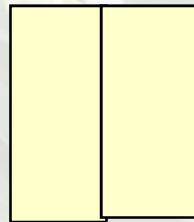
3 OF : + , DCIP : +

MCV	63.0	fl
MCH	22.1	pg
Hb	15.1	g/dl
Hct	43.1	%
RBC	5.1 x 10 ¹² /L	
MCHC	35.0	g/dl
RDW	18.4	%
Hb Type	EE	
Hb E	86.7	%
Hb F	<0.5	%

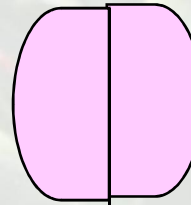
@ β^0 -thal or β^+ -thal

* α -thal 1 or α -thal 2

สามี



หญิงตั้งครรภ์



คู่ที่ 5

homozygous Hb E (with /without α -thal*)

suspected α -thal* trait

risk for

❖ homozygous α -thal 1 (Hb Bart's hydrops fetalis)

OF : + , DCIP : -

MCV	69.7	fl
MCH	22.1	pg
Hb	10.0	g/dl
Hct	31.5	%
RBC	4.5 x 10 ¹² /L	
MCHC	31.7	g/dl
RDW	15.1	%
Hb Type	A ₂ A	
Hb A ₂	2.6	%
Hb F	< 0.5	%

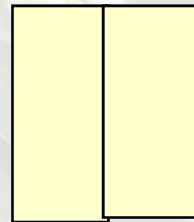
31 OF : + , DCIP : +
 MCV 63.0 fl
 MCH 22.1 pg
 Hb 15.1 g/dl
 Hct 43.1 %
 RBC $5.1 \times 10^{12}/L$
 MCHC 35.0 g/dl
 RDW 18.4 %
 Hb Type EE
 Hb E 86.7 %
 Hb F <0.5 %

@ β^0 -thal or β^+ -thal

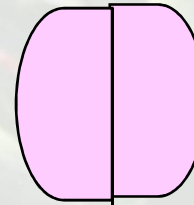
* α -thal 1 or α -thal 2

สามี

หญิงตั้งครรภ์



คู่ที่ 5



OF : + , DCIP : -
 MCV 69.7 fl
 MCH 22.1 pg
 Hb 10.0 g/dl
 Hct 31.5 %
 RBC $4.5 \times 10^{12}/L$
 MCHC 31.7 g/dl
 RDW 15.1 %
 Hb Type A₂A
 Hb A₂ 2.6 %
 Hb F < 0.5 %

homozygous Hb E (with /without α -thal*)

negative β^{A26} , positive α -thal 1(SEA)

homozygous Hb E
 with heterozygous α -thal 1(SEA)

suspected α -thal* trait

positive α -thal 1 (SEA deletion)

heterozygous α -thal 1 (SEA deletion)

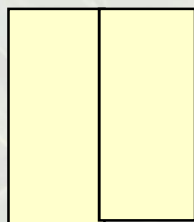
risk for

❖ homozygous α -thal 1 (Hb Bart's hydrops fetalis)

MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP positive

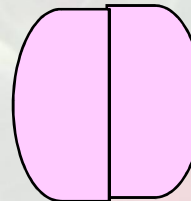
Interpretation ?

สามี



หญิงตั้งครรภ์

คู่มือที่ 6



MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP positive

Interpretation ?

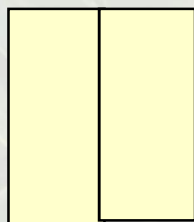
Fetal risk ?

* α -thal : α -thal 1, α -thal 2

@ β -thal : β^0 -thal , β^+ -thal

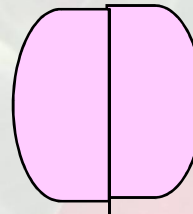
MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP positive

สามี



หญิงตั้งครรภ์

คู่ที่ 6



MCV < 80 fl
MCH < 27 pg
(or OF positive)
DCIP positive

suspected Hb E

either with or without
 α -thal* and/or β -thal@

suspected Hb E

either with or without
 α -thal* and/or β -thal@

risk for

- ❖ homozygous α -thal 1 (Hb Bart's hydrops fetalis)
- ❖ homozygous β^0 -thal
- ❖ β^0 -thal / Hb E

3 OF : + , DCIP : +

MCV	65.8	fl
MCH	22.1	pg
Hb	15.5	g/dl
Hct	46.2	%
RBC	7.0 x 10 ¹² /L	
MCHC	33.5	g/dl
RDW	18.7	%
Hb Type	EA	
Hb E	21.4	%
Hb F	1.7	%

Interpretation ?

สามี หญิงตั้งครรภ์

คู่ที่ 6

Fetal risk ?

OF : + , DCIP : +

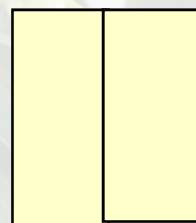
MCV	63.5	fl
MCH	19.5	pg
Hb	9.3	g/dl
Hct	31.1	%
RBC	4.9 x 10 ¹² /L	
MCHC	30.0	g/dl
RDW	22.9	%
Hb Type	A ₂ A Bart'sH	
Hb A ₂	1.9	%
Hb F	0.3	%

Interpretation ?

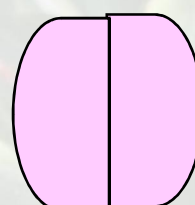
3 OF : + , DCIP : +

MCV	65.8	fl
MCH	22.1	pg
Hb	15.5	g/dl
Hct	46.2	%
RBC	7.0 x 10 ¹² /L	
MCHC	33.5	g/dl
RDW	18.7	%
Hb Type	EA	
Hb E	21.4	%
Hb F	1.7	%

สามี



หญิงตั้งครรภ์



คู่ที่ 6

OF : + , DCIP : +

MCV	63.5	fl
MCH	19.5	pg
Hb	9.3	g/dl
Hct	31.1	%
RBC	4.9 x 10 ¹² /L	
MCHC	30.0	g/dl
RDW	22.9	%
Hb Type	A ₂ A Bart'sH	
Hb A ₂	1.9	%
Hb F	0.3	%

Hb E trait (with/without α -thal 1)

Hb H disease (α -thal1 / α -thal 2)

risk for

❖ homozygous α -thal 1 (Hb Bart's hydrops fetalis)

36 OF : + , DCIP : +
 MCV 65.8 fl
 MCH 22.1 pg
 Hb 15.5 g/dl
 Hct 46.2 %
 RBC $7.0 \times 10^{12}/L$
 MCHC 33.5 g/dl
 RDW 18.7 %
 Hb Type EA
 Hb E 21.4 %
 Hb F 1.7 %

สามี

หญิงตั้งครรภ์

คู่ที่ 6

OF : + , DCIP : +
 MCV 63.5 fl
 MCH 19.5 pg
 Hb 9.3 g/dl
 Hct 31.1 %
 RBC $4.9 \times 10^{12}/L$
 MCHC 30.0 g/dl
 RDW 22.9 %
 Hb Type A₂A Bart'sH
 Hb A₂ 1.9 %
 Hb F 0.3 %

Hb E trait (with/without α -thal 1)

Hb H disease (α -thal1 / α -thal 2)

negative α -thal1 (SEA/THAI)

positive α -thal1 (SEA)

positive homozygous α -thal 2 (3.7 kb deletion)

positive α -thal 2 (3.7 kb deletion)

heterozygous Hb E with
 homozygous α -thal 2

compound heterozygous
 - - (SEA) / - α (3.7)

No risk for
 † 3 severe thalassemia diseases

GOONNAPA

Part II

การประมวลผลผลการตรวจทางห้องปฏิบัติการเพื่อวินิจฉัย
ธาตุสซีเมียและฮีโมโกลบินผิดปกติ

เพศ ชาย อายุ 24 ปี

Hb	6.8	g/dl
Hct	20.8	%
RBC	3.1 x 10 ¹² /L	
MCV	66.7	fl
MCH	21.8	pg
MCHC	32.7	g/dl
RDW	30.9	%
Hb Type	EF	
Hb E	49.2	%
Hb F	44.3	%

Interpretation ?

