

# 提高靶向宿主细胞蛋白肽段定量分析灵敏度的策略

## 配置SCIEX OS软件的SCIEX Triple Quad™ 7500 LC-MS/MS系统 - QTRAP® Ready

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宿主细胞蛋白(Host cell proteins, HCPs)是与重组生物药制 剂生产过程相伴产生的主要杂质种类。其含量与制剂的安全性和 有效性密切相关,因此从制剂开发到质量控制整个过程都非常需 要对HCPs进行定量测定。

在下游生产和质量控制阶段,需要靶向定量的HCPs通常是预 先制定好的,它们在最终制剂或之后纯化步骤中痕量存在。这使 得对于建立更高灵敏度、更快速分析、更皮实耐用、更具复合分 析能力(一针进样定量更多的分析物)的靶向HCP分析方法的需求 更加强烈。三重四极杆和QTRAP液质联用系统由于其优异的定量 分析能力,是开展这项工作的理想平台。

此策略是基于SCIEX Triple Quad 7500 LC-MS/MS系统-QTRAP Ready开发了靶向HCP的分析流程。在离子源和质量分析器前瑞部 分的多重硬件提升,使得仪器灵敏度得到显著提高。<sup>1</sup>

通过分时间段多重反应监测模式算法(Scheduled MRM™算法)2的使用可以完成8 min内同时定量48个蛋白质(每个蛋白4个检测通道)的液质联用分析,定量下限为0.02~4.54 ppm。

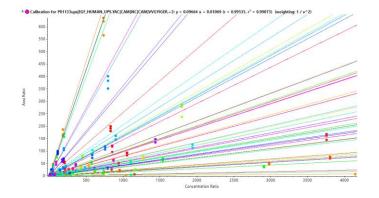


图1.48个宿主细胞蛋白中选择的代表性的肽段标准曲线。



### 靶向HCP定量分析流程的主要特点

- 较以往检测系统灵敏度的提升,使得信噪比有4倍的提高<sup>1</sup>
- 在离子生成(结合E Lens™技术的OptiFlow™ Pro离子源)和离子 传输(D Jet™离子导向)方面的硬件提升
- SCIEX OS软件用于数据采集和数据处理 一方便使用,集合数据 采集、处理、管理于一体的平台
- 通过分时间段MRM算法实现高复合分析,一针8 min液质联用方 法检测超过200个通道,提高工作效率
- 分析方法具有优异的灵敏度、准确性和定量线性,使得定量检 测更加可靠。

### 实验方法

**样品前处理:**通过Sigma-Aldrich公司购置NIST单克隆抗体(NISTmAb)和通用蛋白组学标准品(Universal Proteomics Standard, UPS)。实验中,NISTmAb作为生物制剂分子,而UPS 混合物中48个人源蛋白质模拟靶向的HCPs进行定量检测。牛血清

## SCIEX 7500 System



蛋白(Bovine serum albumin, BSA)作为内标。将UPS蛋白质和 BSA加入NISTmAb溶液中配置成高浓度的标准样品。用含有BSA的 NISTmAb溶液进行连续稀释。在所有样品中NISTmAb和BSA的浓度 保持一致。<sup>3</sup>

样品加入N-辛基葡萄糖苷(OGS) 孵育变性,二硫苏糖醇 (DTT)进行还原,碘代乙酰胺(IAM)烷基化处理。按酶-蛋白质 1:25比例加入胰蛋白酶/赖氨酸-C 37℃消化反应过夜。样品12000 g 离心后进样分析。

**LC-MS条件:** 样品通过ExionLC™系统串联SCIEX Triple Quad™ 7500 系统-QTRAP<sup>®</sup> Ready,进行三次平行分析。详尽方法列于表 1、2和A1。

**数据处理:**数据通过SCIEX OS 软件2.0中的定量功能(点击 "Analytics")进行处理。

#### 表1. MRM分析的色谱条件

参数	数值
色谱柱	Phenomenex Kinetex C18 3 $ imes$ 50 mm; 2.6 $\mu$ m
流动相A	含0.1%甲酸的水
流动相B	含0.1%甲酸的乙腈
梯度	5 min内流动相B从12%变为32%
总分析时间	包括柱平衡时间共8 min
流速	0.5 mL/min
柱温	40 °C
进样体积	20 µL
切换阀设定	1-6.2 min进入质谱系统

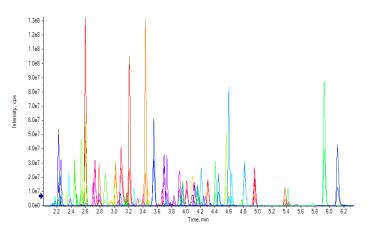
#### 表2. SCIEX 7500系统的源气参数

参数	数值	参数	数值
气帘气	40 psi	源温度	550°C
雾化气	50 psi	辅助气	70 psi
碰撞诱导解离气	11	离子喷雾电压	1500 V

## 特征肽段的选择和MRM方法开发

在以前的文献中,阐述了特征肽段的选择和MRM方法开发的 过程。<sup>1</sup>基于TripleTOF™ 6600+ LC-MS/MS系统对酶解后的NISTmAb-UPS蛋白混合物进行数据依赖性采集(IDA)模式分析。IDA数据 基于NISTmAb、UPS蛋白和BSA序列利用ProteinPilot™软件5.0进行 处理。数据库搜索结果文件(作为肽段库)和蛋白序列一同导入 Skyline软件。基于肽段/通道设置和肽段库匹配生成MRM检测通道 列表。

将MRM检测通道列表导入SCIEX OS软件,经过8 min梯度的试 验进样确定每个肽段的保留时间(图2)。保留时间数据上传至分 时间段MRM算法进行方法优化运算,优化每个MRM检测通道的驻 留时间。分时间段采集的方法用于所有定量分析数据的分析。



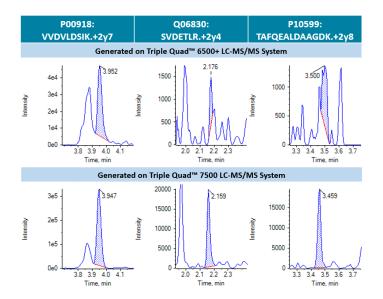
**图2.获得高质量的色谱图**。基于液质联用的靶向HCP定量分析流程的48个目标蛋白质(~200个检测通道)的提取离子流图。

