**Table S5** Genes involved in embryonic development

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| Gene ID (NCBI) | Protein | Log2 Ratio(T/C) | *P*-value | Phenotype after RNAi of DEGs in *T. castaneum* a |
| LOC658306 | Cuticle protein 18.7 | -7.87  | 1.78E-153 | 50.0% b, 30.0% embryo/egg with muscle fluorescence/pattern, but not hatched c |
| LOC655652 | Cuticle protein 7 | -5.29  | 1.04E-75 | 40.0% b, 50.0%-80.0% embryo/egg not developed/not fertilized c |
| LOC662285 | Larval/pupal cuticle protein H1C | -4.87  | 6.56E-22 | 30%-50% embryo/egg with embryonic tissue, no cuticle c |
| LOC663846 | Myosin light chain alkali  | -4.59  | 3.18E-27 | 30%-50% embryo/egg with embryonic tissue, no cuticle c |
| LOC662582 | Multiple organellar RNA editing factor 1, mitochondrial | -4.16  | 3.14E-11 | 20.0% b, 30%-50% embryo/egg not developed/not fertilized c |
| LOC659571 | Suppressor protein SRP40-like | -2.38  | 4.75E-04 | 30.0% embryo/egg not developed/not fertilized c |
| LOC660838 | Myrosinase 1 | -2.36  | 1.27E-03 | 30%-50% embryo/egg with embryonic tissue, no cuticle c |
| LOC661371 | Cytochrome P450 4C1  | -1.90  | 1.32E-03 | 50.0% b, 30.0% embryo/egg with embryonic tissue, no cuticle c |
| LOC663027 | Gooseberry-neuro | -1.66  | 1.27E-04 | 80.0% embryo/egg not developed/not fertilized c |
| LOC103315077 | Gustatory receptor Gr109 | -1.45  | 3.77E-04 | 30%-50% embryo/egg not developed/not fertilized c |
| LOC103313179 | G2/mitotic-specific cyclin-B | -1.44  | 1.83E-04 | 50% embryo/egg not developed/not fertilized c |
| LOC654997 | Protein takeout  | -1.38  | 6.42E-06 | 30%-50% embryo/egg with embryonic tissue, no cuticle c |
| LOC656824 | RNA-binding protein Musashi homolog 2  | -1.31  | 3.42E-08 | 100.0% b, 30% embryo/egg with embryonic tissue, no cuticle c |
| LOC658720 | Abnormal spindle-like microcephaly-associated protein homolog  | -1.30  | 1.51E-04 | 80.0% embryo/egg not developed/not fertilized c |
| LOC655190 | Kinesin 14 | -1.26  | 4.71E-04 | 0.0% b, 50%-80% embryo/egg with embryonic tissue, no cuticle c |
| LOC660850 |  Matrix metalloproteinase 3 | -1.25  | 4.37E-05 | 30.0% embryo/egg with embryonic tissue potentially present, no cuticle c |
| LOC100142254 | Protein aurora borealis | -1.23  | 2.24E-03 | 0.0% b, 80% embryo/egg not developed/not fertilized c |
| LOC656415 | Paired box protein Pax-5 | -1.23  | 1.65E-05 | 100.0% b, 80.0% embryo/egg with muscle fluorescence/pattern, but not hatched c |
| LOC655301 | Condensin complex subunit 2  | -1.23  | 9.92E-04 | 10.0% b, 80.0% embryo/egg not developed/not fertilized c |
| LOC655819 | Coatomer subunit alpha  | -1.19  | 1.89E-04 | 50%-80% embryo/egg not developed/not fertilized c |
| LOC103312803 | Early growth response protein 1 | -1.18  | 1.64E-04 | 100.0% b, 80.0% embryo/egg with embryonic tissue, no cuticle c |
| LOC656251 | Kinesin 8A | -1.16  | 1.89E-05 | 50%-80% embryo/egg not developed/not fertilized c |
| LOC103313715 | Myosin-10  | -1.15  | 1.04E-03 | 40.0% b, 50.0%-80.0% embryo/egg not developed/not fertilized c |
| LOC103313822 | MAR-binding filament-like protein 1-1 | -1.14  | 3.19E-05 | 10.0% b, 80.0% embryo/egg not developed/not fertilized c |
| LOC103315078 | Delta(14)-sterol reductase | -1.14  | 5.10E-04 | 30.0% embryo/egg with embryonic tissue potentially present, no cuticle c |
| LOC660418 | G2/mitotic-specific cyclin-B3 | -1.11  | 1.10E-03 | 80% embryo/egg with embryonic tissue, no cuticle c |
| LOC641600 | Cx cephalothorax | -1.08  | 1.23E-06 | 100.0% b, 30%-50% embryo/egg with embryonic tissue, no cuticle c |
| LOC661666 | Cac cacophony B | -1.06  | 5.32E-04 | 30.0% b, 30.0%-50.0% embryo/egg with muscle fluorescence/pattern, but not hatched c |