Hemoglobin typing report

Received date: 28/2/2557

Type of sample: EDTA blood

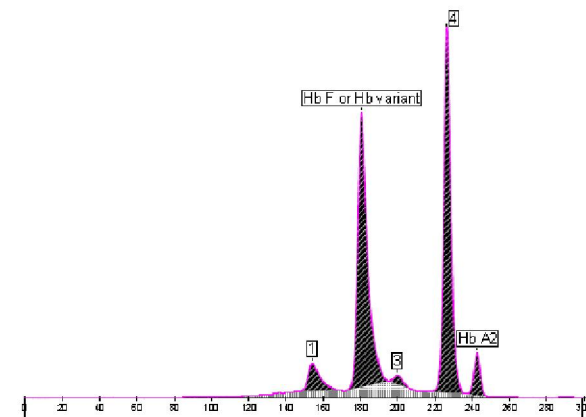
Working date : 28/2/2557

ID : S57-356

Principle : Capillary Electrophoresis

Sample No. : 29

Name : rack: SEBIA Pos.: 5



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	5.4		
Hb F or Hb variant	44.3		
3	1.1		
4	44.8		
Hb A2	4.4		

39

เพศ ชาย อายุ 24 ปี

Hb	6.8	g/dl
Hct	20.8	%
RBC	3.1 x 10 ¹² /L	
MCV	66.7	fl
MCH	21.8	pg
MCHC	32.7	g/dl
RDW	30.9	%
Hb Type	EF	
Hb E	49.2	%
Hb F	44.3	%

 β -thal / Hb Epositive $\beta^{\text{IVS-I\#5}}$ compound heterozygous $\beta^{\text{E}} / \beta^{\text{IVS-I\#5}}$ with or without α -thal α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2Hemoglobin typing report

Received date: 28/2/2557

Type of sample: EDTA blood

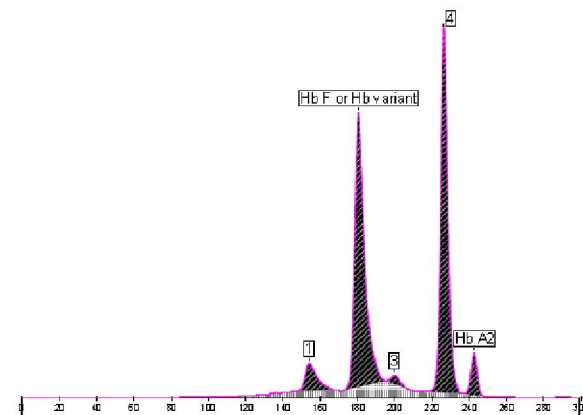
Working date : 28/2/2557

ID : S57-356

Principle : Capillary Electrophoresis

Sample No. : 29

Name : rack: SEBIA Pos.: 5

Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	5.4		
Hb F or Hb variant	44.3		
3	1.1		
4	44.8		
Hb A2	4.4		



40

เพศ หญิง อายุ 18 ปี

Hb 5.8 g/dl
Hct 17.1 %
RBC $3.1 \times 10^{12}/L$
MCV 59.8 fl
MCH 20.4 pg
MCHC 34.0 g/dl
RDW 28.8 %
Hb Type EFA
Hb E 42.4 %
Hb F 19.4 %

Interpretation ?

Hemoglobin typing report

Received date:

Type of sample: EDTA blood

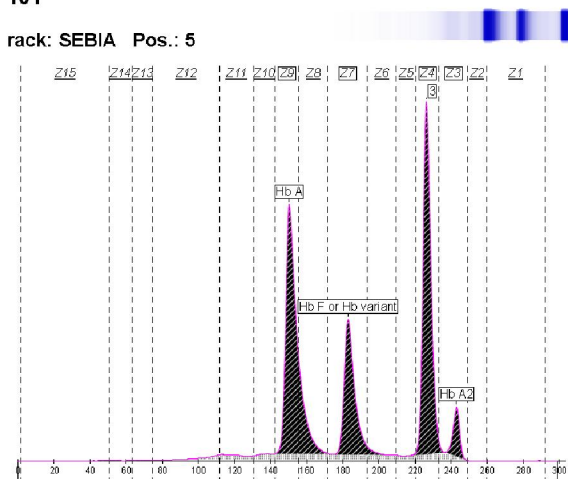
Working date : 11/7/2556

ID : TI-267

Principle : Capillary Electrophoresis

Sample No. : 101

Name : rack: SEBIA Pos.: 5



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
Hb A	38.2		
Hb F or Hb variant	19.4		
3	38.1		
Hb A2	4.3		

เพศ หญิง อายุ 18 ปี

Hb 5.8 g/dl
 Hct 17.1 %
 RBC $3.1 \times 10^{12}/L$
 MCV 59.8 fl
 MCH 20.4 pg
 MCHC 34.0 g/dl
 RDW 28.8 %
 Hb Type EFA
 Hb E 42.4 %
 Hb F 19.4 %

β -thal / Hb E

positive $\beta^{IVS-I\#5}$

compound heterozygous $\beta^E / \beta^{IVS-I\#5}$ รับเลือด

with or without α -thal

α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2

Hemoglobin typing report

Received date:

Type of sample: EDTA blood

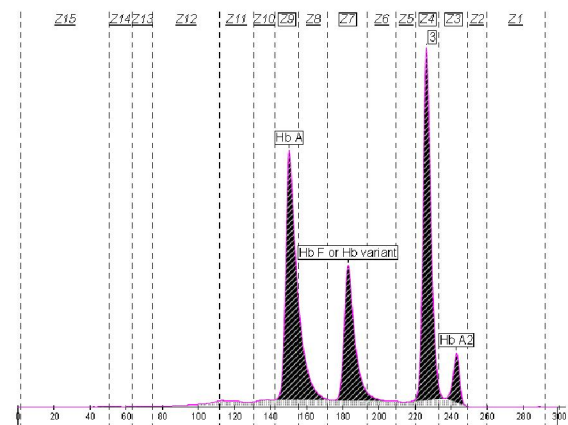
Working date : 11/7/2556

ID : TI-267

Principle : Capillary Electrophoresis

Sample No. : 101

Name : rack: SEBIA Pos.: 5



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
Hb A	38.2		
Hb F or Hb variant	19.4		
3	38.1		
Hb A2	4.3		

42

เพศ ชาย อายุ 3 ปี

Hb 7.6 g/dl
Hct 26.1 %
RBC $3.75 \times 10^{12}/L$
MCV 69.8 fl
MCH 20.3 pg
MCHC 29.1 g/dl
RDW 22.2 %

Hb Type ConSpA₂ABart'sH
Hb A₂ 0.7 %
Hb F 0.4 %

Interpretation ?

Hemoglobin typing report

Received date:

Type of sample: EDTA blood

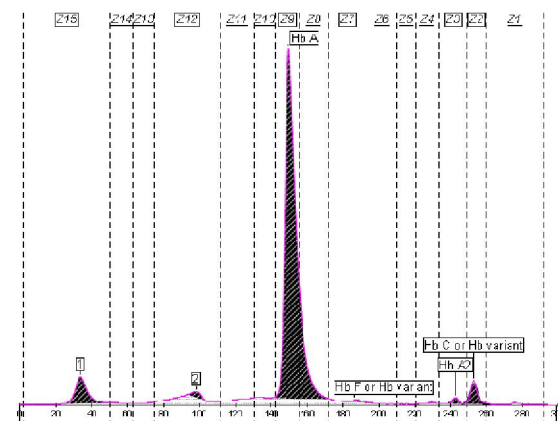
Working date : 26/4/2556

ID : TI-208

Principle : Capillary Electrophoresis

Sample No. : 24

Name : rack: SEBIA Pos.: 8



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	6.8		
2	1.1		
Hb A	87.6		
Hb F or Hb variant	0.4		
Hb A2	0.7		
Hb C or Hb variant	3.4		



43

เพศ ชาย อายุ 3 ปี

Hb 7.6 g/dl
Hct 26.1 %
RBC $3.75 \times 10^{12}/L$
MCV 69.8 fl
MCH 20.3 pg
MCHC 29.1 g/dl
RDW 22.2 %

Hb Type ConSpA₂ABart'sH
Hb A₂ 0.7 %
Hb F 0.4 %

Hb H disease
compound heterozygous α -thal 1/ Hb ConSp
Hemoglobin typing report

Received date:

Type of sample: EDTA blood

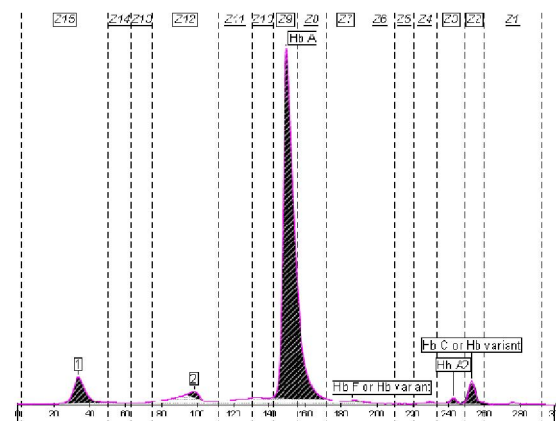
Working date : 26/4/2556

ID : TI-208

Principle : Capillary Electrophoresis

Sample No. : 24

Name : rack: SEBIA Pos.: 8


Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	6.8		
2	1.1		
Hb A	87.6		
Hb F or Hb variant	0.4		
Hb A ₂	0.7		
Hb C or Hb variant	3.4		



44

เพศ หญิง อายุ 35 ปี

Hb 5.9 g/dl

Hct 20.0 %

RBC $3.7 \times 10^{12}/L$

MCV 54.0 fl

MCH 16.0 pg

MCHC 29.7 g/dl

RDW 25.9 %

Hb Type ConSpEABart's

Hb E 15.3 %

Hb F 2.7 %

Interpretation ?