基于SCIEX Triple Quad 7500 LC-MS/MS系统-QTRAP Ready的HCP 定量分析

SCIEX 7500系统通过离子生成和传输效率的优化提高了检测灵 敏度。为了表征对宿主细胞蛋白定量流程的影响,利用SCIEX 7500 系统对UPS蛋白连续稀释的样品进行分析。信噪比平均提高了4倍 (图3)。

## SCIEX 7500 System



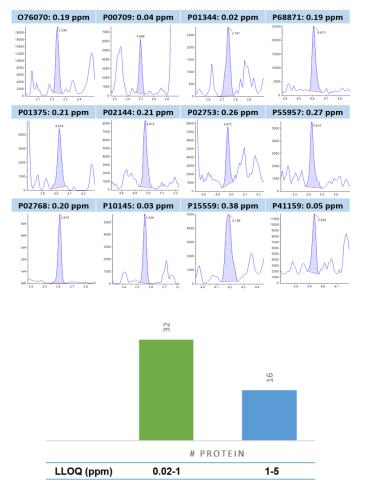


**图3. 检测灵敏度**。代表性肽段通过SCIEX 7500系统(底部)检测的MRM提 取离子流图比较。

在保持NISTmAb每一针进样量为20µg的情况下,UPS蛋白(HCPs)的定量限水平用ppm表示。所有48个蛋白通过每个蛋白2个肽段、每个肽段两个检测通道进行检测确认和定量分析。定量限为0.02-4.54 ppm,其中2/3的蛋白为0.02-1 ppm。其余的为1-4.54 ppm(图4).所有肽段的准确度为85-115%,相对标准偏差不超过15%。UPS蛋白在定量限水平的代表提取离子流图和定量结果见图1,4和5。

### 结论

- 靶向HCP定量分析流程的建立体现了SCIEX 7500系统的高灵敏 度、高分析通量、高耐用性以及高复合分析能力
- 信噪比平均提高4倍
- 具有极其优异的灵敏度,其中2/3的目标蛋白为0.02-1 ppm。其 余的为1-4.54 ppm
- 在高确信度(每个蛋白4个检测通道)的情况下,所有48个蛋白 质的定量用8 min的液质联用分析方法完成



**图4. UPS蛋白定量限汇总**。(顶部)HCPs在定量限水平的肽段MRM离子提取流图,并列出了各自的Uniprot注册号和定量限浓度。(底部)48个蛋白中32个(67%)的定量限为0.02-1 ppm。48个蛋白中16个(33%)定量限为1-5 ppm。

## 参考文献

- 1. Enabling new levels of quantification. SCIEX technical note RUO-MKT-02-11886-A.
- The Scheduled MRM<sup>™</sup> Algorithm Pro. SCIEX Technical note RUO-MKT-02-8539-A.
- 3. Highly sensitive LC-MS/MS workflow for targeted quantification of host cell proteins. SCIEX technical note RUO-MKT-02-11418-A.



