Supplementary Figure Legend

Supplementary Fig 1. Various dose of *apoa2* MO1 and MO2 inhibited the expression of zebrafish *apoa2*-green fluorescent protein (GFP) fused protein in zebrafish embryos at 60%-epiboly stage.

Supplementary Fig 2. Knocking down *apoa2* leads to defective cell movement phenotype during zebrafish gastrulation. (A-V) Embryos were injected with 8 ng control MO or 8 ng *apoa2* MO1 at 1-cell stage and processed for *in situ* hybridization for DV marker genes at shield stage or endoderm, mesoderm and neurectoderm marker genes at tail-bud stage in the morphants. (A-F) *hgg1* was used to indicate the prechordal plate, *ntl* for the prospective notochord, and *dlx3* for the anterior edge of the neural plate. (G-J) *myoD* and *papc* indicated the paraxial and lateral mesoderm. (K-L) *foxD3* was early neural crest specification marker. (M-N) *sox17* expressed in the endoderm progenitors. *Flh* and *gsc* were used as dorsal markers, and *gata2* and *eve1* as ventral markers. (A-B and G-R) show dorsal views, (C-D and U-V) show animal pole views and (E-F and S-T) show lateral views.

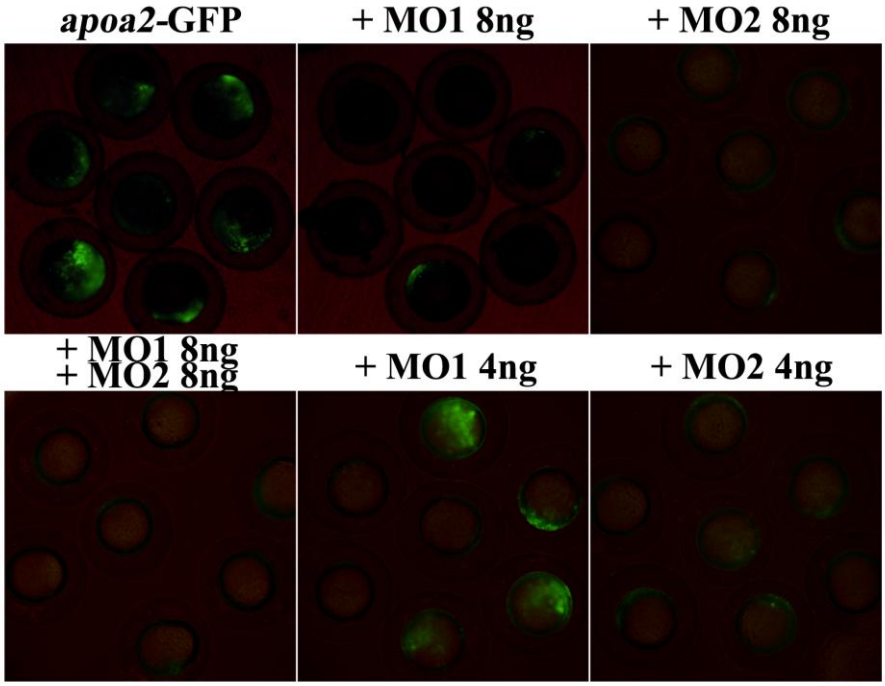
Supplementary Fig 3. Co-injection with *apoa2* MO1 and MO2 at 1-cell or 1k-cell induces disorganization of YSN within the marginal ring and eYSN. The YSN at the blastoderm margin (labeled with SYTOX Green) appeared incomplete division and accumulation (highlighted by white arrowheads) in embyos co-injected with MOs at either 1-cell or 1k-cell (A-E'). The eYSN (marker with DAPI) also displayed similar phenotypes (indicated with white arrowheads) with block *apoa2* at 1-cell or 1k-cell (F-K'). A'-K' denoted magnified views of the regions marked by rectangles in panel A-K.

Supplementary Fig 4. The summary of incomplete nuclear division in the YSL at bud stage. The embryos were pre-injection with control MO or *apoa2* MO1 at 1-cell stage. The ratio of incomplete division was 5.06% in wild-type embryos (n=6) and 17.71% in *apoa2* MO1 embryos (n=9).

