

УТВЕРЖДАЮ
Заместитель директора

_____ Д. А. Шагин

« ____ » _____ 2008 г.

ОТЧЕТ
О НАУЧНО-ИССЛЕДОВАТЕЛЬСКОЙ РАБОТЕ

по теме:

Поиск мутаций в гене RPS19 в образце ДНК №18.1

Заказчик: Федеральный научно-клинический центр детской гематологии,
онкологии и иммунологии Росздрава

Образцы: образец ДНК №18.1

Содержание

| Раздел | Страница |
|--|-----------------|
| 1. Краткое описание гена RPS19 | 3 |
| 2. Образец ДНК №18.1 | 4 |
| 3. ПЦР (праймеры, условия) | 4-5 |
| 4. Определение первичной нуклеотидной последовательности | 5 |
| 5. Заключение | 5 |
| 6. Ссылки | 6 |

Рисунки

Рис 1. Агарозный гель-электрофорез образца ДНК

В **приложении** к данному отчету представлены данные секвенирования в виде 10 файлов.

Обозначения и сокращения

ДНК - дезоксирибонуклеиновая кислота;
мРНК – матричная рибонуклеиновая кислота;
ПЦР - полимеразная цепная реакция;
dNTPs – дезоксинуклеозидтрифосфаты

Введение

Согласно заданию Заказчика, целью НИР является сравнение первичной нуклеотидной последовательности кодирующей области и областей экзон-интронных соединений гена RPS19 человека образца ДНК №18.1 и референсной последовательности методом прямого секвенирования.

1.Краткое описание гена RPS19

| | |
|--|---|
| Символическое обозначение гена | RPS19 |
| Название гена | Рибосомальный белок S19 (ribosomal protein S19) |
| Локализация | 19q13.2 |
| Номер референсной последовательности мРНК * | NM_001022.3 |
| Длина мРНК | 872 н.о. |
| Количество экзонов | 6 |
| Количество описанных мутаций* * | 55 |
| Фенотипы, описанные при мутациях в гене RPS19* | Анемия Даймонда-Блэкфана (Diamond-Blackfan Anemia, OMIM# 105650) |

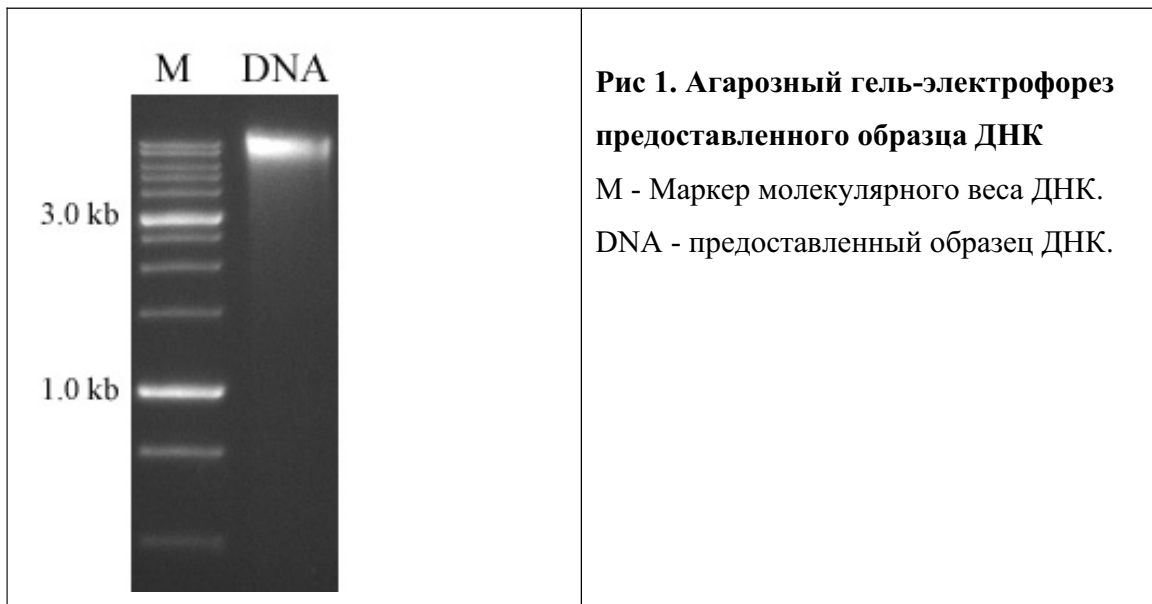
* по данным информационных баз NCBI (National Center for Biotechnology Information [1,2])