图 5. 代表性的5个蛋白质定量结果汇总。列出了浓度范围(单位为ppm)、相对标准偏差和准确度。

P01344uppiGP2_HUMAN_UPS-GWEEC(CAMICCAMIFR-2-p6.         0.02         3 of 3         2.191-2         2.44e-3         10.71         95.28           P0134uppiGP2_HUMAN_UPS-GWEEC(CAMICCAMIFR-2-p6.         0.09         3 of 3         5.65+1         2.084-2         5.55<1         7.73           P0134uppiGP2_HUMAN_UPS-GWEEC(CAMICCAMIFR-2-p6.         1.46         3 of 3         5.120+0         6.887-2         6.03         100.31           P0134uppiGP2_HUMAN_UPS-GWEEC(CAMICCAMIFR-2-p6.         2.84         3 of 3         2.4561         1.417-0         6.04         100.38           P0134uppiGP2_HUMAN_UPS-GWEEC(CAMICCAMIFR-2-p6.         2.84         3 of 3         2.4561         1.417-0         6.04         100.38           P0135uppiTMA_HUMAN_UPS-GWEEC(CAMICCAMIFR-2-p6.         2.84         3 of 3         2.136-1         3.175-2         1.89         100.54           P0135uppiTMA_HUMAN_UPS-MULSAK-2-27.1ght         0.21         3 of 3         3.499.0         4.035-1         1.155         10.37           P0135uppiTMA_HUMAN_UPS-MULSAK-27.1ght         3.561         3.6762         1.326         1.666         1.166           P0135uppiTMA_HUMAN_UPS-MULSAK-27.1ght         3.67         3.673         2.685-2         1.3.6         1.0.66           P0135uppiTMA_HUMAN_UPS-MULSAK-27.1ght         1.64 <td< th=""><th>Component Name</th><th>Actual Conc</th><th>Num. Values</th><th>Mean</th><th>Standard Deviation</th><th>Percent CV</th><th>Accuracy</th></td<>	Component Name	Actual Conc	Num. Values	Mean	Standard Deviation	Percent CV	Accuracy
P01344uppilGF2_HUMAN_UPS.GIVEEQ(CAMJC(CAMJFR-2y6.         0.37         3 of 3         1.563e-1         2.084e-2         5.85         97.63           P01344uppilGF2_HUMAN_UPS.GIVEEQ(CAMJC(CAMJFR-2y6.         1.46         3 of 3         1.471e0         8.870e-2         6.03         100.73           P01344uppilGF2_HUMAN_UPS.GIVEEQ(CAMJC(CAMJFR-2y6.         2.366         3 of 3         2.345e1         1.417e0         6.04         100.38           P01344uppilGF2_HUMAN_UPS.GIVEEQ(CAMJC(CAMJFR-2y6.         23.36         3 of 3         2.131e1         1.147e0         6.04         100.38           P01344uppilGF2_HUMAN_UPS.GIVEEQ(CAMJC(CAMJFR-2y6.         93.44         3 of 3         2.131e1         1.147e0         6.04         100.54           P01375uppiTKPA_HUMAN_UPS.VILLSAIK-2y7.lipht         0.85         3 of 3         2.381e1         1.150         10.57           P01375uppiTKPA_HUMAN_UPS.VILLSAIK-2y7.lipht         13.64         3.181e1         1.5060         11.44         97.21           P01375uppiTKPA_HUMAN_UPS.VILLSAIK-2y7.lipht         216.51         3 of 3         7.306e2         1.0021         5.06         10.12           P0137suppiTKPA_HUMAN_UPS.VILLSAIK-2y7.lipht         216.51         3 of 3         2.326e2         1.5201         5.06         10.12           P0137suppiTKPA_HUMAN_UPS.VILLSAIK-3y7.l	P01344ups IGF2_HUMAN_UPS.GIVEEC[CAM]C[CAM]FR.+2y6.	0.02	3 of 3	2.191e-2	2.346e-3	10.71	95.28
P01344uppl(S2_HUMAN_UPS.GIVECE(CAMJC(CAMJFR-2y6.         1.46         3 of 3         1.471e0         8.870e-2         6.03         100.73           P01344uppl(S2_HUMAN_UPS.GIVECC(CAMJC(CAMJFR-2y6.         5.84         3 of 3         5.192e0         6.381e-2         1.23         8.80           P01344uppl(S2_HUMAN_UPS.GIVECC(CAMJC(CAMJFR-2y6.         9.344         3 of 3         9.126e1         1.041e1         11.41         9.767           P0137bupf(TFA_HUMAN_UPS.VILLSAIK-2y7.light         0.21         3 of 3         2.131e-1         3.175e-2         1.489         100.54           P01375upf(TFA_HUMAN_UPS.VILLSAIK-2y7.light         0.21         3 of 3         2.245e-1         2.495e-2         3.03         9.715           P01375upf(TFA_HUMAN_UPS.VILLSAIK-2y7.light         13.56         3 of 3         2.784e1         4.410e         7.11         106.66           P01375upf(TFA_HUMAN_UPS.VILLSAIK-2y7.light         13.56         3 of 3         2.784e1         4.111e0         7.14         104.26           P01375upf(TFA_HUMAN_UPS.VILLSAIK-2y7.light         167.55         3 of 3         2.085e-1         13.76         100.51           P01375upf(TFA_HUMAN_UPS.VILLSAIK-2y7.light         18.32         3 of 3         2.085e-1         13.76         100.51           P02144uppl(WC,HUMAN_UPS.HGATUTALGGIKK-3b5.light	P01344ups IGF2_HUMAN_UPS.GIVEEC[CAM]C[CAM]FR.+2y6.	0.09	3 of 3	1.087e-1	8.379e-3	7.71	119.40
P01344up]IGF2_HUMAN_UPS_GIVEEC[CAM]C[CAM]FR - 2y6.         5.84         3 of 3         5.192e0         6.381e-2         1.23         88.90           P01344up]IGF2_HUMAN_UPS_GIVEEC[CAM]C[CAM]FR - 2y6.         23.36         3 of 3         2.345e1         1.417e0         6.04         100.38           P01344up]IGF2_HUMAN_UPS_GIVEEC[CAM]C[CAM]FR - 2y6.         93.44         3 of 3         2.131e1         1.141e         97.67           Component Name         Catual Conc.         Num. Values         Mean         Standard Deviation         Percent CV         Accuration           P0137Sup]TNFA_HUMAN_UPS_VNLLSAIK - 2y7.light         0.21         3 of 3         2.131e1         3.175e-2         3.03         9.715           P0137Sup]TNFA_HUMAN_UPS.VNLLSAIK - 2y7.light         0.356         3 of 3         3.493e0         1.035e-1         1.03.07           P0137Sup]TNFA_HUMAN_UPS.VNLLSAIK - 2y7.light         24.591         3 of 3         2.0562         4.000e1         5.06         91.12           P0137Sup]TNFA_HUMAN_UPS.VNLLSAIK - 2y7.light         216.91         3 of 3         2.032e1         2.646r-2         3.06         98.27           P0134upJMYG_HUMAN_UPS.HGATV_TALGGIK + 3b5.light         0.21         3 of 3         2.039e1         1.344         10.15           P02144upJMYG_HUMAN_UPS.HGATV_TALGGIK + 3b5.light	P01344ups IGF2_HUMAN_UPS.GIVEEC[CAM]C[CAM]FR.+2y6.	0.37	3 of 3	3.563e-1	2.084e-2	5.85	97.63
P01344upil(6F2,HUMAN,UPS,GIVEEC(CAM)C(CAM)FR-2y6.         23.36         3 of 3         2.345e1         1.41re0         6.04         100.38           P01344upil(6F2,HUMAN,UPS,GIVEEC(CAM)C(CAM)FR-2y6.         93.44         3 of 3         9.126e1         1.041e1         11.41         97.67           Component Name         Actual Corc.         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P01375upilTNFA,HUMAN,UPS,UNLLSAIK2y7.light         0.21         3 of 3         2.328e-1         2.495e-2         3.03         97.15           P01375upilTNFA,HUMAN,UPS,VNLLSAIK2y7.light         0.85         3 of 3         1.318e1         1.566e0         11.84         97.21           P01375upilTNFA,HUMAN,UPS,VNLLSAIK2y7.light         216.91         3 of 3         2.262e2         1.523e1         6.74         104.26           P01375upilTNFA,HUMAN,UPS,VNLLSAIK2y7.light         867.65         3 of 3         2.308-1         2.865e-2         1.37         100.15           P0134upijNYG,HUMAN,UPS-HADTVLTALGGILK3b5.light         0.21         3 of 3         2.308-1         2.865e-2         1.00.1           P0144upijNYG,HUMAN,UPS-HADTVLTALGGILK3b5.light         0.32         3 of 3         3.369e0         4.529e-1         13.44         10.15           P0144upijNY	P01344ups IGF2_HUMAN_UPS.GIVEEC[CAM]C[CAM]FR.+2y6.	1.46	3 of 3	1.471e0	8.870e-2	6.03	100.73
P01344uppIGF2_HUMAN_UPS.GIVEEC[CAM]C[CAM]FR-2y6.         93.44         3 of 3         9.126e1         1.041e1         11.41         97.67           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P01375upgITNFA_HUMAN_UPS.VILLSAIK.+2y7.light         0.21         3 of 3         2.131e1         3.175e-2         3.08         97.15           P01375upgITNFA_HUMAN_UPS.VILLSAIK.+2y7.light         3.39         3 of 3         3.493e0         4.035e-1         11.55         103.07           P01375upgITNFA_HUMAN_UPS.VILLSAIK.+2y7.light         54.23         3 of 3         5.784e1         4.111e0         7.11         106.66           P01375upgITNFA_HUMAN_UPS.VILLSAIK.+2y7.light         867.65         3 of 3         2.082e1         2.460re2         3.07         101.25           P01375upgITNFA_HUMAN_UPS.VILLSAIK.+2y7.light         867.65         3 of 3         2.083e1         2.665e-2         13.76         100.15           P0144upgIMVG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         0.81         3 of 3         3.232e1         2.467e-2         3.06         9.12         102.74           P0144upgIMVG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         3.32         3 of 3         5.852e1         0.465e-1         13.44         10.15	P01344ups IGF2_HUMAN_UPS.GIVEEC[CAM]C[CAM]FR.+2y6.	5.84	3 of 3	5.192e0	6.381e-2	1.23	88.90
Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P01375upgTINFA_HUMAN_UPS.VNLLSAIK-2y7.light         0.21         3 of 3         2.131e-1         3.175e-2         14.89         100.54           P01375upgTINFA_HUMAN_UPS.VNLLSAIK-2y7.light         0.85         3 of 3         3.493e0         4.035e-1         11.55         103.07           P01375upgTINFA_HUMAN_UPS.VNLLSAIK-2y7.light         3.56         3 of 3         5.784e1         4.111e0         7.11         106.66           P01375upgTINFA_HUMAN_UPS.VNLLSAIK-2y7.light         54.23         3 of 3         2.262e2         4.000e1         5.06         91.12           P01375upgTINFA_HUMAN_UPS.VNLLSAIK-2y7.light         867.65         3 of 3         2.082e-1         2.865e-2         13.76         100.15           P02144upgIMYG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         0.21         3 of 3         3.694e-1         2.865e-2         13.76         100.15           P02144upgIMYG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         0.32         3 of 3         3.694e-1         2.467e-2         3.00         98.82           P02144upgIMYG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         0.32         3 of 3         3.694e-1         1.248e0         9.12           P02144upgIMYG_HUMA	P01344ups IGF2_HUMAN_UPS.GIVEEC[CAM]C[CAM]FR.+2y6.	23.36	3 of 3	2.345e1	1.417e0	6.04	100.38
P01375ups[TNFA_HUMAN_UPS.VNLLSAIK-2y7.light         0.21         3 of 3         2.131e-1         3.175e-2         14.89         100.54           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK-2y7.light         0.85         3 of 3         6.228e-1         2.495e-2         3.03         97.15           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK-2y7.light         3.39         3 of 3         3.493e0         4.035e-1         11.55         103.07           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK-2y7.light         13.56         3 of 3         1.318e1         1.560e0         11.84         97.21           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK-2y7.light         216.91         3 of 3         2.262e2         1.523e1         6.74         104.26           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK-2y7.light         216.91         3 of 3         2.262e2         1.523e1         6.74         104.26           P0144ups[MVG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         0.21         3 of 3         2.282e-1         2.467e-2         10.0         9.0         9.82         9.02144ups[MVG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         3.32         3 of 3         3.69e0         4.529e-1         13.44         101.15           P0144ups[MVG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         3.32         3 of 3         7.694e2         9.460e1         12.30         9.22 <t< td=""><td>P01344ups IGF2_HUMAN_UPS.GIVEEC[CAM]C[CAM]FR.+2y6.</td><td>93.44</td><td>3 of 3</td><td>9.126e1</td><td>1.041e1</td><td>11.41</td><td>97.67</td></t<>	P01344ups IGF2_HUMAN_UPS.GIVEEC[CAM]C[CAM]FR.+2y6.	93.44	3 of 3	9.126e1	1.041e1	11.41	97.67
P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         0.85         3 of 3         8.228e-1         2.495e-2         3.03         97.15           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         3.39         3 of 3         3.493e0         4035e-1         11.55         103.07           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         13.56         3 of 3         5.784e1         4.111e0         7.11         106.66           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         216.91         3 of 3         2.62622         1.523e1         6.74         104.26           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         867.65         3 of 3         2.0862-1         2.866-2         13.76         100.15           P02144ups[MVG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         0.21         3 of 3         3.2960         4.529e-1         13.44         101.15           P02144ups[MVG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         0.83         3 of 3         3.2960         4.529e-1         13.44         101.15           P02144ups[MVG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         13.32         3 of 3         3.6690         4.529e-1         13.44         101.15           P02144ups[MVG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         53.3         3 of 3         2.852e1         6.625e-1         1.13         10.62         97.10<	Component Name	Actual Conc	Num. Values	Mean	Standard Deviation	Percent CV	Accuracy
P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         3.39         3 of 3         3.493e0         4.035e-1         1.155         103.07           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         13.56         3 of 3         1.318e1         1.560e0         11.84         97.21           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         54.23         3 of 3         5.784e1         4.111e0         7.11         106.66           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         216.01         3 of 3         7.906e2         1.523e1         6.74         104.26           P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         867.65         3 of 3         7.906e2         4000e1         5.66         91.12           P02144ups[MYG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         0.21         3 of 3         2.083e-1         2.865e-2         13.76         100.15           P02144ups[MYG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         13.32         3 of 3         3.369e0         4.529e-1         13.44         101.15           P02144ups[MYG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         13.32         3 of 3         1.369e0         4.529e-1         13.44         101.15           P02144ups[MYG_HUMAN_UPS.HGATVLTALGGIK.+3b5.light         13.32         3 of 3         1.852e1         6.65e1+1         11.30         102.37	P01375ups TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light	0.21	3 of 3	2.131e-1	3.175e-2	14.89	100.54
P01375ups TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         13.56         3 of 3         1.318e1         1.560e0         11.84         97.21           P01375ups TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         54.23         3 of 3         5.784e1         4.111e0         7.11         106.66           P01375ups TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         216.91         3 of 3         2.262e2         1.523e1         6.74         104.26           P01375ups TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light         867.65         3 of 3         7.906e2         4.000e1         P.6         Actual Conc.         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         0.83         3 of 3         2.083e-1         2.467e-2         3.00         98.82           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         3.32         3 of 3         3.369e0         4.529e-1         13.44         101.15           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         3.32         3 of 3         2.070e2         2.198e1         10.62         97.10           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         213.26         3 of 3         1.691e1         12.30         90.23           P02144ups MYG_HUMAN_UPS.HGATVLALGGILK.+3b5.light         3.263 <t< td=""><td>P01375upsJTNFA_HUMAN_UPS.VNLLSAIK.+2y7.light</td><td>0.85</td><td>3 of 3</td><td>8.228e-1</td><td>2.495e-2</td><td>3.03</td><td>97.15</td></t<>	P01375upsJTNFA_HUMAN_UPS.VNLLSAIK.+2y7.light	0.85	3 of 3	8.228e-1	2.495e-2	3.03	97.15
P01375ups TNFA_HUMAN_UPS.VNLLSAIK-±y7.light         54.23         3 of 3         5.784e1         4.111e0         7.11         106.66           P01375ups TNFA_HUMAN_UPS.VNLLSAIK.±y7.light         216.91         3 of 3         2.262e2         1.523e1         6.74         104.26           P01375ups TNFA_HUMAN_UPS.VNLLSAIK.±y7.light         867.65         3 of 3         7.906e2         4.000e1         5.06         91.12           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.±3b5.light         0.21         3 of 3         2.323e-1         2.467e-2         3.00         98.82           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.±3b5.light         3.33         3 of 3         3.369e0         4.529e-1         13.44         101.15           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.±3b5.light         3.32         3 of 3         2.635e-1         1.13         109.81           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.±3b5.light         3.32         3 of 3         2.676e2         2.480e1         12.30         90.23           P02144ups MYG_HUMAN_UPS.HGATVLALGGILK.±3b5.light         83.26         3 of 3         1.802e-1         1.528e-2         8.48         100.30           P02144up	P01375ups TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light	3.39	3 of 3	3.493e0	4.035e-1	11.55	103.07
