

||

|| 1071

[] H Y XY ↑
~ H æ H , Â
a , a Â X à Y ↑
ч , è Л
Â
, , ↑ ,

(Sex control) H , Л
Â H б , à à H
|| H, H H Â

1

1.1 —SRF

Jacobs 1959^[1] Y , H Y ↑ Y
(Testis determining factor,TDF), Л "l Л Y à H—Y
ZFY ~ Palmer (1989)^[2] , || Y Э W ,
è Л H SRY(Sex Determining Region of Y-Chromosome) Â 1991 ,Koopman SRY
DNA (14kb) H , ↑ ↓ ,
SRY H || Y Â
|| H ↑ Y ~ ↑ Y
[3] Â H ~ ↑ ()
, ~ ↑ à
è ↑ Â H ~ ↑
H à [4] Â
H H ~ H Y
~ Â H [5] 6†
H testis determining factor, TDF' H testis determining Y' Tdy~ Â Y
Э ~ H TDF ~ ↑ Y à H-Y
ZFY ~ H TDF' Л Â 1990 ~ Sinclair^[7]
Æ 35 kb ~ è Л H SRY(sex determining region of Y
gene) Â Koopman 1991~^[8] SRY 14kbDNA H XX ~
↑ H ↓ ~ SRY TDF Â

2

2500
 1923
 Painter X Y 1959 Welshons Jacobs Y
 , 1 Jacobs 1966 æ Y 1990
 Sinclair Gubbay Y Ψ (sex deter-mining region of the Y,SRY)^[9] $\hat{A}$
 2.1
 || X Y $\hat{A}$ 20 50 , X Y
 à à $\hat{A}$ X 6 Y
 a 1 , è† , $\hat{A}$
 X Y Y Θ SRY , 4

тот X , т 18,000,000 , , н и а
А , т X а Y А

3.2

т X а Y т ~ э ~
и и ы А
, з А Ф а а
а А т , а а
у т и а з э
А

3.2.1

т , Y
А т т ~ т ^ ~
, Л т , DNA ,
, э 100%^[21] э , т
Y т , з ~
~ а н А

3.2.2 т

т PCR
А э а а а , и
э ' ~ э Y Э SRY
, и ~ и А

3.2.2.1 DNA

ы т Ю , э DNA б Y DNA () ,
и , и , и АLeonard (1987)^[22]
т , э и 95%(81/85) А DNA (15)
, з , Э т н
А

3.2.2.2 т Æ (FISH)

FISH

, è 95.5%(65/68) Â Kawasaki T^[25] FISH Y- ↑
 , ì 91%(85/97), 92%(60/65) ↑ 48h Л
 , 12 ↓ Н 12 б Â é
 à à Â é a DNA a à "l ↑ æ 3
 Â

3.2.2.3 PCR

PCR^[26] ŷ DNA DNA , ,
 Ю ↓ Â è DNA ↓ à à 3
 Â Л Н EB Л "l ,
 , ì ÂHerr ^ 1990~^[27] "l П PCR Â
 ж ~ ^ SRY~ ~
 SRY || , ↓ a Л ||
 , Н 95% 100% Â ^ 2003~^[28]
 ~ è 100% 10/10~ Â ^ 2004~^[29]
 ~ è 100% 20/20~ Â
 ~ ~ Л Â ~
 ↓ Â

3.2.2.4 LAMP

б PCR ↓ LAMP^[30] Â ↓
 DNA 65 ↓ || ~ ↓ DNA т æ
 ~ ↓ ÂLAMP ~ 6 ѱ
 ↓ ^ 4 ~ DNA ~ 65
 ° Ю ↓ ~ Л ↓
 Н Â ↓
 40 min Â ~ è
 100% б H.Hirayama,S. 113 58 ~ 55^[31] Â
 LAMP ↓ ↓ Â è DNA è
 Н ~ Â LAMP é PCR ,
 ↓ Â
 ~ PCR à LAMP ~ é
 à à à ~ ~
 ~ ш ~ Â
 Э , || ↓ , ↑ a
 , è a , ì X à Y ↑ , è'

, a H $\hat{A}$ J , $\uparrow$
 , Θ $\downarrow$ $\uparrow$, J ,
 , , J , Θ $\hat{a}$ $\hat{a}$
 , $\hat{A}$

4

Θ , x $\hat{a}$ Y $\uparrow$, Θ
 $\downarrow$ Θ , , $\uparrow$ $\hat{a}$ $\uparrow$
 a $\hat{e}$ H , $\uparrow$, ,
 20 h , $\uparrow$, $\downarrow$ Ю ; PCR
 $\downarrow$ $\downarrow$ $\hat{a}$ J π
 $\hat{A}$ $\sim$ a $\sim$ a $\sim$ a $\sim$ $\uparrow$
 , $\sim$ J $\downarrow$
 , , π , PCR
 $\uparrow$, H , 3 PCR
 $\sim$ $\sim$ "I $\parallel$ Θ
 $\hat{A}$ Θ ч , $\hat{e}$
 $\hat{A}$ γ Loopamp
 , LAMP(loop-mediated isothermal amplification) ,
 $\downarrow$ H , γ PCR
 $\hat{A}$
 , $\hat{e}$ $\mathbb{H}$ '
 $\hat{A}$ x $\hat{a}$ Y $\uparrow$ $\hat{A}$
 $\hat{y}$, $\hat{e}$,
 . π H H , $\hat{e}$ $\mathbb{H}$ $\hat{A}$,
 $\neq$, π , H
 $\hat{A}$

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