** по данным HGMD[®]
(The Human Gene Mutation Database at the Institute of Medical Genetics in Cardiff, [3])

Рибосомы (органеллы клетки, участвующие в синтезе белков) состоят из двух субъединиц – 40S (малой) и 60S (большой). Эти субъединицы состоят в общей сложности из 4 видов РНК и примерно 80 различных белков. Ген RPS19 кодирует рибосомальный белок, являющийся компонентом субъединицы 40S. Белок локализован в цитоплазме и принадлежит к семейству рибосомальных белков S19E. У человека мутации в этом гене описаны у части больных с анемией Даймонда-Блэкфана (Diamond-Blackfan anemia, DBA) - конституциональной эритробластопенией, характеризующейся отсутствием или снижением количества эритроидных предшественников гемопоэза. Это предполагает возможность существования других функций данного белка (участие в эритропоэтической дифференцировке и пролиферации), помимо рибосомального компонента.

по данным Entrez Gene [2]

2. Образец ДНК №18.1



3. Полимеразная цепная реакция (ПЦР)

3.1. Список праймеров и длины соответствующих ПЦР-продуктов

| Название праймера | Последовательность праймера (5' → 3') | Длина праймера (н.о.) | Длина ПЦР-продукта (п.н.) |
|-------------------|---------------------------------------|-----------------------|---------------------------|
| RPS2F1 | gtc ggt gag ctc ctt cag ac | 20 | 414 |
| RPS2R1 | gta caa aga gag gct gga acc | 21 | |
| RPS3F | cac agc ata gtt gtg ttg agg | 21 | 281 |
| RPS3R | aaa gag ctc aga gga gac ag | 20 | |
| RPS4F | cag tga gaa tta gct gtt tac ac | 23 | 361 |
| RPS4R | tgg gca gac tat gca gga cc | 20 | |
| RPS5F1 | gc tcg tta gaa tgc acc tga c | 22 | 368 |
| RPS5R1 | gac tgt cct ttc tcc tgt ctc | 21 | |
| RPS6F | tgg gta gtt agg tag ctg tta c | 22 | 166 |
| RPS6R1 | aaa aga gac cca gac cag ga | 20 | |

3.2. Компоненты и условия ПЦР

| | |
|--|--------|
| Геномная ДНК | 10 нг |
| 10×Encyclo буфер (ЗАО «Евроген») | |
| dNTPs (смесь дезоксинуклеозидтрифосфатов, 10 мМ каждого) | 200 μМ |
| Праймер F | 0.2 μМ |
| Праймер R | 0.2 μМ |
| 50X смесь полимераз «Encyclo» (ЗАО «Евроген») | |
| Общий объем реакционной смеси | 25 μl |

Каждый цикл амплификации (MJ Research PTC-200 DNA Thermal Cycler) включал:

95^oC - 7 с; 60-66^oC - 20 с; 72^oC –30 с.

Общее число циклов – 28-34.

4. Определение первичной нуклеотидной последовательности

Секвенирование ПЦР-продуктов амплификации нуклеотидной последовательности кодирующей области и областей экзон-интронных соединений гена RPS19 человека образца ДНК №18.1 (ABI PRISM genetic analyzer, PE Applied Biosystems, Foster City, CA, USA) проводилось после очистки ПЦР продукта (JETQUICK PCR Purification Spin Kit 50, GENOMED GmbH) с использованием соответствующих праймеров (п.3.1).

Данный подход обладает эффективностью и точностью на уровне требований современных научных исследований, теоретическая вероятность ошибки при секвенировании в настоящем исследовании составляет не более 1/10,000 н.о.

5. Заключение

В результате настоящего научного исследования при сравнении первичной нуклеотидной последовательности кодирующей области и областей экзон-интронных соединений гена RPS19 человека образца ДНК №18.1 с референсной последовательностью мРНК с помощью программы SeqMan™II, а также анализа полученных данных с помощью программы BLAST [4] в экзоне 3 гена RPS19 обнаружена мутация **с.156 G>A (Trp52Stop)** в гетерозиготном состоянии (см. результаты секвенирования 18-1_RPS19_3FR_f, 18-1_RPS19_3FR_r). Следует отметить, что в этом же кодоне, по данным литературы, описаны другие мутации у больных с анемией Даймонда-Блэкфана: **с.154 T>C (Trp52Arg)** и **с.155 G>A (Trp52Stop)** [7, 8].