P01375ups/TMFA_HUMAN_UPS.VNLLSAIK.+2y7.light         216.91         3 of 3         2.262e2         1.523e1         6.74         104.26           P01375ups/TMFA_HUMAN_UPS.VNLLSAIK.+2y7.light         867.65         3 of 3         7.906e2         4.000e1         5.06         91.12           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P02144ups/IMVG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         0.21         3 of 3         2.083e-1         2.865e-2         13.76         100.15           P02144ups/IMVG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         0.83         3 of 3         3.236e0         4.529e-1         13.44         101.15           P02144ups/IMVG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         13.32         3 of 3         3.86e0         4.529e-1         13.44         102.74           P02144ups/IMVG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         13.22         3 of 3         2.67e2         2.198e1         10.62         97.10           P02144ups/IMVG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         852.65         3 of 3         7.694e2         9.460e1         12.30         90.23           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy	P01375ups TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light	13.56	3 of 3	1.318e1	1.560e0	11.84	97.21
P0137Sup;TNFA_HUMAN_UPS;VNLLSAIK+2y7.light         867.65         3 of 3         7.906e2         4.000e1         5.06         91.12           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P02144ups[MYG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         0.21         3 of 3         2.083e-1         2.865e-2         13.76         100.15           P02144ups[MYG_HUMAN_UPS.HGATVLTALGGILK-3b5.light         0.83         3 of 3         8.232e-1         2.467e-2         3.00         98.82           P02144ups[MYG_HUMAN_UPS.HGATVLTALGGILK-3b5.light         13.32         3 of 3         3.369e0         4.529e-1         13.44         101.15           P02144ups[MYG_HUMAN_UPS.HGATVLTALGGILK-3b5.light         13.32         3 of 3         2.070e2         2.198e1         10.62         97.10           P02144ups[MYG_HUMAN_UPS.HGATVLTALGGILK-3b5.light         852.65         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P02144ups[MYG_HUMAN_UPS.LIGATVLTALGGILK-3b5.light         852.65         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P05413ups[FABPH_HUMAN_UPS.LILTTHGTAVC[CAM]TR.1         0.18         3 of 3         2.913e0         3.641e-1         12.50         101.24	P01375ups TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light	54.23	3 of 3	5.784e1	4.111e0	7.11	106.66
Component NameActual ConcNum. ValuesMeanStandard DeviationPercent CVAccuracyP02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light0.213 of 32.083e-12.865e-213.76100.15P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light0.833 of 38.232e-12.467e-23.0098.82P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light3.333 of 33.369e04.529e-113.44101.15P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light13.323 of 31.369e11.248e09.12102.74P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light53.293 of 35.852e16.625e-11.13109.81P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light53.293 of 37.094e29.460e112.3090.23P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light852.653 of 37.094e29.460e112.3090.23P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light852.653 of 37.094e29.460e112.3090.23P05413ups FABPH_HUMAN_UPS.LILT.HGTAVC(CAMJTR.10.183 of 31.802e-11.528e-28.48100.13P05413ups FABPH_HUMAN_UPS.LILT.HGTAVC(CAMJTR.10.723 of 31.86e17.617e-16.42103.11P05413ups FABPH_HUMAN_UPS.LILT.HGTAVC(CAMJTR.111.513 of 31.858e21.482e17.98100.95P05413ups FABPH_HUMAN_UPS.LILT.HGTAVC(CAMJTR.114.093 of 31.858e21.482e17.98100.95P05413ups FAB	P01375ups TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light	216.91	3 of 3	2.262e2	1.523e1	6.74	104.26
P02144ups MVG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         0.21         3 of 3         2.083e-1         2.865e-2         13.76         100.15           P02144ups MVG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         0.83         3 of 3         8.232e-1         2.467e-2         3.00         98.82           P02144ups MVG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         3.33         3 of 3         3.369e0         4.529e-1         13.44         101.15           P02144ups MVG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         13.32         3 of 3         5.852e1         6.625e-1         1.13         109.81           P02144ups MVG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         53.29         3 of 3         2.070e2         2.198e1         10.62         97.10           P02144ups MVG_HUMAN_UPS.HGATVLTALGGILK+3b5.light         852.65         3 of 3         7.694e2         9.460e1         12.30         90.23           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P05413ups FABPH_HUMAN_UPS.LILT.HTHGTAVCICAMITR.1         0.72         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P05413ups FABPH_HUMAN_UPS.LILT.HTGTAVCICAMITR.1         0.72         3 of 3         1.802e-1         1.528e-2         8.48         100.75	P01375ups[TNFA_HUMAN_UPS.VNLLSAIK.+2y7.light	867.65	3 of 3	7.906e2	4.000e1	5.06	91.12
P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         0.83         3 of 3         8.232e-1         2.467e-2         3.00         98.82           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         3.33         3 of 3         3.369e0         4.529e-1         13.44         101.15           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         13.32         3 of 3         5.852e1         6.625e-1         1.13         109.81           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         213.16         3 of 3         2.070e2         2.198e1         10.62         97.10           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         852.65         3 of 3         7.694e2         9.460e1         12.30         90.23           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.18         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         1.802e-1         1.62.0         10.00         98.86           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         1.816e1         7.617e-1         6.42         103.11	Component Name	Actual Conc	Num. Values	Mean	Standard Deviation	Percent CV	Accuracy
P02144ups MVG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         3.33         3 of 3         3.369e0         4.529e-1         13.44         101.15           P02144ups MVG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         13.32         3 of 3         1.369e1         1.248e0         9.12         102.74           P02144ups MVG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         53.29         3 of 3         5.852e1         6.625e-1         1.13         109.81           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         213.16         3 of 3         2.070e2         2.198e1         10.62         97.10           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         852.65         3 of 3         7.694e2         9.460e1         12.30         90.23           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.18         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         1.802e-1         1.528e-2         8.48         100.24           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         1.802e-1         1.528         10.62         9.64	P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light	0.21	3 of 3	2.083e-1	2.865e-2	13.76	100.15
P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK + 3b5.light         13.32         3 of 3         1.369e1         1.248e0         9.12         102.74           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK + 3b5.light         53.29         3 of 3         5.852e1         6.625e-1         1.13         109.81           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK + 3b5.light         213.16         3 of 3         2.070e2         2.198e1         10.62         97.10           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK + 3b5.light         852.65         3 of 3         7.694e2         9.460e1         12.30         90.23           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVCICAM]TR.1         0.18         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVCICAM]TR.1         0.72         3 of 3         2.913e0         3.641e-1         12.50         101.28           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVCICAM]TR.1         11.51         3 of 3         1.858e1         4.387e0         8.97         106.24           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVCICAM]TR.1         184.09         3 of 3         6.585e2         3.983e1         6.05         89.43 <td>P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light</td> <td>0.83</td> <td>3 of 3</td> <td>8.232e-1</td> <td>2.467e-2</td> <td>3.00</td> <td>98.82</td>	P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light	0.83	3 of 3	8.232e-1	2.467e-2	3.00	98.82
