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# Centrosomal glutamylation recruits signaling molecules to ensure centrosomal structural integrity and functions

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Centrosome, a key organelle for microtubule nucleation and ciliogenesis, is involved in various cellular activities including migration, polarity, division, signaling and so on. Centrosome malfunctions lead to numerous diseases and disorders. Glutamylation, a post-translational modification that conjugates glutamic acid chain on c-terminal tails of tubulin, are abundant on mature centrosomes. Although this has been demonstrated for over 30 years, the roles of glutamylation in centrosomes are still unclear mainly due to the inability of centrosome glutamylation manipulating. We recently established a new tool which enables us to spatiotemporally remove centrosomal glutamylation by rapidly recruiting the engineered deglutamylase to centrosomes. Acute deglutamylation did not perturb the integrity of centrioles or pericentriolar matrix. Intriguingly, centrosomes with hypoglutamlyation lost NEDD1 and γ-tubulin, resulting in defects of microtubule nucleation. Depletion of glutamylation also caused detrimental impacts on ciliogenesis and cilia maintenance as well as centriolar satellite trafficking. As expected, deglutamylated centrosomes with aforementioned deficits delayed the mitotic exit. In summary, our study provided a novel tool to spatiotemporally manipulate glutamylation in centrosomes and uncovered new insights of how centrosome organizes and regulates itself via glutamylation.

**Author contributions in this study**
YC Lin design research; SR Hong, WT Yang, CS Song, YC Chuang, YC Chang, CY Lin, YC Chen performed research and analyzed data. KJ Liao performed live-cell imaging under the supervision of LHC Wang. IH Lin perform immunostaining under the supervision of WJ Wang.

**Main research location**
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