6. ССЫЛКИ

1. Entrez Nucleotide <http://www.ncbi.nlm.nih.gov/sites/entrez?db=Nucleotide>
2. Entrez Gene <http://www.ncbi.nlm.nih.gov/sites/entrez?db=gene>
3. Stenson et al (2003), The Human Gene Mutation Database (HGMD®): 2003 Update. *Hum Mutat* (2003) 21:577-581. <http://www.hgmd.cf.ac.uk/ac/index.php>
4. Basic Blast <http://blast.ncbi.nlm.nih.gov/Blast.cgi>
5. Human Blat Search <http://genome.ucsc.edu/cgi-bin/hgBlat>
6. UCSC Genome Browser <http://genome.ucsc.edu/>
7. Draptchinskaia N, Gustavsson P, Andersson B, et al. The gene encoding ribosomal protein S19 is mutated in Diamond-Blackfan anaemia. *Nat Genet.* 1999 Feb; 21(2):169-75.
8. Willig TN, Draptchinskaia N, Dianzani I, et al. Mutations in ribosomal protein S19 gene and Diamond - Blackfan anemia: wide variations in phenotypic expression. *Blood.* 1999 Dec 15; 94(12):4294-306.



Project : Default
Sample : 18.1_RPS19_2F1R1_f1
Result : 18.1_RPS19_2F1R1_f1

System : CEQ

Operator :
Instrument : CEQ

Sequence Results: 18.1_RPS19_2F1R1_f1

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_2F1R1_f1
Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex2_2F1.scf
Loaded from SCF File: 18.1_RPS19_2F1R1_f1.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex2_2F1
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008

Base Sequence: 18.1_RPS19_2F1R1_f1

```
1  AATACGGGGGGTACCACGGTTTAGGATGCGCTGGAGCGAAAGGATTGGGGTGGGGTCCGTGCTCTTGGCAGTCGTCTCTG
81  CCAGGCCTGTGTTACATGCTTGACTTTCTCCCTCAGATGCCTGGAGTTACTGTAAAAGACGTGAACCAGCAGGAGTTCG
161 TCAGAGCTCTGGCAGCCTTCCTCAAAAAGTGAGTTGGGGACTGAGGTTCAAACGGGTGGAGGCTGTCGCCTTGGCCTG
241 CCCATCTGAGCCCCAGTGTTTGCCGGTCTTGGCAGGGGAGGCTTGTTTGGGGCCTCCGTGGCTCCTTTCAGCGTGAGGCC
321 TGGCTTGTGTTCCGGTTCC
```




Project : Default
Sample : 18.1_RPS19_2F1R1_f1
Result : 18.1_RPS19_2F1R1_f1

System : CEQ

Operator :
Instrument : CEQ

Raw Sample Data: 18.1_RPS19_2F1R1_f1

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown
Cap No Hours Used: Unknown
Gel Part No: Unknown
Gel Lot No: Unknown
Gel No Hours Used: Unknown

Note: Loaded from SCF File: RPS19Ex2_2F1.scf
 Loaded from SCF File: 18.1_RPS19_2F1R1_f1.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex2_2F1
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008



Project : Default
Sample : 18.1_RPS19_2F1R1_r1
Result : 18.1_RPS19_2F1R1_r1

System : CEQ

Operator :
Instrument : CEQ

Sequence Results: 18.1_RPS19_2F1R1_r1

Created: 25.11.2008 14:37:49

Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49

Project: Default
System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_2F1R1_r1
Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex2_2R1.scf
Loaded from SCF File: 18.1_RPS19_2F1R1_r1.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex2_2R1
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008

Base Sequence: 18.1_RPS19_2F1R1_r1

```
1  ACCCAAACAAGGCCTCCCCTGCCAGGGACCTGAAAACACTGGGGCTCAGATGGGCAGGCCAAGGCGACAGCCTCCACCC
81  GTTTTGAACCTCAGTCCCCAAACTCACTTTTGGAGGAAGGCTGCCAGAGCTCTGACGAACTCCTGCTGGTTCACGTCTTT
161 TACAGTAACTCCAGGCATCTGAGGGAGAAAAGTCAAGCATGTGAACACAGGCCTGGCAGAGACGACTGCCAAGAGCACGGA
241 CCCCACCCCAATCCTTTTCGCTCCAGCGCATCCTAAACCGTGGTACCCCCGTTACTTCCCACGGCCCCCTTCAACGCCGGG
321 CTCCGGCTCCTGCTGGGTCTGAAG
```