Hemoglobin typing report

Received date:

Type of sample: EDTA blood

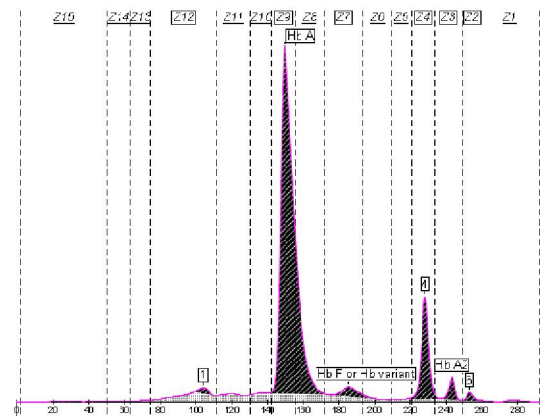
Working date : 15/2/2556

ID : TI-175

Principle : Capillary Electrophoresis

Sample No. : 16

Name : rack: SEBIA Pos.: 8



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	0.9		
Hb A	80.2		
Hb F or Hb variant	2.7		
4	13.0		
Hb A2	2.3		
6	0.9		



45

เพศ หญิง อายุ 35 ปี

Hb 5.9 g/dl
Hct 20.0 %
RBC $3.7 \times 10^{12}/L$
MCV 54.0 fl
MCH 16.0 pg
MCHC 29.7 g/dl
RDW 25.9 %
Hb Type ConSpEABart's
Hb E 15.3 %
Hb F 2.7 %

ConSpEABart's disease

**Heterozygous Hb E with
compound heterozygous α -thal 1/ Hb ConSp**

Hemoglobin typing report

Received date:

Type of sample: EDTA blood

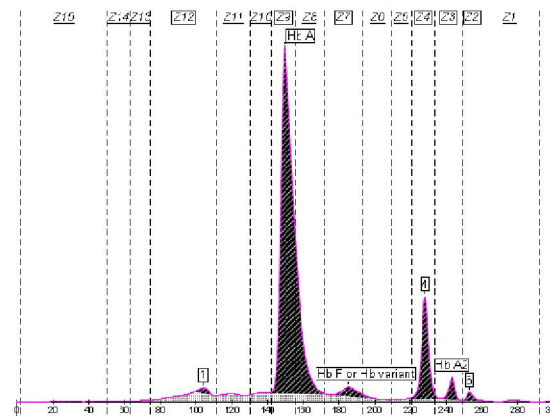
Working date : 15/2/2556

ID : TI-175

Principle : Capillary Electrophoresis

Sample No. : 16

Name : rack: SEBIA Pos.: 8



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	0.9		
Hb A	80.2		
Hb F or Hb variant	2.7		
4	13.0		
Hb A2	2.3		
6	0.9		



เพศ ชาย อายุ 29 ปี

Hb 12.2 g/dl
Hct 38.3 %
RBC 7.33 x 10¹²/L
MCV 52.2 fl
MCH 16.7 pg
MCHC 32.0 g/dl
RDW 19.0 %
Hb Type EABart's
Hb E 15.2 %
Hb F 2.8 %

Interpretation ?

Hemoglobin typing report

Received date:

Type of sample: EDTA blood

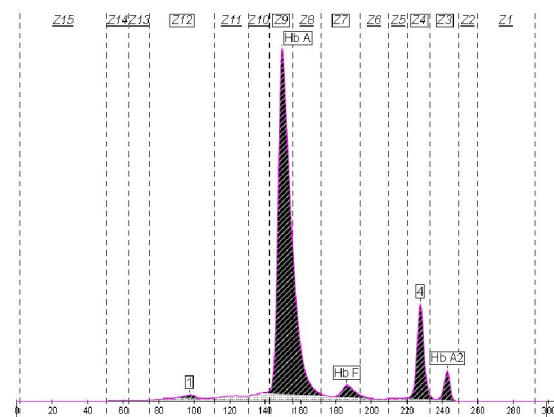
Working date : 15/2/2556

ID : TI-174

Principle : Capillary Electrophoresis

Sample No. : 15

Name : rack: SEBIA Pos.: 7



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	0.7		
Hb A	81.3		
Hb F	2.8		
4	12.1		
Hb A2	3.1		

47

เพศ ชาย อายุ 29 ปี

Hb 12.2 g/dl
Hct 38.3 %
RBC $7.33 \times 10^{12}/L$
MCV 52.2 fl
MCH 16.7 pg
MCHC 32.0 g/dl
RDW 19.0 %
Hb Type EABart's
Hb E 15.2 %
Hb F 2.8 %

EABart's disease

Heterozygous Hb E with
 compound heterozygous α -thal 1/ α -thal 2

Hemoglobin typing report

Received date:

Type of sample: EDTA blood

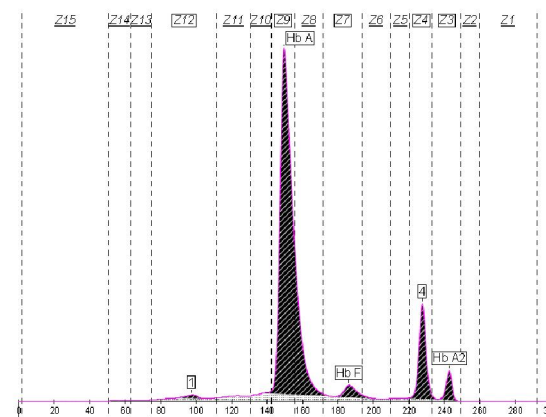
Working date : 15/2/2556

ID : TI-174

Principle : Capillary Electrophoresis

Sample No. : 15

Name : rack: SEBIA Pos.: 7



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	0.7		
Hb A	81.3		
Hb F	2.8		
4	12.1		
Hb A2	3.1		

เพศ ชาย อายุ 45 ปี

Hb 13.3 g/dl
Hct 41.2 %
RBC 6.49 x 10¹²/L
MCV 63.5 fl
MCH 20.5 pg
MCHC 32.3 g/dl
RDW 17.0 %
Hb Type EA
Hb E 21.1 %
Hb F 0.5 %

Interpretation ?

Hemoglobin typing report

Received date: 10/7/2558

Type of sample: EDTA blood

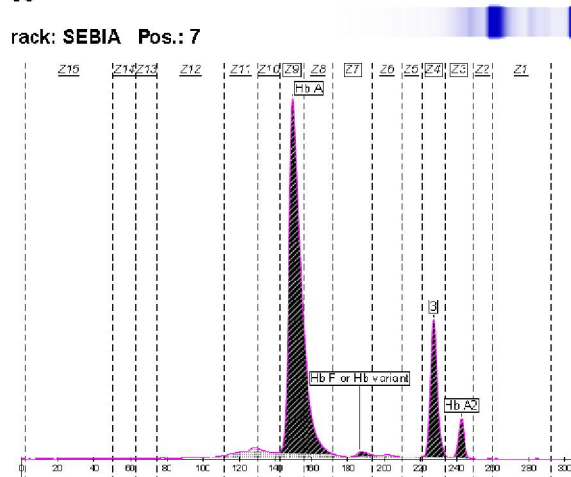
Working date : 10/7/2558

ID : CPN58-157

Principle : Capillary Electrophoresis

Sample No. : 55

Name : rack: SEBIA Pos.: 7



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
Hb A	78.1		
Hb F or Hb variant	0.8		
3	16.9		
Hb A2	4.2		

49

เพศ ชาย อายุ 45 ปี

Hb 13.3 g/dl
Hct 41.2 %
RBC 6.49 x 10¹²/L
MCV 63.5 fl
MCH 20.5 pg
MCHC 32.3 g/dl
RDW 17.0 %
Hb Type EA
Hb E 21.1 %
Hb F 0.5 %

Hemoglobin typing report

Received date: 10/7/2558

Type of sample: EDTA blood

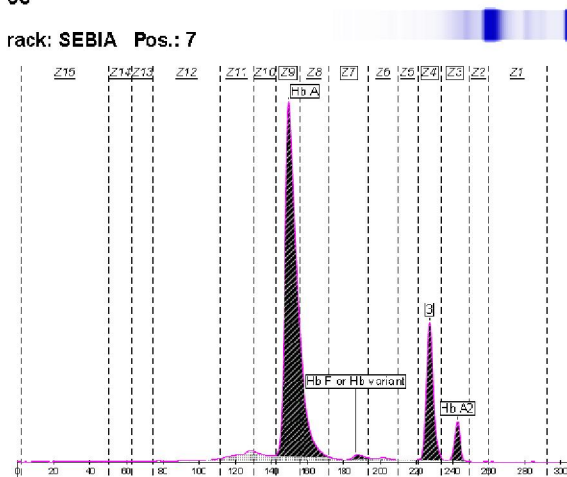
Working date : 10/7/2558

ID : CPN58-157

Principle : Capillary Electrophoresis

Sample No. : 55

Name : rack: SEBIA Pos.: 7

**Hemoglobin Electrophoresis**

Fractions	%	Ref. %	Ref. g/dl
Hb A	78.1		
Hb F or Hb variant	0.8		
3	16.9		
Hb A2	4.2		

Suspected heterozygous Hb E with α -thal 1**Positive α -thal 1(SEA deletion)****Heterozygous Hb E with heterozygous α -thal 1**

50

เพศ หญิง อายุ 59 ปี

Hb 7.7 g/dl
Hct 23.8 %
RBC 4.4x 10¹²/L
MCV 54.4 fl
MCH 17.5 pg
MCHC 32.2 g/dl
RDW 19.2 %
Hb Type EA
Hb E 57.8 %
Hb F 5.7 %

Interpretation ?