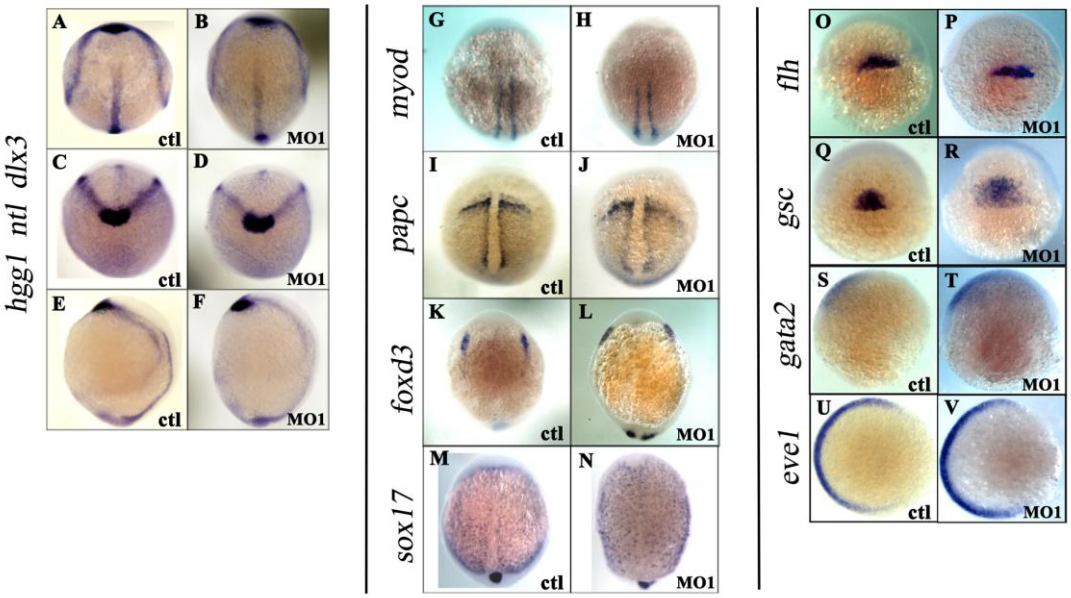
Supplementary Fig 5. *Apoa2* protein affects human HeLa cell proliferation. (A): Representative images are shown the mitotic activity after treatment with serum, HDL, apoA-II and Lipids. (B): Quantification of the mitotic activity after treatment with serum, HDL, apoA-II and lipids is shown. (C): The represent images are shown the mitotic activity after overexpressing GFP and GFP fused *apoa2* C-terminal mutant MC46 in HeLa cells.

Supplementary Fig 6. ApoA-II protein or its mutant did not affect the formation of spindle or centrosome. Overexpression of full-length apoa2-GFP and mutation MC46-GFP in HeLa cells, alpha-tubulin antibody lablled spindle fiber and gamma-tubulin antibody lablled centrosome. Scale bar=20 μm.

Supplemental figure 1



Supplemental figure 2



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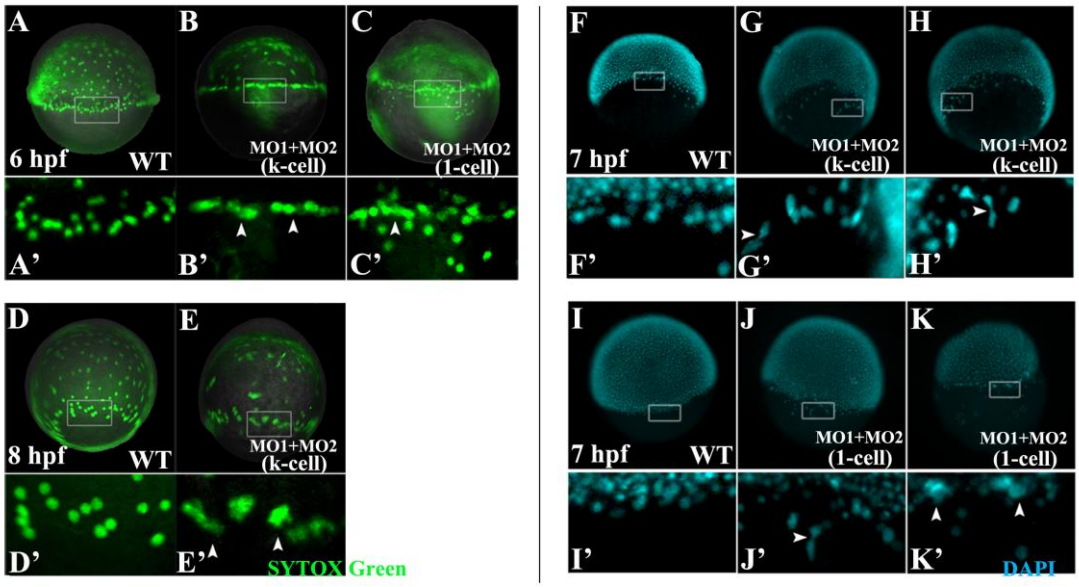

