This version of the ESI published 25 Mar 2024 replaces the original version published 05 Jan 2024. Figure S2 has been updated due to incorrect images in the original version.

# Electronic Supplementary Information

## Green synthesis of chlorella-derived carbon dots and their fluorescence imaging in zebrafish

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## Experimental Section

### *Materials and Chemicals*

All chemical reagents were used as received. Chlorella were purchased from Xinyuan Fine Chemical Co., LTD., China. Zebrafish were purchased from Shanghai Feixi Co., LTD..

### *Characterization Methods*

X-ray diffraction (XRD) was conducted with a Rigaku D/Max 2400 automatic powder X-ray diffractometer with Cu-Kα radiation (λ = 1.5418 Å). UV-Vis absorption spectroscopy was performed on U-4100 spectrophotometer. Surface elemental composition and chemical state of samples were analyzed by X-ray photoelectron spectroscopy (XPS) on Thermo ESCALAB 250Xi with Al- K α radiation (hν = 1486.6 eV). Fourier transform infrared (FTIR) spectroscopy was carried out on a Nicolet 6700 spectrometer.

### *Synthesis of CDs*

Chlorella (10 g) and distilled water (50 mL) were added into the beaker sequentially, and transferred the solution to a reactor after stirring for 10 min. The reactor was heated at 200 °C for 8 h. Afterward, the final mixture was cooled down to room temperature and collected by suction filtrating using a pinhole filter (0.22 μm) before freeze drying of the resulting brown powder sample.

### *Breeding conditions of zebrafish*

The male/female zebrafish were separated. Water was changed daily, and zebrafish were fed three times a day. The light period of 12 h was temporarily extended for 7

days. The male and female fish were placed in the middle of the spawning box at opposite ends of the board. At 8 am the next day, the cover was removed, and two hours later, the eggs were collected.