Hemoglobin typing report

Received date: 23/4/2556

Type of sample: EDTA blood

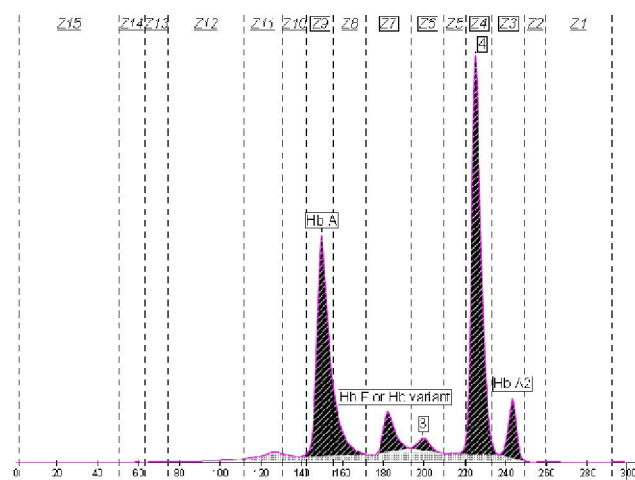
Working date : 24/4/2556

ID : S56-588

Principle : Capillary Electrophoresis

Sample No. : 29

Name : rack: SEBIA Pos.: 5



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
Hb A	36.5		
Hb F or Hb variant	5.7		
3	1.8		
4	50.0		
Hb A2	6.0		



51

เพศ หญิง อายุ 59 ปี

Hb 7.7 g/dl
Hct 23.8 %
RBC $4.4 \times 10^{12}/L$
MCV 54.4 fl
MCH 17.5 pg
MCHC 32.2 g/dl
RDW 19.2 %
Hb Type EA
Hb E 57.8 %
Hb F 5.7 %

Suspected β^+ -thal /Hb Epositive β^{Malay} Compound heterozygous $\beta^{\text{Malay}}/\beta^E$ with or without α -thal α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2

Hemoglobin typing report

Received date: 23/4/2556

Type of sample: EDTA blood

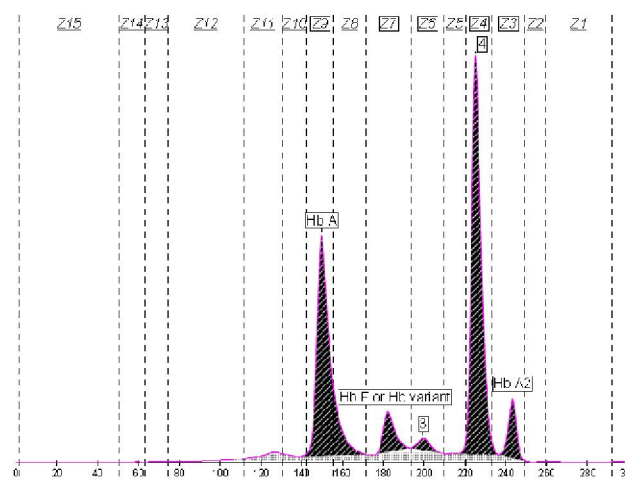
Working date : 24/4/2556

ID : S56-588

Principle : Capillary Electrophoresis

Sample No. : 29

Name : rack: SEBIA Pos.: 5



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
Hb A	36.5		
Hb F or Hb variant	5.7		
3	1.8		
4	50.0		
Hb A2	6.0		



เพศ หญิง อายุ 29 ปี

Hb	12.7	g/dl
Hct	38.5	%
RBC	5.5 x 10 ¹² /L	
MCV	69.3	fl
MCH	22.8	pg
MCHC	33.0	g/dl
RDW	19.2	%
Hb Type	A ₂ A	
Hb A ₂	3.8	%
Hb F	0.4	%

Interpretation ?

Hemoglobin typing report

Received date: 20/6/2557

Type of sample: EDTA blood

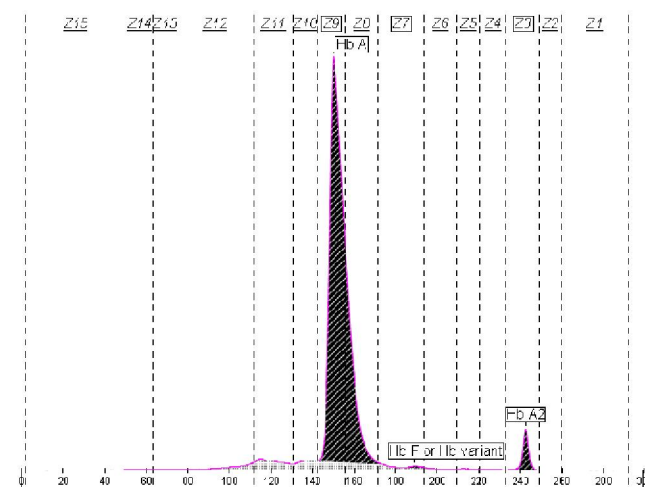
Working date : 20/6/2557

ID : Fa57-304

Principle : Capillary Electrophoresis

Sample No. : 19

Name : rack: SEBIA Pos.: 3



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
Hb A	95.8		
Hb F or Hb variant	0.4		
Hb A2	3.8		

53

เพศ หญิง อายุ 29 ปี

Hb 12.7 g/dl
Hct 38.5 %
RBC $5.5 \times 10^{12}/L$
MCV 69.3 fl
MCH 22.8 pg
MCHC 33.0 g/dl
RDW 19.2 %
Hb Type A₂A
Hb A₂ 3.8 %
Hb F 0.4 %

 β -thal trait ?positive β^{Malay} heterozygous $\beta^{\text{Malay}}(\beta^+-\text{thal})$ with or without α -thal α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2Hemoglobin typing report

Received date: 20/6/2557

Type of sample: EDTA blood

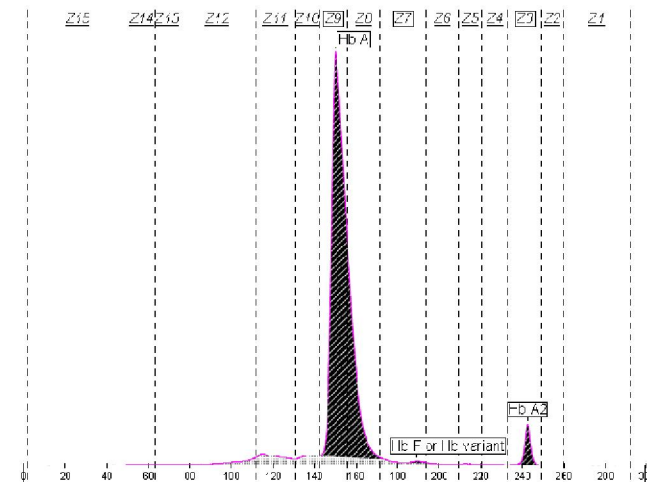
Working date : 20/6/2557

ID : Fa57-304

Principle : Capillary Electrophoresis

Sample No. : 19

Name : rack: SEBIA Pos.: 3

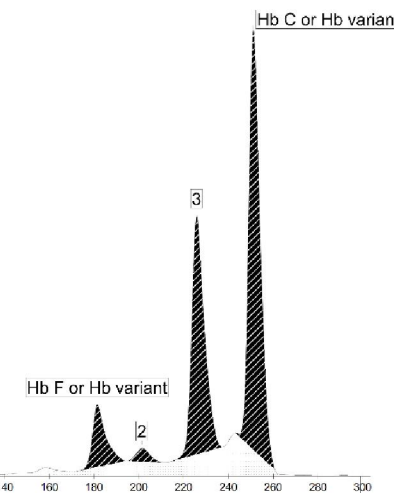
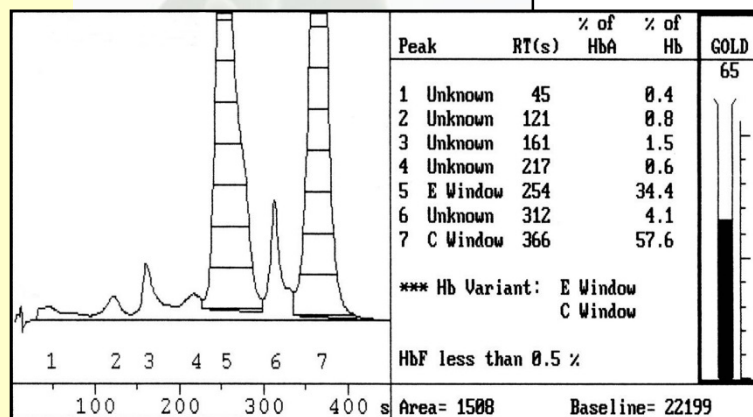


Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
Hb A	95.8		
Hb F or Hb variant	0.4		
Hb A ₂	3.8		

54 พศ ชาย อายุ 5 ปี

Hb	9.9	g/dl
Hct	30.2	%
RBC	4.5 x 10 ¹² /L	
MCV	67.1	fl
MCH	22.0	pg
MCHC	32.7	g/dl
RDW	17.4	%
Hb Type	E and Abn Hb	
Hb E	35.1	%
Abn Hb	53.8	%



Hemoglobin Electrophoresis

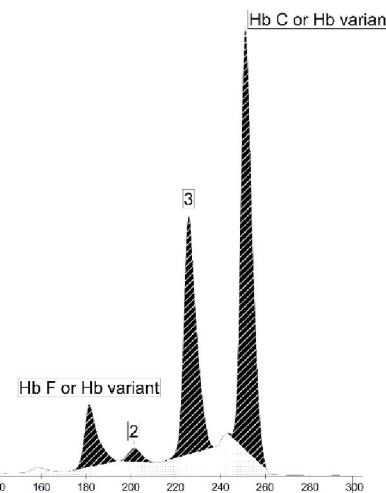
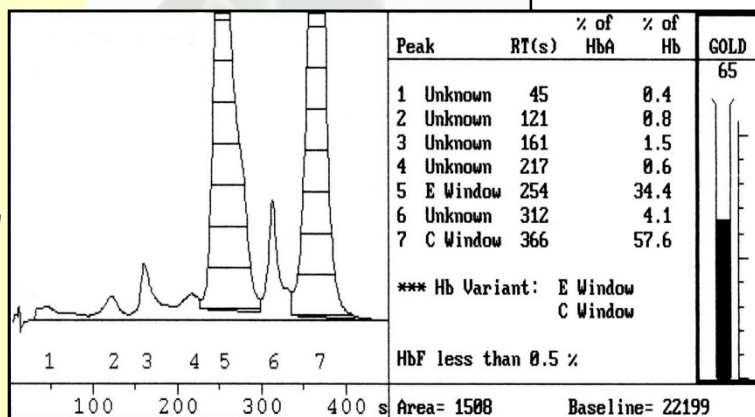
Fractions	%	Ref. %	Ref. g/dl
Hb F or Hb variant	9.2		
2	1.9		
3	35.1		
Hb C or Hb variant	53.8		

Interpretation ?

55

เพศ ชาย อายุ 5 ปี

Hb 9.9 g/dl
Hct 30.2 %
RBC $4.5 \times 10^{12}/L$
MCV 67.1 fl
MCH 22.0 pg
MCHC 32.7 g/dl
RDW 17.4 %
Hb Type E and Abn Hb
Hb E 35.1 %
Abn Hb 53.8 %



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
Hb F or Hb variant	9.2		
2	1.9		
3	35.1		
Hb C or Hb variant	53.8		

Suspected compound heterozygous Hb E / Abn Hb(β -chain variant ?)

positive β^c

compound heterozygous Hb E / Hb C

with or without α -thal

α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2

56

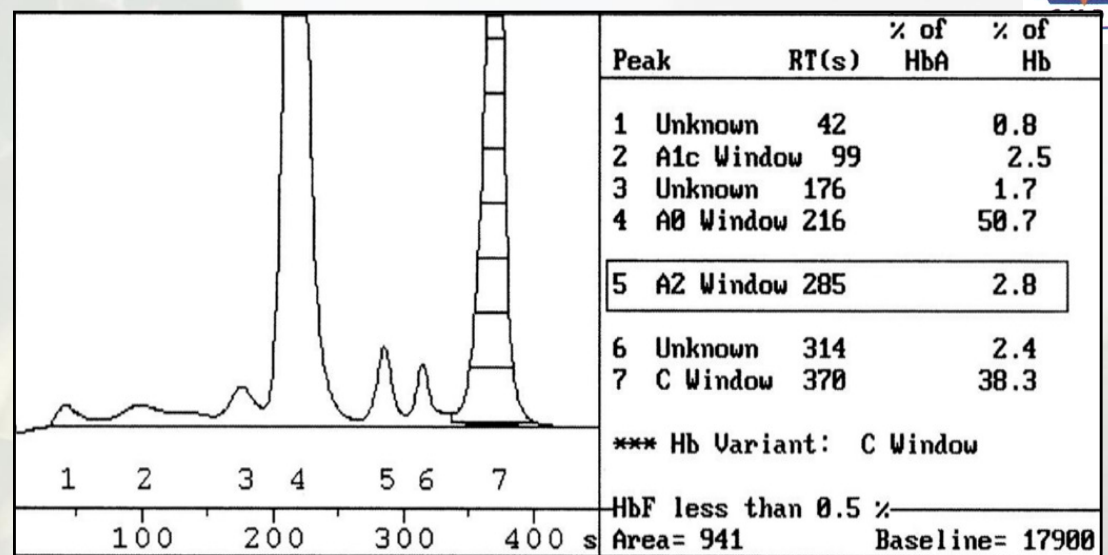
เพศ หญิง อายุ 36 ปี

Hb 12.5 g/dl
Hct 35.8 %
RBC $4.2 \times 10^{12}/L$
MCV 85.2 fl
MCH 29.7 pg
MCHC 34.9 g/dl
RDW 13.2 %

Hb Type A₂A and Abn Hb

Hb A₂ 2.8 %

Abn Hb 38.3 %



Interpretation ?

57

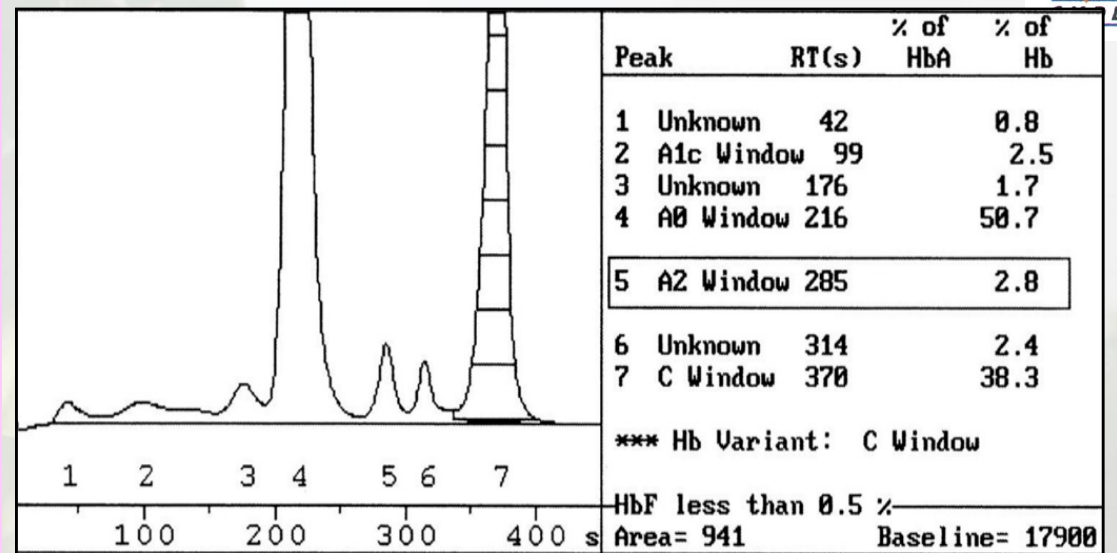
เพศ หญิง อายุ 36 ปี

Hb 12.5 g/dl
Hct 35.8 %
RBC $4.2 \times 10^{12}/L$
MCV 85.2 fl
MCH 29.7 pg
MCHC 34.9 g/dl
RDW 13.2 %

Hb Type A₂A and Abn Hb

Hb A₂ 2.8 %

Abn Hb 38.3 %



Suspected heterozygous Abn Hb (β -chain variant ?)