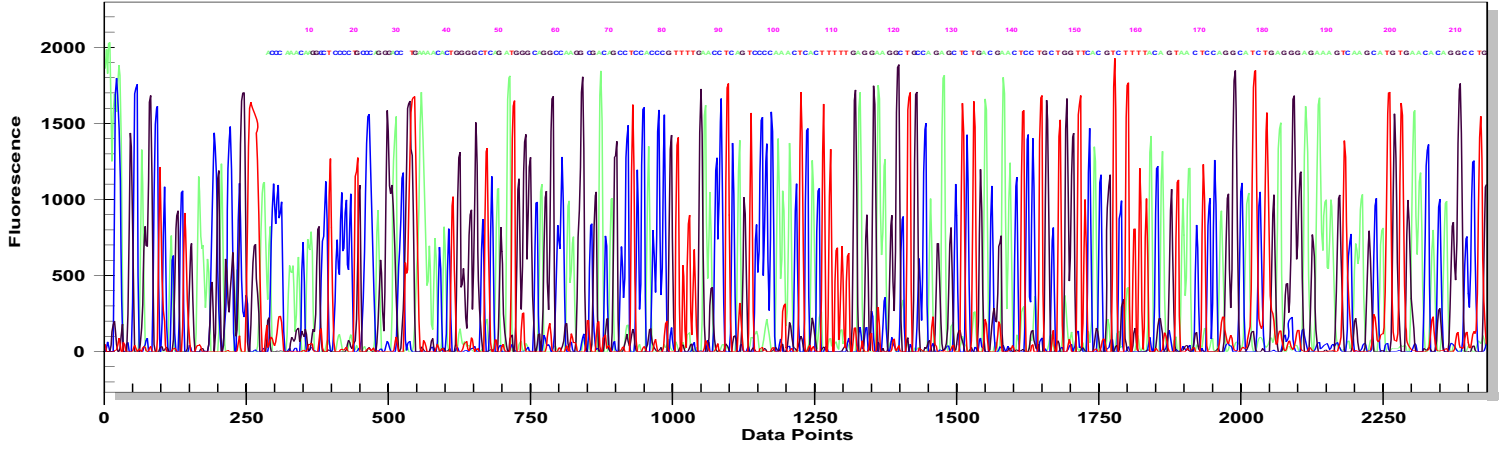


Project : Default
Sample : 18.1_RPS19_2F1R1_r1
Result : 18.1_RPS19_2F1R1_r1

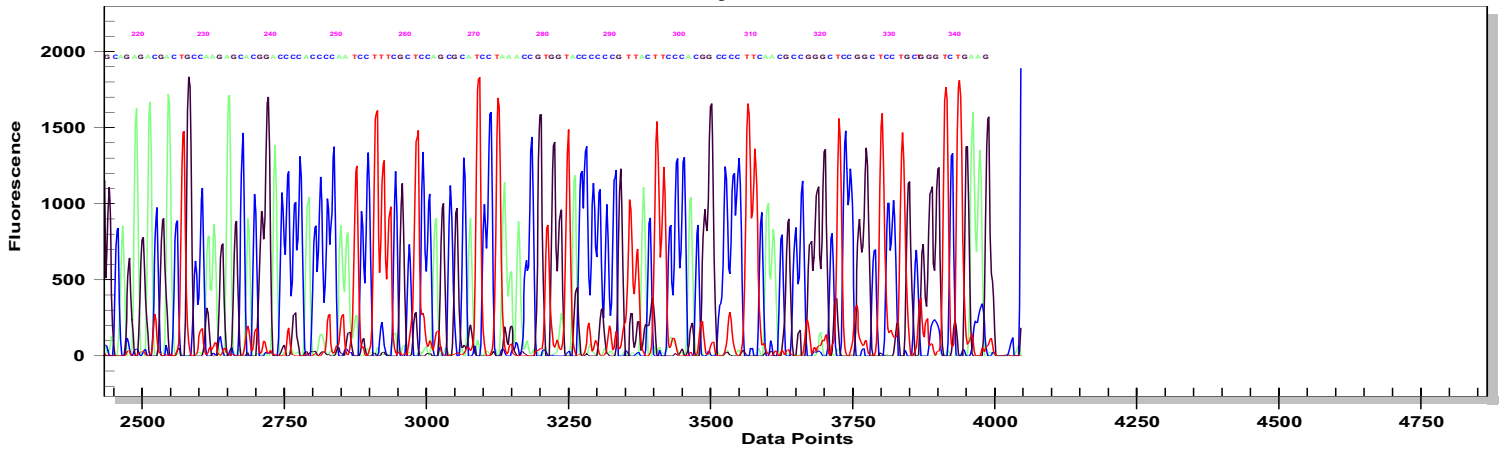
System : CEQ

Operator :
Instrument : CEQ

Analyzed Data



Analyzed Data





Project : Default
Sample : 18.1_RPS19_3FR_f
Result : 18.1_RPS19_3FR_f

System : CEQ

Operator :
Instrument : CEQ

Sequence Results: 18.1_RPS19_3FR_f

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_3FR_f
Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex3_3F.scf
Loaded from SCF File: 18.1_RPS19_3FR_f.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex3_3F
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008