P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         53.29         3 of 3         5.852e1         6.625e-1         1.13         109.81           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         213.16         3 of 3         2.070e2         2.198e1         10.62         97.10           P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         852.65         3 of 3         7.694e2         9.460e1         12.30         90.23           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.18         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         7.108e-1         7.111e-2         10.00         98.86           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         1.802e-1         1.520         101.28           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         1.51         3 of 3         1.816e1         7.617e-1         6.42         103.11           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         1.858e2         1.482e1         7.98         100.95	P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light	3.33	3 of 3	3.369e0	4.529e-1	13.44	101.15
P02144ups/MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         213.16         3 of 3         2.070e2         2.198e1         10.62         97.10           P02144ups/MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         852.65         3 of 3         7.694e2         9.460e1         12.30         90.23           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P05413ups/FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.18         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P05413ups/FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         7.108e-1         7.111e-2         10.00         98.86           P05413ups/FABPH_HUMAN_UPS.LILTHGTAVC[CAM]TR.1         2.88         3 of 3         2.913e0         3.641e-1         12.50         101.28           P05413ups/FABPH_HUMAN_UPS.LILTHGTAVC[CAM]TR.1         11.51         3 of 3         1.186e1         7.617e-1         6.42         103.11           P05413ups/FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         1.858e2         1.482e1         7.98         100.95           P05413ups/FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         4.938e-2         6.649e-3         13.46         100.78	P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light	13.32	3 of 3	1.369e1	1.248e0	9.12	102.74
P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light         852.65         3 of 3         7.694e2         9.460e1         12.30         90.23           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.18         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         7.108e-1         7.111e-2         10.00         98.86           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         2.913e0         3.641e-1         12.50         101.28           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         1.86e1         7.617e-1         6.42         103.11           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         11.51         3 of 3         1.88e2         1.482e1         7.98         100.95           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         6.585e2         3.983e1         6.05         89.43           P05413ups FABPH_HUMAN_UPS.VIGLDFIPGLHPILTLSK.+3y11+2         0.05         3 of 3         4.938e-2         6.649e-3         13.46         100.78	P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light	53.29	3 of 3	5.852e1	6.625e-1	1.13	109.81
Component NameActual ConcNum. ValuesMeanStandard DeviationPercent CVAccuracyP05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.10.183 of 31.802e-11.528e-28.48100.13P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.10.723 of 37.108e-17.111e-210.0098.86P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.12.883 of 32.913e03.641e-112.50101.28P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.111.513 of 31.186e17.617e-16.42103.11P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.146.023 of 34.889e14.387e08.97106.24P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1184.093 of 31.858e21.482e17.98100.95P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1786.353 of 36.585e23.98ae16.0589.43Component NameActual ConcNum. ValuesMeanStandard DeviationPercent CVAccuracyP41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+20.053 of 34.938e-26.649e-313.46100.78P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+20.793 of 37.431e-11.537e-22.0794.18P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+23.163 of 33.230e01.070e-13.31102.33P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+212.623 of 31.224e12.971e-12.4396.94P41159ups LEP_H	P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light	213.16	3 of 3	2.070e2	2.198e1	10.62	97.10
P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.18         3 of 3         1.802e-1         1.528e-2         8.48         100.13           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         7.108e-1         7.111e-2         10.00         98.86           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         2.88         3 of 3         2.913e0         3.641e-1         12.50         101.28           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         11.51         3 of 3         1.186e1         7.617e-1         6.42         103.11           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         11.51         3 of 3         1.858e1         4.387e0         8.97         106.24           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         1.858e2         1.482e1         7.98         100.95           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         786.35         3 of 3         6.585e2         3.983e1         6.05         89.43           P05413ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.05         3 of 3         4.938e-2         6.649e-3         13.46         100.78           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.20         3 of 3         1.934e-1         2.484e-2         12.84         98.18 <td>P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light</td> <td>852.65</td> <td>3 of 3</td> <td>7.694e2</td> <td>9.460e1</td> <td>12.30</td> <td>90.23</td>	P02144ups MYG_HUMAN_UPS.HGATVLTALGGILK.+3b5.light	852.65	3 of 3	7.694e2	9.460e1	12.30	90.23
P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         0.72         3 of 3         7.108e-1         7.111e-2         10.00         98.86           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         2.88         3 of 3         2.913e0         3.641e-1         12.50         101.28           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         11.51         3 of 3         1.186e1         7.617e-1         6.42         103.11           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         46.02         3 of 3         4.889e1         4.387e0         8.97         106.24           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         1.858e2         1.482e1         7.98         100.95           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         736.35         3 of 3         6.585e2         3.983e1         6.05         89.43 <b>Component Name</b> Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.05         3 of 3         1.934e-1         2.484e-2         12.84         98.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.79         3 of 3         7.431e-1         1.537e-2         2.07         94.18	Component Name	Actual Conc	Num. Values	Mean	Standard Deviation	Percent CV	Accuracy
P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         2.88         3 of 3         2.913e0         3.641e-1         12.50         101.28           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         11.51         3 of 3         1.186e1         7.617e-1         6.42         103.11           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         46.02         3 of 3         4.889e1         4.387e0         8.97         106.24           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         1.858e2         1.482e1         7.98         100.95           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         786.35         3 of 3         6.585e2         3.983e1         6.05         89.43           P05413ups FABPH_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.05         3 of 3         4.938e-2         6.649e-3         13.46         100.78           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.20         3 of 3         1.934e-1         2.484e-2         12.84         98.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.79         3 of 3         3.230e0         1.070e-1         3.31         102.33           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         3.64         3 of 3         1.224e1         2.971e-1         2.43         96.	P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1	0.18	3 of 3	1.802e-1	1.528e-2	8.48	100.13
