



Quartet Protein Reference Materials

Human Protein for Quality Control and Performance Assessment of Proteomic Profiling
(Chinese Quartet Family of Monozygotic Twin Daughters, Father, and Mother: **D5, D6, F7, and M8**)

The Quartet Protein Reference Materials suite (RM) was prepared as part of "*The Quartet Project: Quality Control and Data Integration of Multi-omics Profiling*" in which matched reference materials of DNA, RNA, proteins, and metabolites were simultaneously manufactured from the same batch of cultured cells. A unit of the Quartet Protein Reference Materials consists of four vials containing peptides of human total protein isolated from the immortalized B-lymphoblastoid cell line of a specific family member of a Chinese Quartet family from Fudan Taizhou Cohort, including father (F7), mother (M8), and two monozygotic twin daughters (D5 and D6). Each vial contains approximately 10 µg of dried, tryptic peptide mixtures. Four labeled peptides are spiked in at different weight ratios as external controls.

SPECIFICATIONS

Name of Protein Reference Material	Color	Amount	Description	External Controls
FDU_Quartet_Protein_D5_20171028	●	10 µg	Dried, tryptic peptide mixtures	YILAGVENS (1:1,000) ADVTPADFEWSK (1:3,000) DGLDAASYAPVR (1:9,000) DPSAPVNTVR (1:27,000)
FDU_Quartet_Protein_D6_20171028	●			
FDU_Quartet_Protein_F7_20171028	●			
FDU_Quartet_Protein_M8_20171028	●			

Quartet Protein Reference Materials suite is stored at -80 °C and shipped with dry ice. External controls are chemically synthesized peptides with C13 and N15 labeled valine and are spiked in the tryptic peptide mixtures at known weight ratios.

INTENDED USES

The Quartet Protein Reference Materials suite is intended for quality control and performance assessment of quantitative proteomic profiling. It can measure and mitigate technical variation, enabling more accurate data integration in large cohort studies. The Quartet performance metrics for proteomic profiling are: 1) Quartet multi-sample based signal-to-noise ratio (SNR); and 2) Reference datasets based correlation coefficient. This protein RM suite should be profiled in the same way as study samples in each batch within a lab. Because the RM is tryptic peptide mixtures, it is not suitable for assessing the pre-analytical steps such as protein extraction and tryptic digestion, and it aims to evaluate the performances of following proteomics profiling steps. It is for research purpose only.

REFERENCE DATASETS

The Quartet Protein Reference Datasets are provided as the relative expression values of six sample pairs (D5/D6, D5/F7, D5/M8, D6/F7, D6/M8, and F7/M8), using methods described in the Quartet protein manuscript. The v1.0 of protein reference datasets covers approximately 11.9-15.3% of the SwissProt annotation database. As proteomics profiling technologies and data analysis methods improve, the reference datasets will be updated periodically. All the reference datasets and the quality assessment tools can be accessed through the Quartet Data Portal (<http://chinese-quartet.org/>).

NOTICE AND WARRANTIES TO USERS

The Quartet Protein Reference Materials are being provided on an "AS IS" basis. The provider hereby warrants that the Quartet Protein Reference Materials have been obtained or created a) in full compliance with all applicable local, governmental and international laws, regulations and guidelines, b) after obtaining and in full compliance with all necessary approvals from the relevant research ethics committees, and c) after obtaining and in full compliance with all necessary, properly signed informed consents and acknowledgement forms from any human subjects, or their legal guardians. The provider makes no representation or warranty, whether expressed or implied, with respect to the Quartet Protein Reference Materials, including any representation or warranty as to the durability, storage, disposal, merchantability or fitness for a particular purpose or to the non-infringement of the Quartet Protein Reference Materials on the proprietary rights of a third party. The recipient shall use the Quartet Protein Reference Materials obtained or created as described above at its sole risk and liability.

The Quartet Protein reference materials and raw datasets are publicly available and accessible. Researchers are encouraged to access and analyze the datasets. The recipients of the Reference Materials are highly encouraged to share their data with Fudan University through the Quartet Data Portal in order for us to improve the reference datasets and to better serve the community.

For other questions, please feel free to contact the Quartet Project team (quartet@fudan.edu.cn and <http://chinese-quartet.org/>), and/or Drs. Yuanting Zheng (zhengyuanting@fudan.edu.cn) and Leming Shi (lemingshi@fudan.edu.cn).