Base Sequence: 18.1_RPS19_3FR_f

```
1 TGTGTCCGGGAAGCTGAAAGTCCCCGAATGGGTGGATACCGCTCAAGCTGGCCAAGCACAAAGAGCTTGCTCCCTACGAT
81 GAGAACTGATTCTACACGCGAGCTGGTGAGGAACTTAGGTCTTTGGCTGGAGAGTGGGGAGCTGGGTGACCCCTGGCACA
161 AACCACTACT
```




Project : Default
Sample : 18.1_RPS19_3FR_f
Result : 18.1_RPS19_3FR_f

System : CEQ

Operator :
Instrument : CEQ

Raw Sample Data: 18.1_RPS19_3FR_f

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown
Cap No Hours Used: Unknown
Gel Part No: Unknown
Gel Lot No: Unknown
Gel No Hours Used: Unknown

Note: Loaded from SCF File: RPS19Ex3_3F.scf
Loaded from SCF File: 18.1_RPS19_3FR_f.scf

Properties:
DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex3_3F
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008



Project : Default
Sample : 18.1_RPS19_3FR_r
Result : 18.1_RPS19_3FR_r

System : CEQ

Operator :
Instrument : CEQ

Sequence Results: 18.1_RPS19_3FR_r

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_3FR_r
Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex3_3R.scf
Loaded from SCF File: 18.1_RPS19_3FR_r.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex3_3R
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008

Base Sequence: 18.1_RPS19_3FR_r

```
1  CGCGTGTAGAATCAGTTCTCATCGCTAGGGAGCAAGCTCTTTGTGCTTGGCCAGCTTGACGGTAATCCACCCATTCGGGG
81  ACTTTCAGCTTCCCGGACCTAAGACCAAAACAGTGGGAAAAGCACGATTCAGTCGATCTCCACAAACTACCCCATATCCC
161 AAATGCCCTCCCCTCAACAC
```




Project : Default
Sample : 18.1_RPS19_3FR_r
Result : 18.1_RPS19_3FR_r

System : CEQ

Operator :
Instrument : CEQ

Raw Sample Data: 18.1_RPS19_3FR_r

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown
Cap No Hours Used: Unknown
Gel Part No: Unknown
Gel Lot No: Unknown
Gel No Hours Used: Unknown

Note: Loaded from SCF File: RPS19Ex3_3R.scf
 Loaded from SCF File: 18.1_RPS19_3FR_r.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex3_3R
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008



Project : Default
 Sample : 18.1_RPS19_4FR_f
 Result : 18.1_RPS19_4FR_f

System : CEQ

Operator :
 Instrument : CEQ

Sequence Results: 18.1_RPS19_4FR_f

Created: 25.11.2008 14:37:49 Project: Default
 System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
 System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_4FR_f
 Sample Plate: Unknown
 Sample Position: Unknown
 Method: Unknown

Instrument: Unknown
 Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex4_4F.scf
 Loaded from SCF File: 18.1_RPS19_4FR_f.scf

Properties:

DYEP: ET Terminators
 MACH: MegaBACE # MR-DELL
 NAME: RPS19Ex4_4F
 SampleRemark:
 BCSW: Cimarron 3.12
 DATE: Wed Sep 17 14:15:17 2008

Base Sequence: 18.1_RPS19_4FR_f

```

1 ACAGCGCGGCACCTGTACCTCCGGGGTGGCGCTGGGGTTGGCTCCATGACCAAGATCTATGGGGGACGTCAGAGAAACGG
81 CGTCATGCCCAGCCACTTCAGCCGAGGCTCCAAGAGTGTGGCCCGCCGGGTCTCCAAGCCCTGGAGGGGCTGAAAATGG
161 TGGAAAAGGACCAAGATGGGTAAGCAGGGTAGGGGGGCTGCATTGATGGAGTAGCCTTGAGGCCCGGTCA
  
```




Project : Default
Sample : 18.1_RPS19_4FR_f
Result : 18.1_RPS19_4FR_f

System : CEQ

Operator :
Instrument : CEQ

Raw Sample Data: 18.1_RPS19_4FR_f

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown
Cap No Hours Used: Unknown
Gel Part No: Unknown
Gel Lot No: Unknown
Gel No Hours Used: Unknown

Note: Loaded from SCF File: RPS19Ex4_4F.scf
 Loaded from SCF File: 18.1_RPS19_4FR_f.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex4_4F
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008