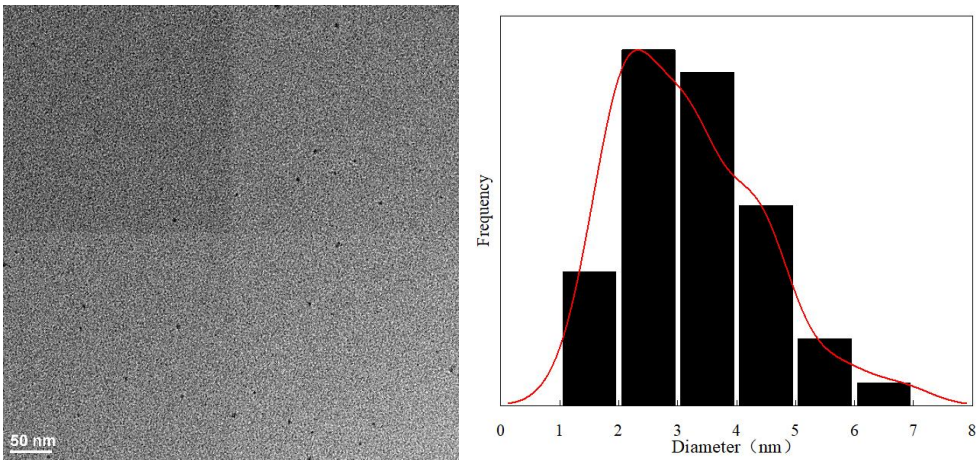


**Figure S1.** TEM image of CDs

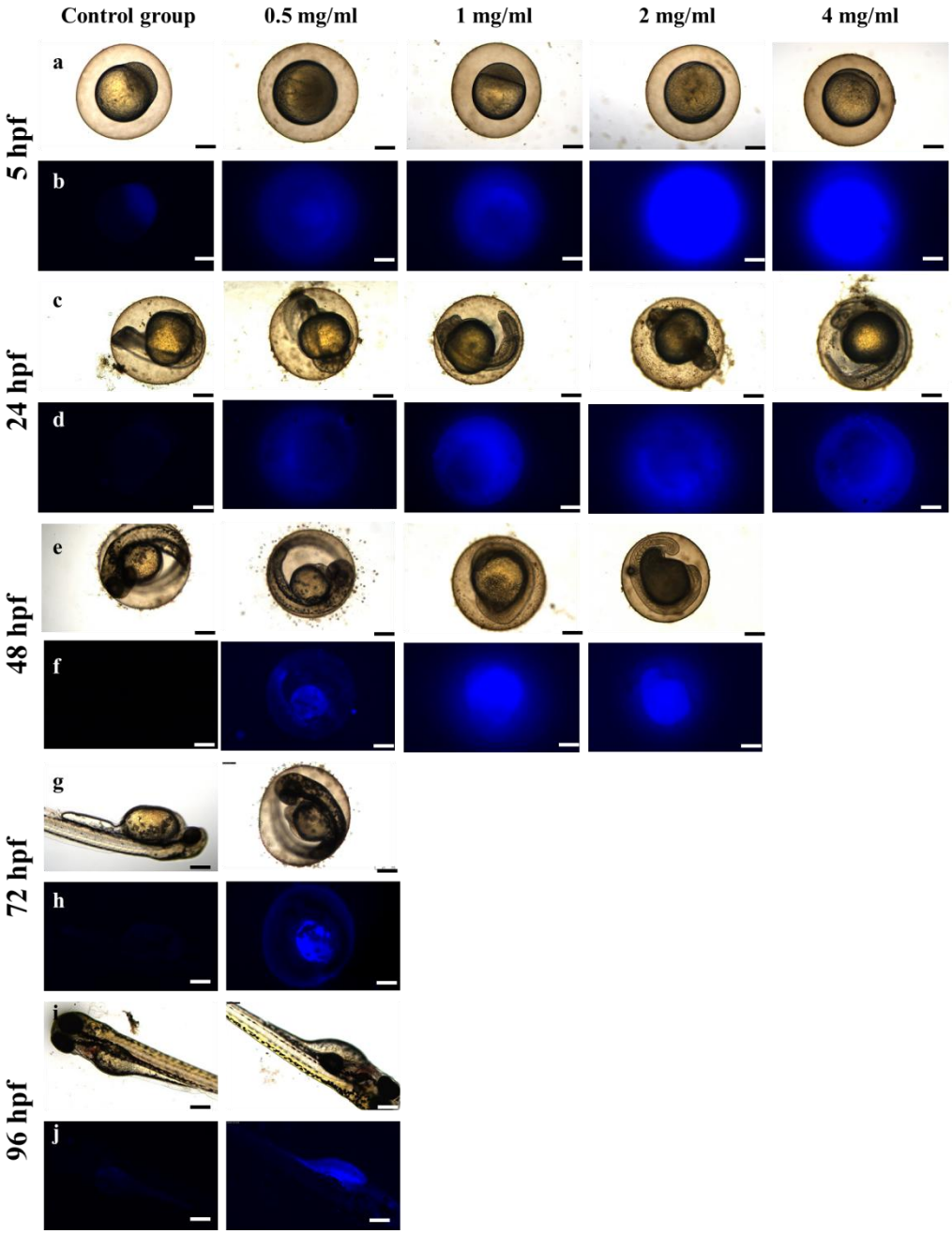


**Figure S2.** The fluorescent imaging of zebrafish eggs in different concentrations of CDs solution (0, 0.5, 1, 2, and 4 mg/mL). (a,c,e,g,i) Bright field; (b,d,f,h,j) fluorescent field (ultraviolet). Scale bars, 250 μm.

