Construction and Quality Control of Obstetrics and Gynecology Disease Biobank

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Aim: To ensure the sample quality meet the requirement of experiment research, the gynecology and obstetrics biobank of Nanjing Drum Tower hospital designed different quality control method for relevant types of samples and a range of viable quality control procedure has been formulated.

Methods: The gynecology and obstetrics department and biobank cooperate to accomplish the biobanking process. Disease categories included birth defect, preeclampsia (PE), endometriosisand gynecological oncology. Sample types after disposition were frozen tissue, paraffin-embedded tissue, OCT-embedded tissue, plasma, buffy coat, serum, blood clots and urine. Different categories of samples were randomly selected 1% cases for quality control experiments:

- frozen tissue, buffy coat and blood clots: RNA and DNA were extracted and the concentration, purity and integrity were detected.
- paraffin-embedded tissue: morphological observation after hematoxylin-eosinstaining and immunohistochemistry (IHC) detection of β-actin.
- OCT-embedded tissue: immunofluorescence detection of β-actin.
- Four kind of organs (skin, heart, liverand placenta) frozen tissue samples derived from 18 fetal autopsy specimens were chosen for study of RNA quality between cold ischemia time(CIT).

Results： Recently there are about 2,000 cases, 360,000 vials samples in the obstetrics and gynecology disease biobank. According to the results of quality control experiments: 1) All the concentration and purity parameters of selected samples were qualified. 2) Frozen tissues with cold ischemia time(CIT)≤1h, using qualified standard RIN≥7, the qualification rate was 90%.

Tab1. Quality control experiment projects of different sample types.

Sample types	experiment methods	detection index
frozen tissue	RNA extraction RNA concentration and purity detection RNA integrity detection RT-qPCR	RNA concentration, RNA purity, RNA integrity β-actin mRNA expression
buffy coat and blood clots	DNAextraction DNA concentration and purity detection DNA integrity detection	DNA concentration, DNA purity, DNA integrity
paraffin-embedded tissue	morphological observation hematoxylin-eosin staining immunohistochemistry	Morphological images β-tubulin protein expression
OCT-embedded tissue	immunofluorescence	β-tubulin protein expression

3) Frozen tissues with CIT between1~18h, using qualified standard RIN≥5, the qualification rate was 61.1%. 4) All the paraffin-embedded tissues were qualified for morphological observation 5) The qualification rate of OCT-embedded tissue was 89%. 6) CIT had a great influence on the integrity of frozen tissue RNA, and the RNA integrity parameters of different tissue types in the same specimen were significantly different.

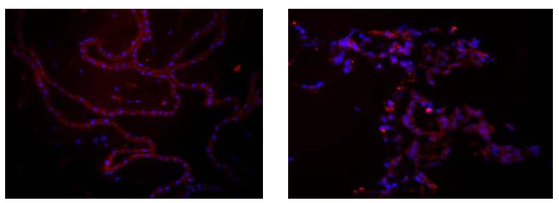

Fig.1 Images of mmunofluorescence detection of β-actin in endometrium tissue and placenta, 400×. Left: endometrium; Right: placenta

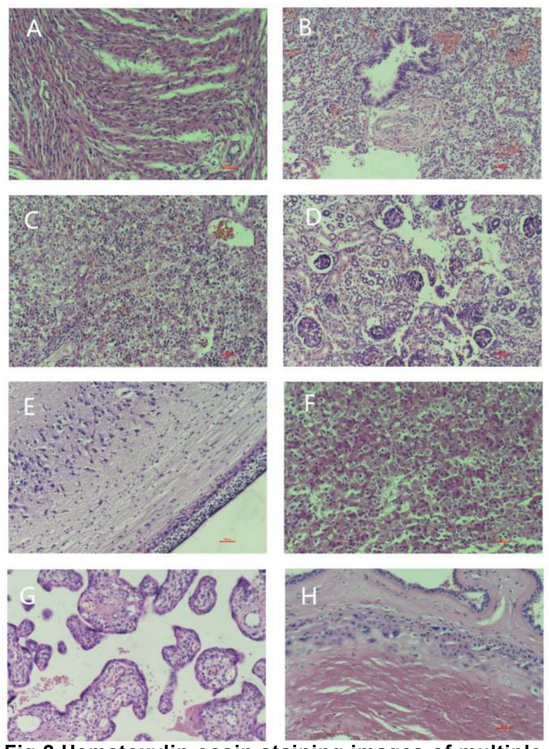

Fig.2 Hematoxylin-eosin staining images of multiple tissues and different organs derived from autopsy. 200×. A) Heart B) Lung C)Liver D)Kidney E)Brain F)Adrenal gland G)Placenta H) Embryolemma

Conclusions： An obstetrics and gynecology disease biobank with various types of diseases and abundant samples was constructed. Using specific quality control experiments for different types of samples was a reliableoperating strategy, which can be beneficial for providing qualified research resources.

Key word: obstetrics and gynecology disease, biospecimen, biobanking, quality control, qualification rate

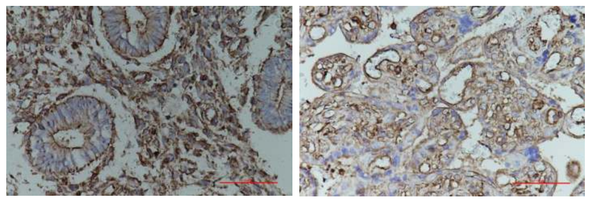

Fig.3 Images of immunohistochemistry (IHC) detection of β-actin in endometrium tissue and placenta, 400×. Left: endometrium; Right: placenta

Fig. 4 Left: The relationship between RQN and CIT in four different tissue types; Right: The relationship between RQN and tissue types in four groups of different CIT, the sort order from good to poor, which were skin, heart, liver and placenta.