Project : Default
Sample : 18.1_RPS19_4FR_r
Result : 18.1_RPS19_4FR_r

System : CEQ

Operator :
Instrument : CEQ

Sequence Results: 18.1_RPS19_4FR_r

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_4FR_r
Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex4_4R.scf
Loaded from SCF File: 18.1_RPS19_4FR_r.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex4_4R
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008

Base Sequence: 18.1_RPS19_4FR_r

```
1 TGCAGCCCCCCTACCCTGCTTACCTATCTTGGTCCTTTTCCACCATTTTCAGCCCCCTCCAGGGCTTGGAGGACCCGGCG
81 GGCCACACTCTTGAGAGCCTCGGCTGAAGTGGCTGGGCATGACGCCGTTTCTCTGACGTCCCCCATAGATCTTGGTCATG
161 GAGCCAACCCAGCGCCACCCCGGAGGTACAGGTGCCGCGCTGTGGAAGCTGGGGGTAGTGTGAGAGGGAGATTTAAGGG
241 TCTTGATCAAGGTCTCAGGTAAACAATTTCCT
```




Project : Default
Sample : 18.1_RPS19_4FR_r
Result : 18.1_RPS19_4FR_r

System : CEQ

Operator :
Instrument : CEQ

Raw Sample Data: 18.1_RPS19_4FR_r

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown
Cap No Hours Used: Unknown
Gel Part No: Unknown
Gel Lot No: Unknown
Gel No Hours Used: Unknown

Note: Loaded from SCF File: RPS19Ex4_4R.scf
Loaded from SCF File: 18.1_RPS19_4FR_r.scf

Properties:
DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex4_4R
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008



Project : Default
Sample : 18.1_RPS19_5F1R1_f1
Result : 18.1_RPS19_5F1R1_f1

System : CEQ

Operator :
Instrument : CEQ

Sequence Results: 18.1_RPS19_5F1R1_f1

Created: 25.11.2008 15:00:41 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 15:00:41 Project: Default
System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_5F1R1_f1
Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex5_RPS5F1.scf
Loaded from SCF File: 18.1_RPS19_5F1R1_f1.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex5_RPS5F1
SampleRemark:
BCSW: Cimarron 3.12
DATE: Mon Sep 15 15:30:06 2008

Base Sequence: 18.1_RPS19_5F1R1_f1

```
1 GGCCTCAGTGGGACTTGGCTTGGCGGCAGGTGGCTTCTTGAGAAGCCTGGCTCACAGCCAGGAGGGAAGGGGCTGAGAAC
81 AGGACCTGTGCTCACTGGGGCCTGCATGACCCCTCCCTCCCCACAGCGCCGCAAACCTGACACCTCAGGGACAAAGAGAT
161 CTGGACAGAATCGCCGGACAGGTAAGGCCTGCGTTTGGGGTGGGGCTGGGTCCCTTAGTCGCTGCCAAGCATTTCCAAA
241 GCCCATACTTTGTGTCAGGTAGACTTATTTTCCTTCTCTGGAGGGCACAGCCCAGGGTGCTGGTGGGGTCAGAGGAGGGCTGC
321 CCAGAGACAGGAGAAAGGACAGTCCTGTC
```