P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         11.51         3 of 3         1.186e1         7.617e-1         6.42         103.11           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         46.02         3 of 3         4.889e1         4.387e0         8.97         106.24           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         1.858e2         1.482e1         7.98         100.95           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         736.35         3 of 3         6.585e2         3.983e1         6.05         89.43           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.05         3 of 3         4.938e-2         6.649e-3         13.46         100.78           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.20         3 of 3         1.934e-1         2.484e-2         12.84         98.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.79         3 of 3         3.230e0         1.070e-1         3.31         102.33           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         12.62         3 of 3         3.230e0         1.070e-1         3.31         102.33 <td>P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1</td> <td>0.72</td> <td>3 of 3</td> <td>7.108e-1</td> <td>7.111e-2</td> <td>10.00</td> <td>98.86</td>	P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1	0.72	3 of 3	7.108e-1	7.111e-2	10.00	98.86
P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         46.02         3 of 3         4.889e1         4.387e0         8.97         106.24           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         1.858e2         1.482e1         7.98         100.95           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         736.35         3 of 3         6.585e2         3.983e1         6.05         89.43           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.05         3 of 3         4.938e-2         6.649e-3         13.46         100.78           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.20         3 of 3         1.934e-1         2.484e-2         12.84         98.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.79         3 of 3         7.431e-1         1.537e-2         2.07         94.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         3.16         3 of 3         3.230e0         1.070e-1         3.31         102.33           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         12.62         3 of 3         1.224e1         2.971e-1         2.43         96.94 </td <td>P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1</td> <td>2.88</td> <td>3 of 3</td> <td>2.913e0</td> <td>3.641e-1</td> <td>12.50</td> <td>101.28</td>	P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1	2.88	3 of 3	2.913e0	3.641e-1	12.50	101.28
P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         184.09         3 of 3         1.858e2         1.482e1         7.98         100.95           P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         736.35         3 of 3         6.585e2         3.983e1         6.05         89.43           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.05         3 of 3         1.934e-1         2.484e-2         12.84         98.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.79         3 of 3         7.431e-1         1.537e-2         2.07         94.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         3.16         3 of 3         3.230e0         1.070e-1         3.31         102.33           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         12.62         3 of 3         1.224e1         2.971e-1         2.43         96.94           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         50.49         3 of 3         5.442e1         8.632e-1         1.59         107.78	P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1	11.51	3 of 3	1.186e1	7.617e-1	6.42	103.11
P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1         736.35         3 of 3         6.585e2         3.983e1         6.05         89.43           Component Name         Actual Conc         Num. Values         Mean         Standard Deviation         Percent CV         Accuracy           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.05         3 of 3         4.938e-2         6.649e-3         13.46         100.78           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.20         3 of 3         1.934e-1         2.484e-2         12.84         98.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.79         3 of 3         7.431e-1         1.537e-2         2.07         94.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         3.16         3 of 3         3.230e0         1.070e-1         3.31         102.33           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         12.62         3 of 3         1.224e1         2.971e-1         2.43         96.94           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         50.49         3 of 3         5.442e1         8.632e-1         1.59         107.78	P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1	46.02	3 of 3	4.889e1	4.387e0	8.97	106.24
Component NameActual ConcNum. ValuesMeanStandard DeviationPercent CVAccuracyP41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+20.053 of 34.938e-26.649e-313.46100.78P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+20.203 of 31.934e-12.484e-212.8498.18P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+20.793 of 37.431e-11.537e-22.0794.18P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+23.163 of 33.230e01.070e-13.31102.33P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+212.623 of 31.224e12.971e-12.4396.94P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+250.493 of 35.442e18.632e-11.59107.78	P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1	184.09	3 of 3	1.858e2	1.482e1	7.98	100.95
P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.05         3 of 3         4.938e-2         6.649e-3         13.46         100.78           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.20         3 of 3         1.934e-1         2.484e-2         12.84         98.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         0.79         3 of 3         7.431e-1         1.537e-2         2.07         94.18           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         3.16         3 of 3         3.230e0         1.070e-1         3.31         102.33           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         12.62         3 of 3         1.224e1         2.971e-1         2.43         96.94           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         50.49         3 of 3         5.442e1         8.632e-1         1.59         107.78	P05413ups FABPH_HUMAN_UPS.LILTLTHGTAVC[CAM]TR.1	736.35	3 of 3	6.585e2	3.983e1	6.05	89.43
P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+20.203 of 31.934e-12.484e-212.8498.18P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+20.793 of 37.431e-11.537e-22.0794.18P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+23.163 of 33.230e01.070e-13.31102.33P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+212.623 of 31.224e12.971e-12.4396.94P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+250.493 of 35.442e18.632e-11.59107.78	Component Name	Actual Conc	Num. Values	Mean	Standard Deviation	Percent CV	Accuracy
P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2       0.79       3 of 3       7.431e-1       1.537e-2       2.07       94.18         P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2       3.16       3 of 3       3.230e0       1.070e-1       3.31       102.33         P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2       12.62       3 of 3       1.224e1       2.971e-1       2.43       96.94         P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2       50.49       3 of 3       5.442e1       8.632e-1       1.59       107.78	P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2	0.05	3 of 3	4.938e-2	6.649e-3	13.46	100.78
P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         3.16         3 of 3         3.230e0         1.070e-1         3.31         102.33           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         12.62         3 of 3         1.224e1         2.971e-1         2.43         96.94           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         50.49         3 of 3         5.442e1         8.632e-1         1.59         107.78	P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2	0.20	3 of 3	1.934e-1	2.484e-2	12.84	98.18
P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         12.62         3 of 3         1.224e1         2.971e-1         2.43         96.94           P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2         50.49         3 of 3         5.442e1         8.632e-1         1.59         107.78	P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2	0.79	3 of 3	7.431e-1	1.537e-2	2.07	94.18
P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2 50.49 3 of 3 5.442e1 8.632e-1 1.59 107.78	P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2	3.16	3 of 3	3.230e0	1.070e-1	3.31	102.33
	P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2	12.62	3 of 3	1.224e1	2.971e-1	2.43	96.94
P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2 201.98 3 of 3 2.016e2 7.902e0 3.92 99.80	P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2	50.49	3 of 3	5.442e1	8.632e-1	1.59	107.78
	P41159ups LEP_HUMAN_UPS.VTGLDFIPGLHPILTLSK.+3y11+2	201.98	3 of 3	2.016e2	7.902e0	3.92	99.80