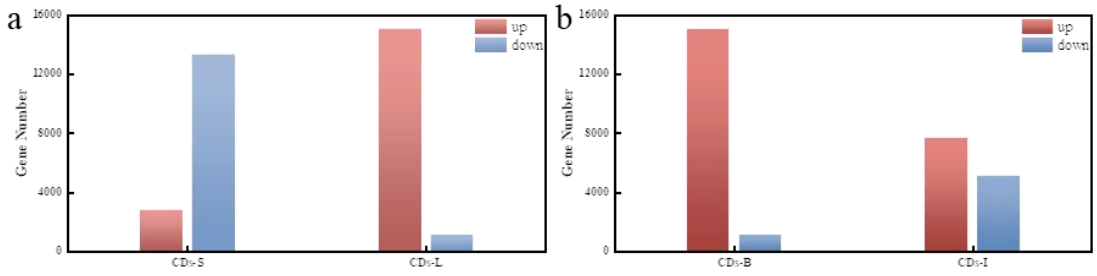


**Figure S3.** Differential gene up-regulation and down-regulation.

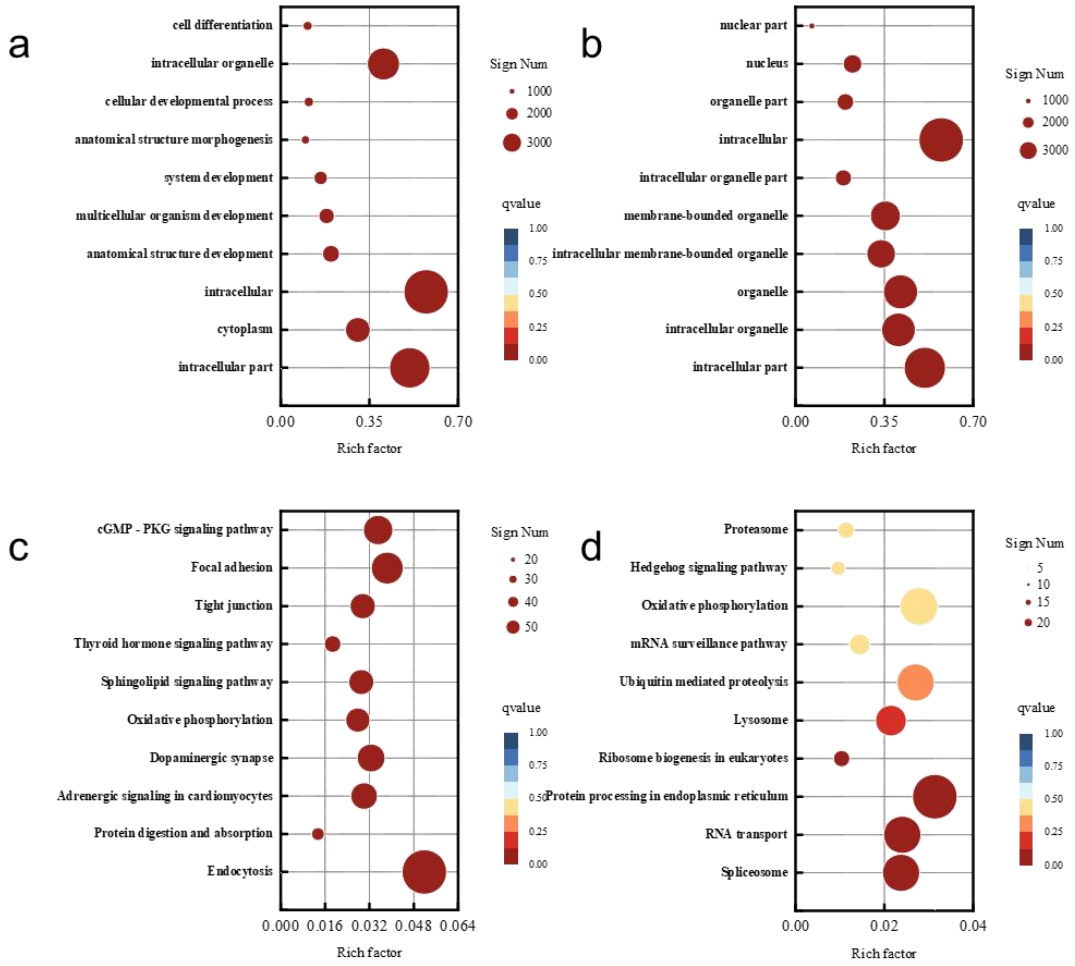


**Figure S4.** GO enrichment plot of CDs-S (a) and CDs-L (b); KEGG enrichment plot of CDs-S (c) and CDs-L (d).