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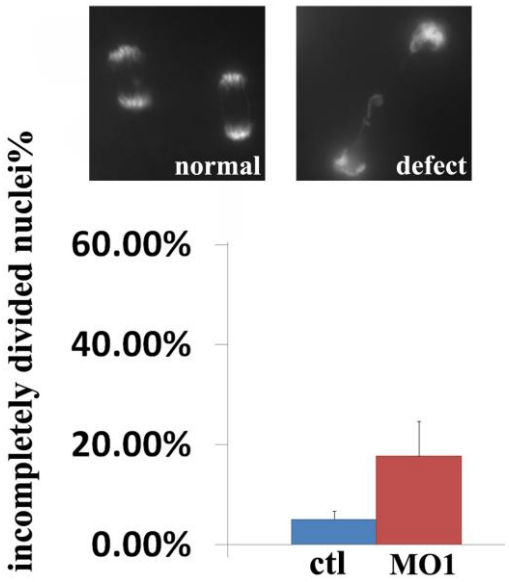
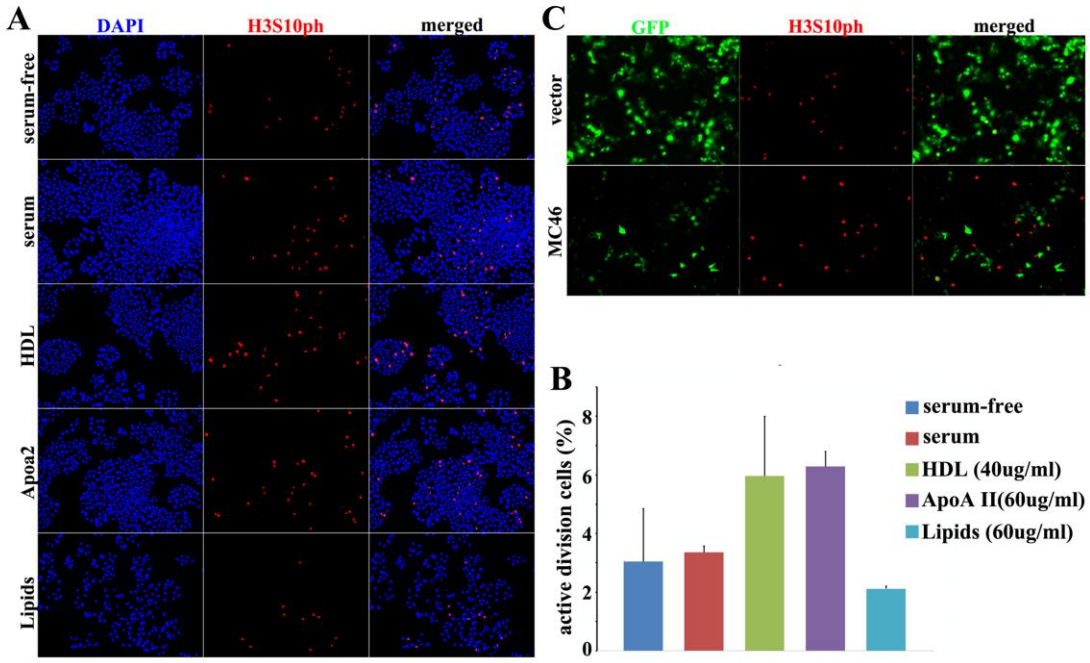


Supplemental figure 5



Supplemental figure 6