**Supplementary table 3.**Summaries for the function of 10 hub genes.

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| **Gene symbol** | **Full name** | **Functions** |
| BUB1B | BUB1 Mitotic Checkpoint Serine/Threonine Kinase B | Essential component of the mitotic checkpoint. Required for normal mitosis progression. Inhibiting the activity of the anaphase-promoting complex/cyclosome by blocking the binding of CDC20 to APC/C. |
| CCNB1  CCNB2  CDK1  CDC20  AURKA  TOP2A  CDKN3  NUSAP1  MELK | Cyclin B1  Cyclin B2  Cyclin Dependent Kinase 1  Cell Division Cycle 20  Aurora Kinase A  DNA Topoisomerase II Alpha  Cyclin Dependent Kinase Inhibitor 3  Nucleolar and Spindle Associated Protein 1  Maternal Embryonic Leucine Zipper Kinase | Essential for the control of the cell cycle at the G2/M (mitosis) transition.  Essential for the control of the cell cycle at the G2/M (mitosis) transition.  Plays a key role in the control of the eukaryotic cell cycle by modulating the centrosome cycle as well as mitotic onset; promotes G2-M transition and regulates G1 progress and G1-S transition.  Required for full ubiquitin ligase activity of the anaphase promoting complex/cyclosome and confer substrate specificity upon the complex.  Mitotic serine/threonine kinase that contributes to the regulation of cell cycle progression. Plays a critical role in various mitotic events including the establishment of mitotic spindle, centrosome duplication, centrosome separation as well as maturation.  Control of topological states of DNA by transient breakage and subsequent rejoining of DNA strands. Essential during mitosis and meiosis for proper segregation of daughter chromosomes.  May play a role in cell cycle regulation. Dual specificity phosphatase active toward substrates containing either phosphotyrosine or phosphoserine residues.  Microtubule-associated protein with the capacity to bundle and stabilize microtubules. May associate with chromosomes and promote the organization of mitotic spindle microtubules around them.  Serine/threonine-protein kinase involved in various processes such as cell cycle regulation, self-renewal of stem cells, apoptosis and splicing regulation. Has a broad substrate specificity; phosphorylates BCL2L14, CDC25B, MAP3K5/ASK1 and ZNF622. Acts as an activator of apoptosis by phosphorylating and activating MAP3K5/ASK1. |