“中华家系”1号人源蛋白质参考物质

蛋白组检测质量评价用人源蛋白质

(中国同卵双胞胎家庭，两个女儿、父亲和母亲：D5, D6, F7 和 M8)

“中华家系”1号蛋白质参考物质来源于“**Quartet 中华家系1号项目：多组学质量控制和数据整合**”，该项目研制了同批次细胞来源的 DNA、RNA、蛋白质、代谢物的多组学参考物质。“中华家系”1号蛋白质参考物质一套内含 4 管人源永生 B 淋巴瘤细胞系的总蛋白质酶解的肽段，细胞系建立自复旦泰州队列的中国同卵双胞胎家庭，包括父亲(F7)、母亲(M8)和两个同卵双胞胎女儿 (D5 和 D6)。每管蛋白质参考物质包含 10 µg 总肽段冻干粉。按照已知质量比例添加四个同位素标记的人工合成肽段作为外加质控。

规格参数

蛋白质参考物质的名称	颜色	总量	特征描述	外加质控品
FDU_Quartet_Protein_D5_20171028	●	10 µg	总蛋白经胰酶酶解的肽段冻干粉	YILAGVENS (1:1,000) ADVTPADFEWSK (1:3,000) DGLDAASYAPVR (1:9,000) DSPSAPVNVTVR (1:27,000)
FDU_Quartet_Protein_D6_20171028	●			
FDU_Quartet_Protein_F7_20171028	●			
FDU_Quartet_Protein_M8_20171028	●			

“中华家系”1号蛋白质参考物质在-80 °C条件下长期保存，采用干冰运输。外加质控品是化学合成的肽段，缬氨酸经 C13 和 N15 同位素标记，按照表格中的质量比添加到酶解肽段中。

预期用途

“中华家系”1号蛋白质参考物质的预期用途是对蛋白组检测进行质量控制和性能评价，也可用于评估和消除多批次检测中的技术噪音，为多中心、长期大队列研究的数据整合提供质量保证。采用“中华家系”1号蛋白质参考物质进行高通量蛋白表达谱性能评价的指标包括：1) 基于“中华家系”1号多样本的信噪比；2) 基于参考数据集的相关性系数。蛋白质参考物质需要和研究样本平行检测，才能保证对每个实验室、每批次数据的质量进行有效的评价。本蛋白质参考物质是酶解后的肽段，适用于评价蛋白组的上机检测及后续生物信息学分析过程。不适用于评价蛋白提取、胰酶消化等样本前处理过程。本蛋白质参考物质仅适用于科学研究。

参考数据集

“中华家系”1号蛋白质组参考数据集是 6 个样本对的相对表达值(D5/D6, D5/F7, D5/M8, D6/F7, D6/M8 和 F7/M8)，具体整合构建方法参考“中华家系”1号蛋白质组文章。v1.0 版本参考数据集覆盖 11.9-15.3% 的 SwissProt 注释数据库。随着高通量蛋白质组检测技术和分析算法的进步，将定期发布参考数据集的升级版。“中华家系”1号蛋白质组参考数据集、原始数据以及质量评价工具可以通过 Quartet Data Portal 获取使用(<http://chinese-quartet.org/>)。

用户使用条款

“中华家系”1号蛋白质参考物质按照“原样”提供。研究者保证本参考物质的研制：a) 完全符地区、政府和国际相关法律、法规和指导原则；b) 获得伦理委员会审批并遵守相关条款；c) 志愿者或其法定监护人已知情并签署知情同意书。研究者对“中华家系”1号蛋白质参考物质不作任何明示或暗示的陈述或保证，包括其耐用性、储存、处置、特定用途的适用性或适销性，或不侵犯“中华家系”1号蛋白质参考物质的第三方的所有权。物质接收者使用本参考物质涉及上述条款的，应自行承担相关风险和责任。

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如有其它问题，请联系“中华家系”1号项目团队(quartet@fudan.edu.cn 或 <http://chinese-quartet.org/>)，或者项目负责人郑媛婷博士(zhengyuanting@fudan.edu.cn) 和石乐明博士(lemingshi@fudan.edu.cn)。