## Supplementary Tables

### Supplementary Table 1. Primer sequences used in quantitative RT-PCR.

| Gene          | Forward primer                     | Reverse primer                          |
|---------------|-----------------------------------|-----------------------------------------|
| FOXO3-mouse   | ACTGAGGAAAGGGGAAATGG              | CAAAGGTGTAAGCTGTAACACG                  |
| GLUT4-mouse   | ACACCTTCCTAGCTGTTTCCTCTCTCTCTCTCT | CCAGCCACGTTCAGTCTGTTGTA                 |
| GLUT4-human   | ATCCCTGGAGATCTCCTCATTGG            | CAGGATGTTGGGAGCAATCT                    |
| LNK-mouse     | CCAATGTGCGATAGAGAAAGGTAAAAG       | CAAACCTCAGTCAGCCCTCTCATGAC             |
| LNK-human     | AATAGGAGGTTGGCAGAAGACAG            | TCCCCTAGCCCAAGTAAATTTAA                 |
| FOXO3-human   | TGGTGGTTGAACCTGTTGGA              | GTTGGAGGTCTGTGTTGCC                     |
| GAPDH-human   | GAGCCAAAAAGGTCATCATCTCTCTCT       | GTTCATGAGTCCTTCCACAGTAC                |
| FSHR-human    | GCGGAA CCC CAA CAT CGT GTC        | TGA AGA AAT CTC TGC GAA AGT             |
| GAPDH-mouse   | AAGCCCATCACCACCTCTCTCTCTCTCT      | CCTCCTCACCACCTCTCTTTG                   |
| FSHR-mouse    | TGCTTACTACCGGTTGCTCCTCTCTCT       | TCTCAGTCAATGGCTGTTCCG                   |
| LHR-mouse     | GCCGCTGCACATTTTCAAC               | CAGTGGCAGAGTGCTGCA                     |
| AMHR-mouse    | GGGGCCTTTGGACACTCCTTCT            | GTCTCAGGATCCTCAGCA                     |
| CYP19-mouse   | AACCCCATGCGATATAATGTCAC           | AGGACCTGGTATTGAAGAGACGAG                |
| AR-mouse      | TCCCAAGACCTATCGGAGGAGCG           | GTGGGCTTGAGGAGAACCAT                   |

FOXO3, forkhead box class O3; GLUT4, glucose transporter 4; FSHR, follicle stimulating hormone receptor; LHR, luteinizing hormone receptor; AMHR, anti-Mullerian hormone type 2 receptor; CYP19, cytochrome P450, family 19; AR, androgen receptor.

### Supplementary Table 2. Antibodies used in western blot (WB) and immunofluorescence (IF).

| Protein                   | Company                          | Product code | Dilution | Application | Molecular weight(k Da) |
|---------------------------|----------------------------------|--------------|----------|-------------|-----------------------|
| Akt (pan) (11E7) Rabbit mAb | Cell Signaling Technology        | 4685         | 1:1000   | WB          | 55-70                 |
| Phospho-Akt (Ser473) (D9E) XP® Rabbit mAb | Cell Signaling Technology | 4060         | 1:1000   | WB          | 55-70                 |
| FoxO3a (75D8) Rabbit mAb | Cell Signaling Technology        | 99199        | 1:1000 1:500 | WB IF | 70-100               |
| β-Actin (13E5) Rabbit mAb | Cell Signaling Technology        | 4970         | 1:1000   | WB          | 35-55                 |
| Phospho-FoxO3a (Ser253) Antibody | Cell Signaling Technology | 9466S        | 1:1000 1:500 | WB IF | 70-100               |
| LNK antibody(A-12)       | Santa Cruz Biotechnology         | sc-393709    | 1:1000   | WB          | 55-70                 |
**Supplementary Table 3.** Correlation between LNK mRNA expression in granulosa cells and clinical features in patients.

|         | FOXO3 | BMI   | WC    | WHR   | FPG   | FIN   | HOMA-IR | Oocyte maturation rate |
|---------|-------|-------|-------|-------|-------|-------|---------|------------------------|
| Total population | r 0.6336, p <0.0001 | 0.3648, n 52 | 0.3369, r 0.6759 | 0.3735 | 0.3369, p 0.0038 | 0.324, n 54 | 0.3170, p 0.0018 | 0.0530, n 50 | 0.3400, p 0.0530 | 0.3239, p 0.0353 | -0.3519, p 0.0353 |
| PCOS   | r 0.6336, p <0.0001 | 0.3648, n 31 | 0.3369, r 0.3735 | 0.375 | 0.3369, p 0.0038 | 0.324, n 32 | 0.3170, p 0.0018 | 0.0530, n 32 | 0.3400, p 0.0530 | 0.3239, p 0.0353 | -0.3519, p 0.0353 |
| control | r 0.3084, p 0.0530 | 0.3648, n 21 | 0.3369, r 0.3735 | 0.375 | 0.3369, p 0.0038 | 0.324, n 32 | 0.3170, p 0.0018 | 0.0530, n 32 | 0.3400, p 0.0530 | 0.3239, p 0.0353 | -0.3519, p 0.0353 |

BMI, body mass index; WC, waist circumference; WHR, waist-hip ratio; FPG, fasting plasma glucose; FIN, fasting insulin; HOMA-IR, homeostasis model assessment for insulin resistance.

**Supplementary Table 4.** Correlation between FOXO3 mRNA expression in granulosa cells and clinical features in patients.

|         | LNK | BMI   | WC    | WHR   | FPG   | FIN   | HOMA-IR | Oocyte maturation rate |
|---------|-----|-------|-------|-------|-------|-------|---------|------------------------|
| Total population | r 0.6336, p <0.0001 | 0.3989, n 52 | 0.3714, r 0.6759 | 0.4212 | 0.4166, p 0.0012 | 0.022, n 47 | 0.2529, p 0.0011 | 0.0676 | 0.1244, p 0.0018 | 0.1767, p 0.0011 | 0.1884, p 0.0024 | -0.4900, p 0.0024 |
| PCOS   | r 0.6336, p <0.0001 | 0.3989, n 31 | 0.3714, r 0.375 | 0.4212 | 0.2529, p 0.0012 | 0.022, n 32 | 0.1244, p 0.0018 | 0.0676 | 0.1767, p 0.0011 | 0.1884, p 0.0024 | -0.4900, p 0.0024 |
| control | r 0.3084, p 0.0530 | 0.3989, n 21 | 0.3714, r 0.375 | 0.4212 | 0.2529, p 0.0012 | 0.022, n 32 | 0.1244, p 0.0018 | 0.0676 | 0.1767, p 0.0011 | 0.1884, p 0.0024 | -0.4900, p 0.0024 |

BMI, body mass index; WC, waist circumference; WHR, waist-hip ratio; FPG, fasting plasma glucose; FIN, fasting insulin; HOMA-IR, homeostasis model assessment for insulin resistance.