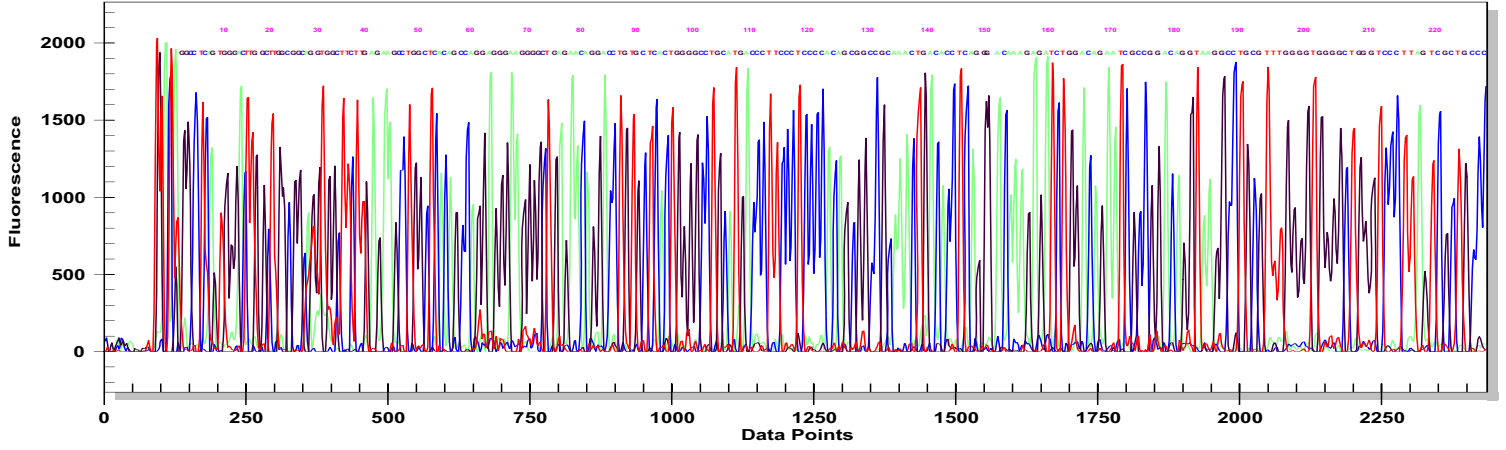


Project : Default
Sample : 18.1_RPS19_5F1R1_f1
Result : 18.1_RPS19_5F1R1_f1

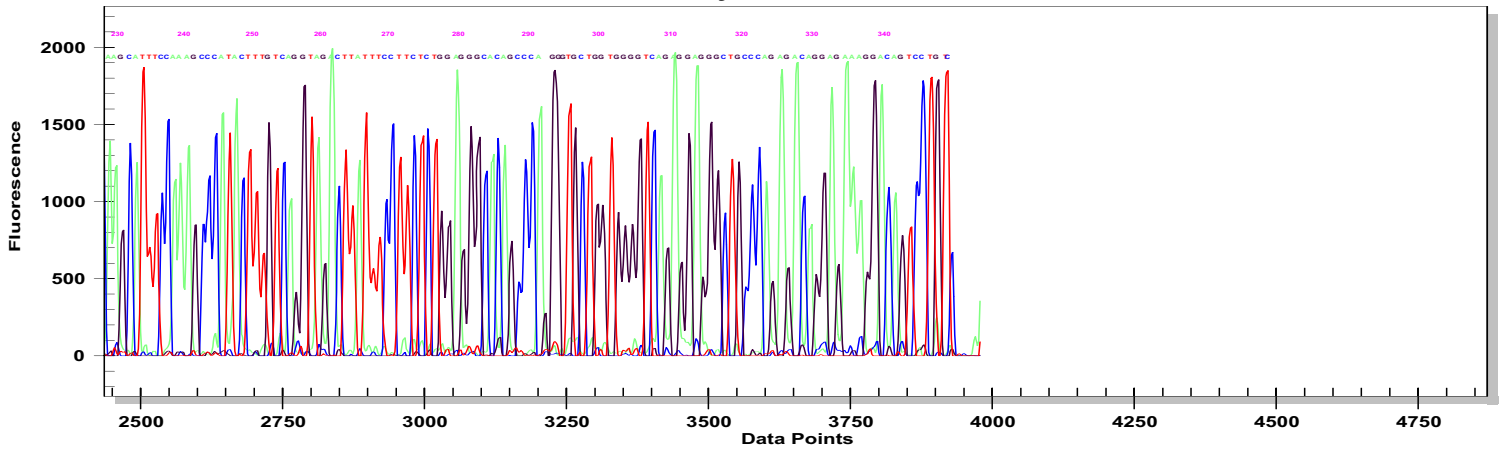
System : CEQ

Operator :
Instrument : CEQ

Analyzed Data



Analyzed Data





Project : Default
Sample : 18.1_RPS19_5F1R1_f1
Result : 18.1_RPS19_5F1R1_f1

System : CEQ

Operator :
Instrument : CEQ

Raw Sample Data: 18.1_RPS19_5F1R1_f1

Created: 25.11.2008 15:00:41 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 15:00:41 Project: Default
System: CEQ [Rev 0]

Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown
Cap No Hours Used: Unknown
Gel Part No: Unknown
Gel Lot No: Unknown
Gel No Hours Used: Unknown

Note: Loaded from SCF File: RPS19Ex5_RPS5F1.scf
 Loaded from SCF File: 18.1_RPS19_5F1R1_f1.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex5_RPS5F1
SampleRemark:
BCSW: Cimarron 3.12
DATE: Mon Sep 15 15:30:06 2008



Project : Default
Sample : 18.1_RPS19_5F1R1_r1
Result : 18.1_RPS19_5F1R1_r1

System : CEQ

Operator :
Instrument : CEQ

Sequence Results: 18.1_RPS19_5F1R1_r1

Created: 25.11.2008 15:00:41 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 15:00:41 Project: Default
System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_5F1R1_r1
Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex5_RPS5R1_.scf
Loaded from SCF File: 18.1_RPS19_5F1R1_r1.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex5_RPS5R1_
SampleRemark:
BCSW: Cimarron 3.12
DATE: Mon Sep 15 15:30:06 2008