#### 表 A1. UPS蛋白(包括蛋白名称和Uniprot注册号)列表

Uniprot注册 号	Uniprot蛋白名称[同义名]	Uniprot注册号	Uniprot蛋白名称[同义名]
P00915	Carbonic anhydrase 1	P55957	BH3 Interacting domain death agonist [BID]
P00918	Carbonic anhydrase 2	076070	Gamma-synuclein
P01031	Complement C5 [Complement C5a]	P08263	Glutathione S-transferase A1 [GST A1-1]
P69905	Hemoglobin alpha chain	P01344	Insulin-like growth factor II
P68871	Hemoglobin beta chain	P01127	Platelet-derived growth factor B chain
P41159	Leptin	P10599	Thioredoxin
P02768	Serum Albumin	P99999	Cytochrome c[Apocytochrome c]
P62988	Ubiquitin	P06396	Gelsolin
P04040	Catalase	P09211	Glutathione S-transferase P [GST]
P00167	Cytochrome b5	P01112	GTPase HRas [Ras protein]
P01133	Epidermal Growth Factor	P01579	Interferon gamma (IFN-gamma)
P02144	Myoglobin C	P02787	Serotransferrin [Apotransferrin]
P15559	NAD(P)H dehydrogenase [quinone] 1 [DT Diaphorase] C	000762	Ubiquitin-conjugating enzyme E2 C [UbcH10]
P62937	Peptidyl-prolyl cis-trans isomerase A [Cyclophilin A]	P51965	Ubiquitin-conjugating enzyme E2 E1 [UbcH6]
Q06830	Peroxiredoxin 1	P08758	Annexin A 5
P63165	Small ubiquitin-related modifier 1 [SUMO-1]	P02741	C-reactive protein
P00709	Alpha-lactalbumin	P05413	Fatty acid-binding protein
P06732	Creatine kinase M-type [CK-MM]	P10145	Interleukin-8
P12081	Histidyl-tRNA synthetase [Jo-1]	P02788	Lactotransferrin
P61626	Lysozyme C	P10636	Microtubule-associated protein tau [Tau protein
Q15843	Neddylin [Nedd8]	P00441	Superoxide dismutase [Cu-Zn]
P02753	Retinol-binding protein	P01375	Tumor necrosis factor [TNF-alpha]
P16083	Ribosyldihydronicotinamide dehydrogenase [quinone] [Quinone oxidoreductase 2] [NQO2]		
P63279	Ubiquitin-conjugating enzyme E2 I [UbcH9]		
P01008	tithrombin-III		
P61769	Beta-2-microglobulin		

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