positive β^C

heterozygous Hb C

with or without α -thal

α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2

58

เพศ ชาย อายุ 43 ปี

Hb 13.9 g/dl

Hct 42.1 %

RBC $5.2 \times 10^{12}/L$

MCV 81.7 fl

MCH 26.9 pg

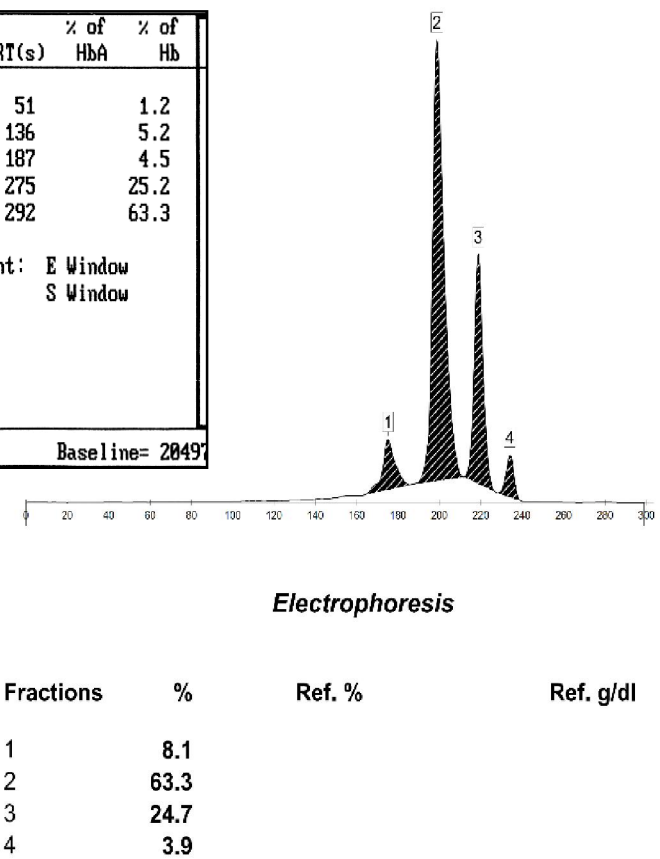
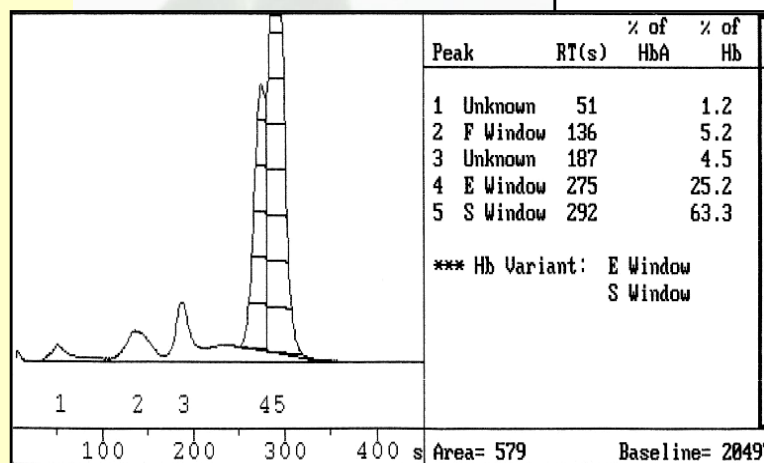
MCHC 32.9 g/dl

RDW 13.3 %

Hb Type E and Abn Hb

Hb E 28.6 %

Abn Hb 63.3 %



Interpretation ?

59

เพศ ชาย อายุ 43 ปี

Hb 13.9 g/dl

Hct 42.1 %

RBC $5.2 \times 10^{12}/L$

MCV 81.7 fl

MCH 26.9 pg

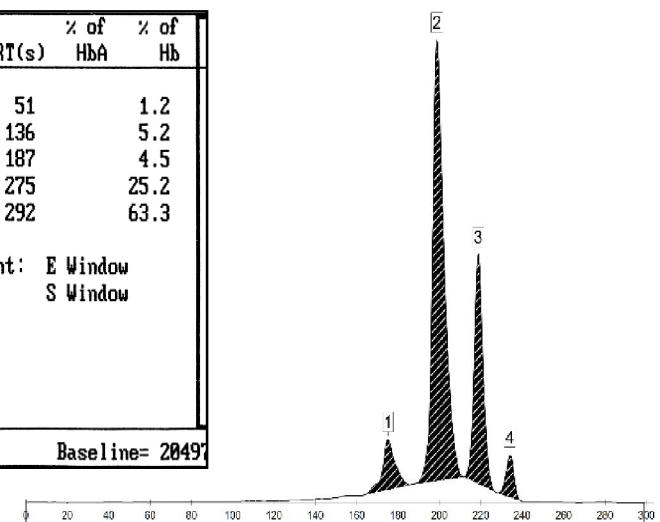
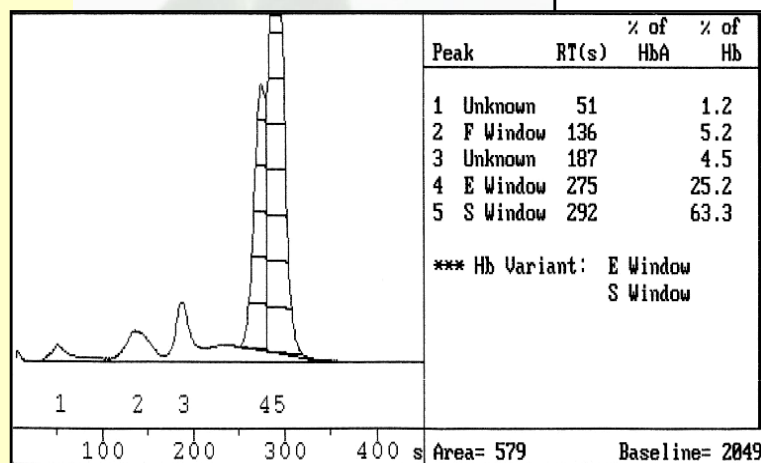
MCHC 32.9 g/dl

RDW 13.3 %

Hb Type E and Abn Hb

Hb E 28.6 %

Abn Hb 63.3 %



Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	8.1		
2	63.3		
3	24.7		
4	3.9		

Suspected compound heterozygous Hb E / Abn Hb(β -chain variant ?)positive β^D -punjab

compound heterozygous Hb E / Hb D-Punjab

with or without α -thal α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2

60

เพศ ชาย อายุ 55 ปี

Hb 4.3 g/dl

Hct 12.7 %

RBC $1.66 \times 10^{12}/L$

MCV 76.5 fl

MCH 25.7 pg

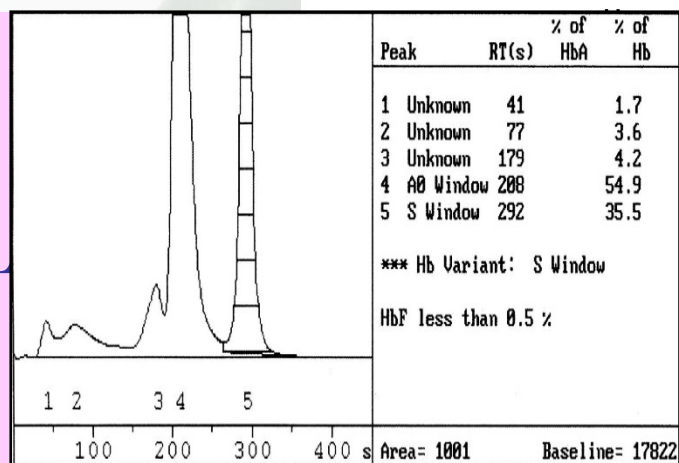
MCHC 33.6 g/dl

RDW 14.8 %

Hb Type A₂A and Abn HbHb A₂ 2.9 %

Abn Hb 37.6 %

Interpretation ?

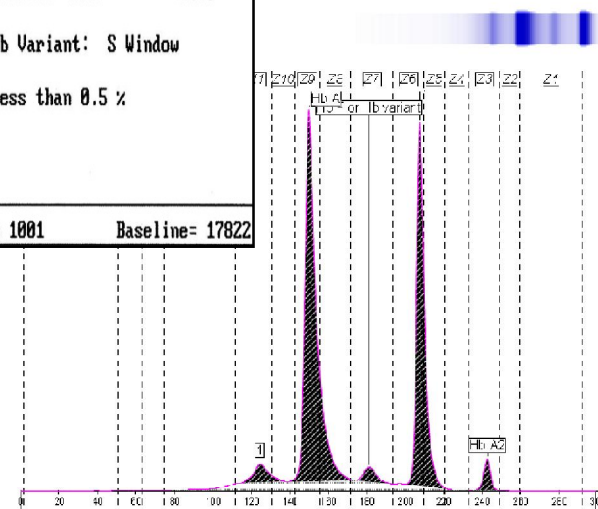


globin typing report

Type of sample: EDTA blood

ID : S58-922

capillary Electrophoresis



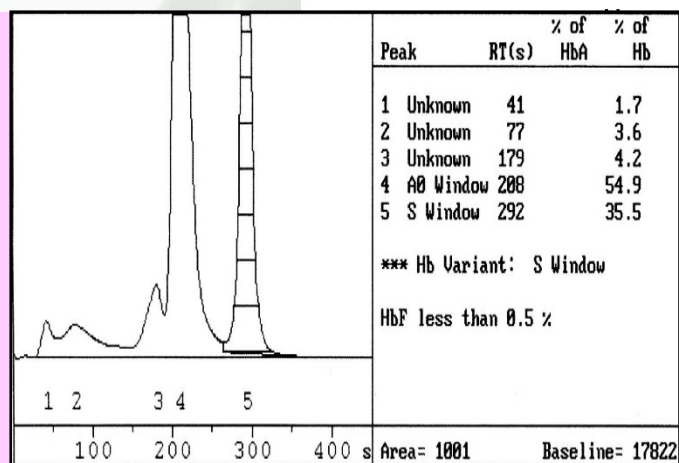
Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	3.2		
Hb A	54.1		
Hb F or Hb variant	2.2		
4	37.6		
Hb A2	2.9		