| LOC100142549 | Targeting protein for Xklp2 | -1.05  | 1.68E-03 | 80% embryo/egg not developed/not fertilized c |
| LOC663303 | Serine/threonine-protein kinase PLK4 | -1.04  | 7.62E-05 | 20.0% b, 80% embryo/egg not developed/not fertilized c |
| LOC664554 | Interference hedgehog  | -1.03  | 6.40E-05 | 100.0% b, 80% embryo/egg not developed/not fertilized c |
| LOC663073 | Centromere protein J | -1.02  | 1.44E-03 | 0.0% b, 80% embryo/egg not developed/not fertilized c |
| LOC100142163 | Proclotting enzyme | -0.96  | 1.09E-06 | 30.0% embryo/egg with embryonic tissue, no cuticle c |
| LOC657972 | LIM/homeobox protein Lhx5  | -0.91  | 1.99E-04 | 100% b, 50%-80% embryo/egg not developed/not fertilized; 30% embryo/egg with embryonic tissue potentially present, no cuticle c |
| LOC641549 | Sp8 Sp-like zinc finger transcription factor | -0.90  | 5.64E-06 | 30%-50% embryo/egg not developed/not fertilized c |
| LOC663965 | Spaetzle | -0.85  | 1.15E-05 | 0.0% b, 30% embryo/egg with embryonic tissue, no cuticle c |
| LOC661456 | Intraflagellar transport protein 122 homolog  | -0.81  | 1.34E-03 | 30% embryo/egg with embryonic tissue, no cuticle c |
| LOC662692 | Probable RNA-directed DNA polymerase from transposon X-element | -0.80  | 1.12E-08 | 20% b, 80% embryo/egg with embryonic tissue, no cuticle c |
| LOC659234 | Collagen alpha-1(XVIII) chain | -0.80  | 2.03E-03 | 50% b, 50%-80% embryo/egg not developed/not fertilized c |
| LOC103315170 | Uncharacterized protein | -0.80  | 2.34E-03 | 80% embryo/egg not developed/not fertilized c |
| LOC103312413 | Collagen alpha-1(XV) chain | -0.79  | 1.27E-03 | 50% b, 30% embryo/egg not developed/not fertilized c |
| LOC664449 | Centrosomal protein of 135 kda | -0.79  | 2.12E-03 | 30% b, 80% embryo/egg not developed/not fertilized c |
| LOC654988 | PDZ domain-containing RING finger protein 4 | -0.77  | 6.82E-05 | 20% b, 50%-80% embryo/egg not developed/not fertilized c |
| LOC660242 | RIMS-binding protein 2 | -0.75  | 2.22E-03 | 10% b, 80% embryo/egg with embryonic tissue potentially present, no cuticle c |
| LOC103314214 | Serine-rich adhesin for platelets | -0.73  | 1.09E-03 | 10% b, 30% embryo/egg with embryonic tissue, no cuticle c |
| LOC660815 | Tyrosine-protein kinase-like otk | -0.73  | 4.80E-06 | 0% b, 50%-80% embryo/egg not developed/not fertilized c |
| LOC661284 | Partitioning defective 3 homolog B | -0.73  | 3.73E-07 | 30%-50% embryo/egg not developed/not fertilized c |
| LOC655424 | Irregular chiasm C-roughest protein | -0.71  | 2.58E-04 | 0.0% b, 50%-80% embryo/egg not developed/not fertilized c |
| LOC656060 | Breast cancer anti-estrogen resistance protein 3 | -0.66  | 1.94E-03 | 20.0% b, 30.0% embryo/egg not developed/not fertilized c |
| LOC663741 | Low-density lipoprotein receptor-related protein 4  | -0.66  | 5.07E-05 | 80.0% b, 30.0% embryo/egg with embryonic tissue, no cuticle c |
| LOC100142603 | PARG cat and/or AKAP 110 domain containing protein  | -0.65  | 1.64E-03 | 30%-50% embryo/egg with embryonic tissue, no cuticle c |
| LOC656677 | Protein stoned-B | -0.64  | 9.16E-04 | 100.0% b, 80.0% embryo/egg not developed/not fertilized c |
| LOC100142008 | Mucin-4 | -0.53  | 1.49E-03 | 30.0% embryo/egg with embryonic tissue, no cuticle c |
| LOC659444 | Myosin light chain kinase, smooth muscle  | -0.52  | 1.65E-03 | 20.0 % b, 80.0% embryo/egg not developed/not fertilized c |
| LOC658463 | Kinesin-related protein 6 isoform X2 | -0.52  | 1.09E-03 | 30%-50% embryo/egg not developed/not fertilized c |
| LOC660987 | SLIT-ROBO Rho gtpase-activating protein 1 | -0.50  | 2.16E-03 | 14.29% b, 30% embryo/egg with embryonic tissue, no cuticle c |