Base Sequence: 18.1_RPS19_5F1R1_r1

```
1 ACCGACAGCACCTGGGCTGTGCCCTCCAGAGAAGGAAATAAGTCTACCTGACAAAGTATGGGCTTTGGAAATGCTTGGGC
81 AGCGACTAAGGGACCCAGCCCCACCCCAAACGCAGGCCTTACCTGTCCGGCGATTCTGTCCAGATCTCTTTGTCCCTGAG
161 GTGTCAGTTTGC GGCCGCTGTGGGGAGGGAAGGGTCATGCAGGCCCCAGTGAGCACAGGTCTGTTCTCAGCCCTTTCCC
241 TTCCTGGCTGTGAGCCAGGCTTCTCAAGAAGCCACCTGCCGCCAGCCAAGTCCCCTGAGGGCCCTAGTCAGGTGCATTC
321 TAACGAGCTGGGA
```




Project : Default
Sample : 18.1_RPS19_5F1R1_r1
Result : 18.1_RPS19_5F1R1_r1

System : CEQ

Operator :
Instrument : CEQ

Raw Sample Data: 18.1_RPS19_5F1R1_r1

Created: 25.11.2008 15:00:41 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 15:00:41 Project: Default
System: CEQ [Rev 0]

Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown
Cap No Hours Used: Unknown
Gel Part No: Unknown
Gel Lot No: Unknown
Gel No Hours Used: Unknown

Note: Loaded from SCF File: RPS19Ex5_RPS5R1_.scf
 Loaded from SCF File: 18.1_RPS19_5F1R1_r1.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex5_RPS5R1_
SampleRemark:
BCSW: Cimarron 3.12
DATE: Mon Sep 15 15:30:06 2008



Project : Default
Sample : 18.1_RPS19_6FR1_f
Result : 18.1_RPS19_6FR1_f

System : CEQ

Operator :
Instrument : CEQ

Sequence Results: 18.1_RPS19_6FR1_f

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_6FR1_f
Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex6_6F.scf
Loaded from SCF File: 18.1_RPS19_6FR1_f.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex6_6F
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008

Base Sequence: 18.1_RPS19_6FR1_f

```
1  AAGTGCCAGCAGAGACCCTTGATAACGGTGTGAATTCCATCTTTTCCCACAGGTGGCAGCTGGCAACAAGAAGCATTAGA
81  ACAAACCATGCTGGGTAAATAAATTGCCTCATTCGTAATCCTGGTCTGGGTCTCTTTTA
```




Project : Default
Sample : 18.1_RPS19_6FR1_r
Result : 18.1_RPS19_6FR1_r

System : CEQ

Operator :
Instrument : CEQ

Sequence Results: 18.1_RPS19_6FR1_r

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Name: 18.1_RPS19_6FR1_r
Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown

Analysis Parameters: Unknown

Note: Loaded from SCF File: RPS19Ex6_6R.scf
Loaded from SCF File: 18.1_RPS19_6FR1_r.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex6_6R
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008

Base Sequence: 18.1_RPS19_6FR1_r

```
1  AATGCTTCTTGTTGGCAGCTGCCACCGTGGGGGAAAAGATGGAAGAATAAAAGTTAGTCAAGGGGGTCTCTGCTGGGGCA
81 CTTTGTAACAGCTACCTAACTACCCA
```




Project : Default
Sample : 18.1_RPS19_6FR1_r
Result : 18.1_RPS19_6FR1_r

System : CEQ

Operator :
Instrument : CEQ

Raw Sample Data: 18.1_RPS19_6FR1_r

Created: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Modified: 25.11.2008 14:37:49 Project: Default
System: CEQ [Rev 0]

Sample Plate: Unknown
Sample Position: Unknown
Method: Unknown

Instrument: Unknown
Cap Serial No: Unknown
Cap No Hours Used: Unknown
Gel Part No: Unknown
Gel Lot No: Unknown
Gel No Hours Used: Unknown

Note: Loaded from SCF File: RPS19Ex6_6R.scf
 Loaded from SCF File: 18.1_RPS19_6FR1_r.scf

Properties:

DYEP: ET Terminators
MACH: MegaBACE # MR-DELL
NAME: RPS19Ex6_6R
SampleRemark:
BCSW: Cimarron 3.12
DATE: Wed Sep 17 14:15:17 2008