61

เพศ ชาย อายุ 55 ปี

Hb 4.3 g/dl
Hct 12.7 %
RBC $1.66 \times 10^{12}/L$
MCV 76.5 fl
MCH 25.7 pg
MCHC 33.6 g/dl
RDW 14.8 %
Hb Type A₂A and Abn Hb
Hb A₂ 2.9 %
Abn Hb 37.6 %

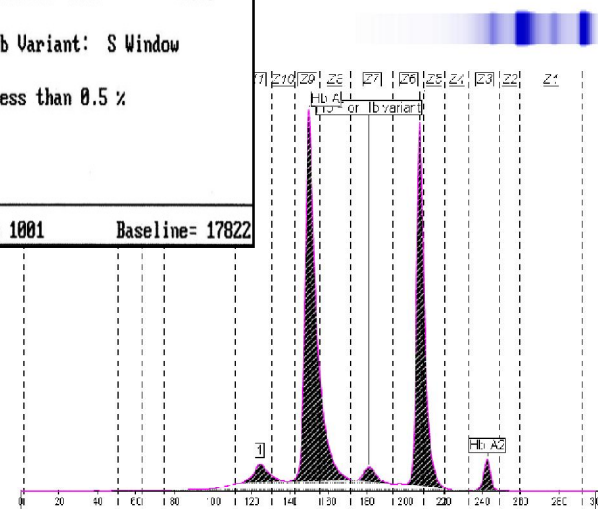


globin typing report

Type of sample: EDTA blood

ID : S58-922

capillary Electrophoresis



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	3.2		
Hb A	54.1		
Hb F or Hb variant	2.2		
4	37.6		
Hb A2	2.9		

Suspected heterozygous Abn Hb (β -chain variant ?)positive $\beta^{\text{D-Punjab}}$

heterozygous Hb D-Punjab

with or without α -thal α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2

เพศ หญิง อายุ 44 ปี

Hb	12	g/dl
Hct	36.7	%
RBC	4.84	$\times 10^{12}/L$
MCV	75.8	fl
MCH	24.7	pg
MCHC	32.7	g/dl
RDW	15.6	%
Hb Type	A ₂ FA	
Hb A ₂	2.3	%
Hb F	24.9	%

Interpretation ?

Hemoglobin typing report

Received date: 19/6/2557

Type of sample: EDTA blood

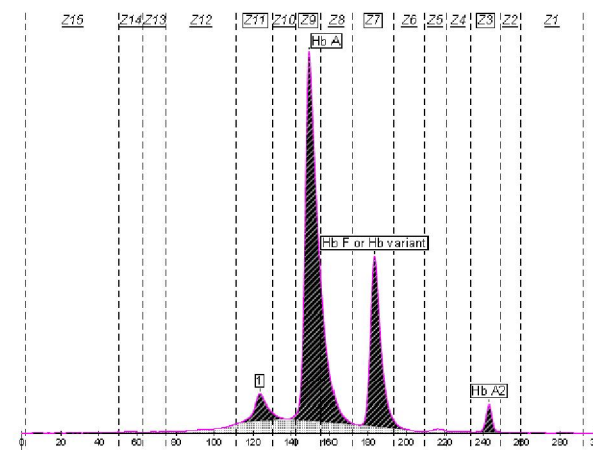
Working date : 20/6/2557

ID : S57-1042

Principle : Capillary Electrophoresis

Sample No. : 35

Name : rack: SEBIA Pos.: 3



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	4.8		
Hb A	68.0		
Hb F or Hb variant	24.9		
Hb A2	2.3		

เพศ หญิง อายุ 44 ปี

Hb	12	g/dl
Hct	36.7	%
RBC	4.84	$\times 10^{12}/L$
MCV	75.8	fl
MCH	24.7	pg
MCHC	32.7	g/dl
RDW	15.6	%
Hb Type	A ₂ FA	
Hb A ₂	2.3	%
Hb F	24.9	%

β-thal? or high F

positive HPFH

Heterozygous HPFH

with or without α-thal

α-thal : heterozygous α-thal 1, heterozygous α-thal 2, homozygous α-thal 2

Hemoglobin typing report

Received date: 19/6/2557

Type of sample: EDTA blood

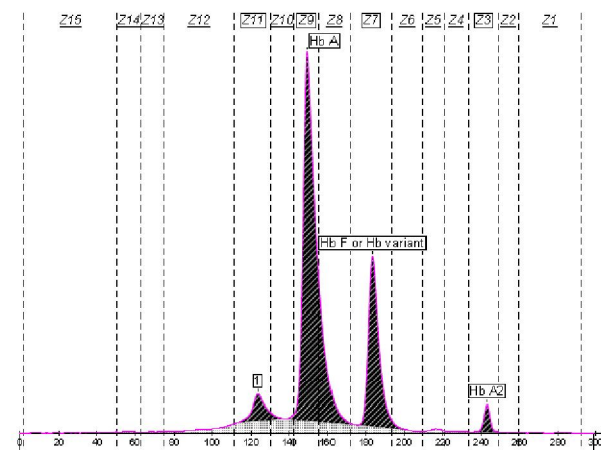
Working date : 20/6/2557

ID : S57-1042

Principle : Capillary Electrophoresis

Sample No. : 35

Name : rack: SEBIA Pos.: 3



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	4.8		
Hb A	68.0		
Hb F or Hb variant	24.9		
Hb A2	2.3		

เพศ ชาย อายุ 30 ปี

Hb 10.1 g/dl
Hct 32.3 %
RBC $4.4 \times 10^{12}/L$
MCV 73.0 fl
MCH 22.8 pg
MCHC 31.2 g/dl
RDW 22.6 %
Hb Type A₂FA
Hb A₂ 8.2 %
Hb F 4.0 %

Interpretation ?

Hemoglobin typing report

Received date: 20/8/2557

Type of sample: EDTA blood

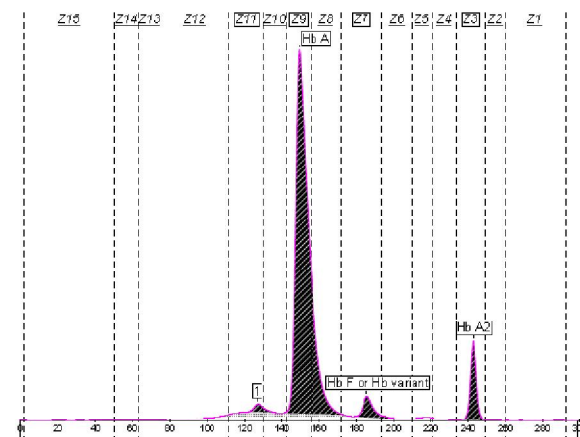
Working date : 22/8/2557

ID : S57-1433

Principle : Capillary Electrophoresis

Sample No. : 8

Name : rack: SEBIA Pos.: 8



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	1.4		
Hb A	86.4		
Hb F or Hb variant	4.0		
Hb A2	8.2		

65

เพศ ชาย อายุ 30 ปี

Hb 10.1 g/dl
Hct 32.3 %
RBC $4.4 \times 10^{12}/L$
MCV 73.0 fl
MCH 22.8 pg
MCHC 31.2 g/dl
RDW 22.6 %
Hb Type A₂FA
Hb A₂ 8.2 %
Hb F 4.0 %

 β -thal? or high F**positive β^0 – thal(3.4 kb deletion)****heterozygous β^0 - thal(3.4 kb deletion)****with or without α -thal** **α -thal : heterozygous α -thal 1, heterozygous α -thal 2, homozygous α -thal 2****Hemoglobin typing report**

Received date: 20/8/2557

Type of sample: EDTA blood

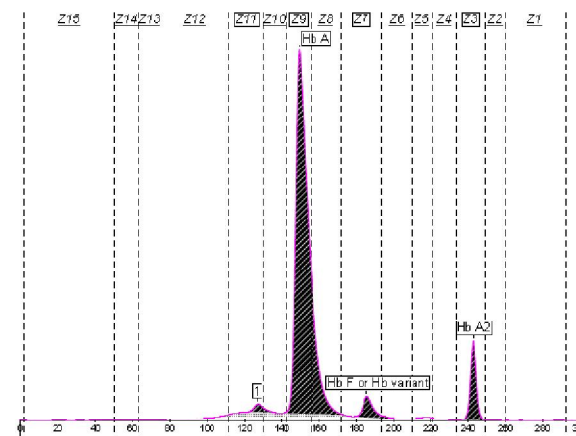
Working date : 22/8/2557

ID : S57-1433

Principle : Capillary Electrophoresis

Sample No. : 8

Name : rack: SEBIA Pos.: 8

**Hemoglobin Electrophoresis**

Fractions	%	Ref. %	Ref. g/dl
1	1.4		
Hb A	86.4		
Hb F or Hb variant	4.0		
Hb A2	8.2		

เพศ ชาย อายุ 1 ปี

Hb 7.5 g/dl
Hct 22.0 %
RBC $2.9 \times 10^{12}/L$
MCV 74.6 fl
MCH 25.5 pg
MCHC 34.2 g/dl
RDW 21.7 %
Hb Type A₂FA
Hb A₂ 3.0 %
Hb F 25.8 %

Interpretation ?