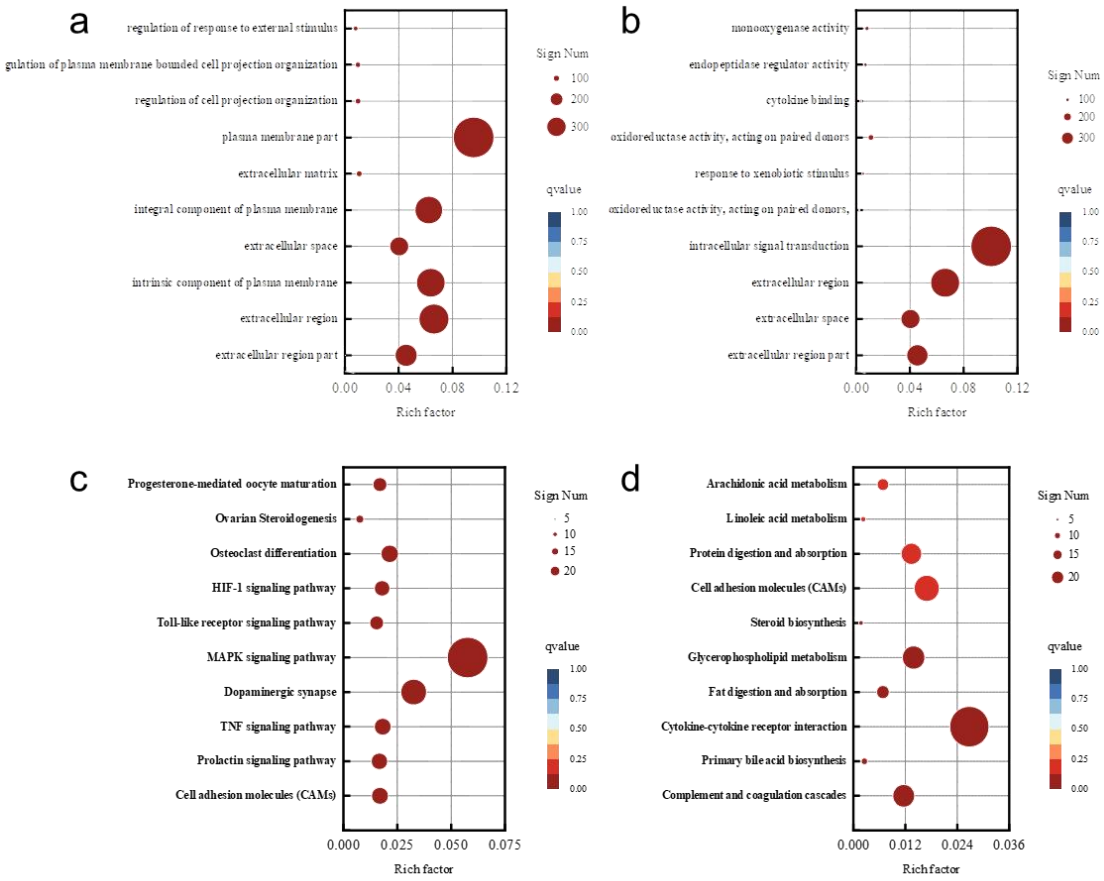


**Figure S5.** GO enrichment plot of CDs-B (a) and CDs-I (b); KEGG enrichment plot of CDs-B (c) and CDs-I (d).

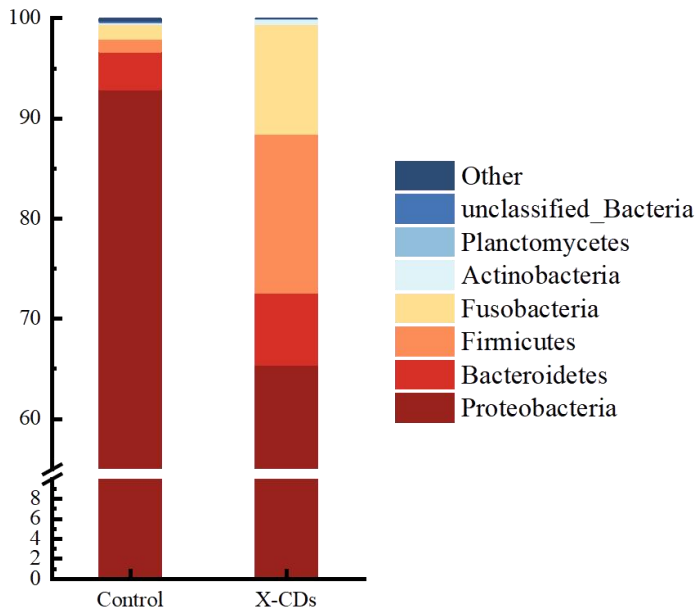


**Figure S6.** Intestinal flora abundance map of zebrafish