Hemoglobin typing report

Received date: 29/12/2557

Type of sample: EDTA blood

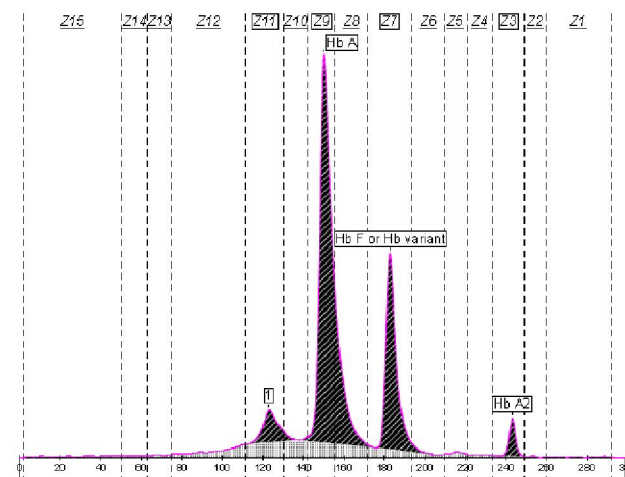
Working date : 9/1/2558

ID : S57-2189

Principle : Capillary Electrophoresis

Sample No. : 22

Name : rack: SEBIA Pos.: 6



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	5.9		
Hb A	65.3		
Hb F or Hb variant	25.8		
Hb A2	3.0		

67

เพศ ชาย อายุ 1 ปี

Hb 7.5 g/dl
Hct 22.0 %
RBC $2.9 \times 10^{12}/L$
MCV 74.6 fl
MCH 25.5 pg
MCHC 34.2 g/dl
RDW 21.7 %
Hb Type A₂FA
Hb A₂ 3.0 %
Hb F 25.8 %

β-thal? or high F**positive β⁰ – thal(IVS-I#5)****positive β⁺ – thal(Hb Malay)****Compound heterozygous β⁰/ β⁺(Hb Malay)****with or without α-thal****α-thal : heterozygous α-thal 1, heterozygous α-thal 2, homozygous α-thal 2****Hemoglobin typing report**

Received date: 29/12/2557

Type of sample: EDTA blood

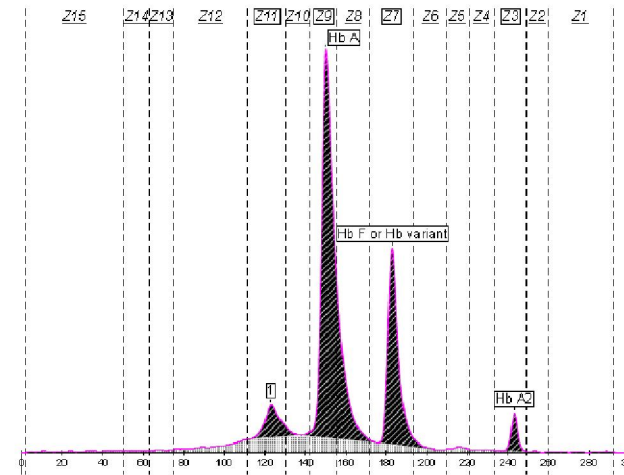
Working date : 9/1/2558

ID : S57-2189

Principle : Capillary Electrophoresis

Sample No. : 22

Name : rack: SEBIA Pos.: 6

**Hemoglobin Electrophoresis**

Fractions	%	Ref. %	Ref. g/dl
1	5.9		
Hb A	65.3		
Hb F or Hb variant	25.8		
Hb A2	3.0		

เพศ ชาย อายุ 4 ปี

Hb 7.5 g/dl
Hct 22.0 %
RBC $2.9 \times 10^{12}/L$
MCV 74.6 fl
MCH 25.5 pg
MCHC 34.2 g/dl
RDW 21.7 %
Hb Type A₂FA
Hb A₂ 2.7 %
Hb F 18.9 %

Interpretation ?

Hemoglobin typing report

Received date: 15/6/2558

Type of sample: EDTA blood

Working date : 19/6/2558

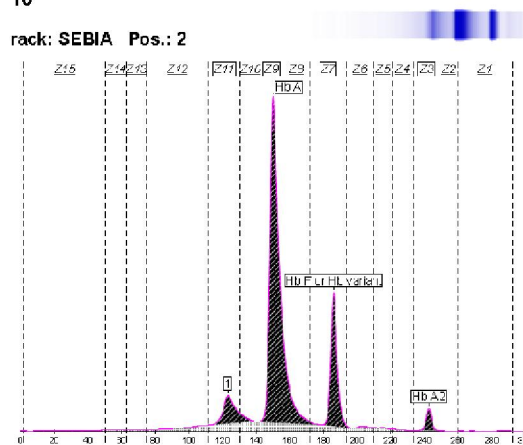
ID : S58-024



Principle : Capillary Electrophoresis

Sample No. : 10

Name : rack: SEBIA Pos.: 2



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	7.8		
Hb A	70.8		
Hb F or Hb variant	18.9		
Hb A2	2.7		

เพศ ชาย อายุ 4 ปี

Hb	7.5	g/dl
Hct	22.0	%
RBC	$2.9 \times 10^{12}/L$	
MCV	74.6	fl
MCH	25.5	pg
MCHC	34.2	g/dl
RDW	21.7	%
Hb Type	A ₂ FA	
Hb A ₂	2.7	%
Hb F	18.9	%

β-thal? or high F

positive β^{Tak}

Heterozygous Hb Tak + ซีดจากสาเหตุอื่น

with or without α-thal

α-thal : heterozygous α-thal 1, heterozygous α-thal 2, homozygous α-thal 2

Hemoglobin typing report

Received date: 15/6/2558

Type of sample: EDTA blood

Working date : 19/6/2558

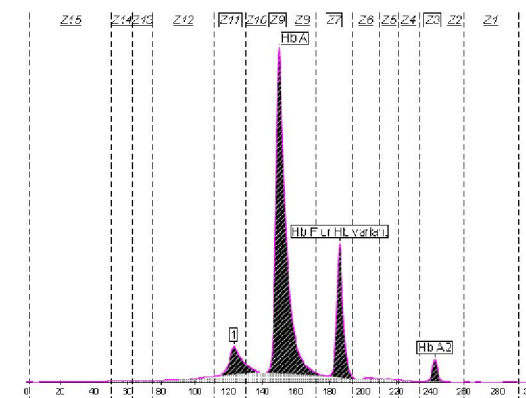
ID : S58-024



Principle : Capillary Electrophoresis

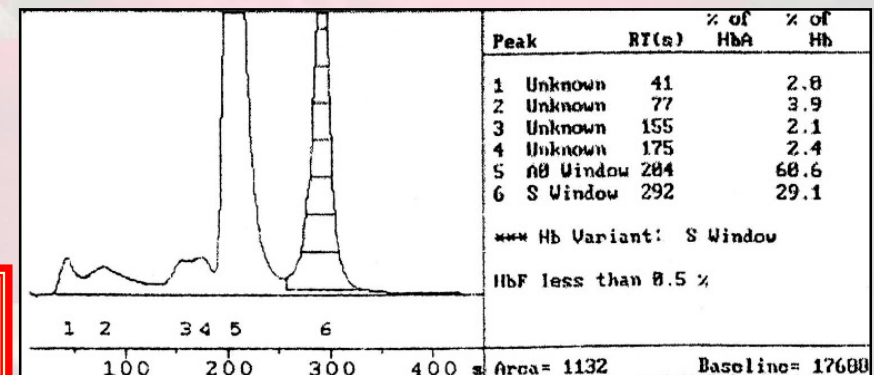
Sample No. : 10

Name : rack: SEBIA Pos.: 2



Hemoglobin Electrophoresis

Fractions	%	Ref. %	Ref. g/dl
1	7.8		
Hb A	70.8		
Hb F or Hb variant	18.9		
Hb A2	2.7		



ขอขอบคุณ

คุณอัปดุลเลาะ หะมะ และ พ.ญ.อัมรา

ผู้ส่ง **case consult (part II)**

นศ.ปริญญาเอก กฤษดา สิงหะ

ผู้รวบรวมข้อมูล **case consult (part II)**



Thank you for your attention



Goonnapa Fucharoen

**Centre for Research
and Developments of
Medical Diagnostic Laboratories
Khon Kaen University**

goonnapa@kku.ac.th

GOONNAPA