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Useful for functional analysis of γ-Tubulin

Gatastatin G2

<γ-Tubulin Inhibitor>

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Gatastatin G2 is a superior derivative of Gatastatin, which is the world's first γ-tubulin specific inhibitor. As Gatastatin G2 has little effect on microtubule-polymerization by α and β-tubulin but specifically inhibits γ-tubulin function, this reagent is very useful for functional analysis of γ-tubulin.

* This product has been commercialized under the license from University of Tsukuba

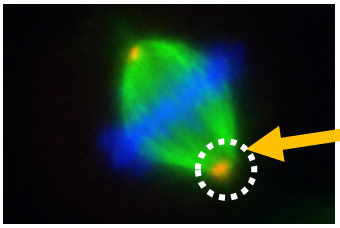
Background

γ-tubulin ?

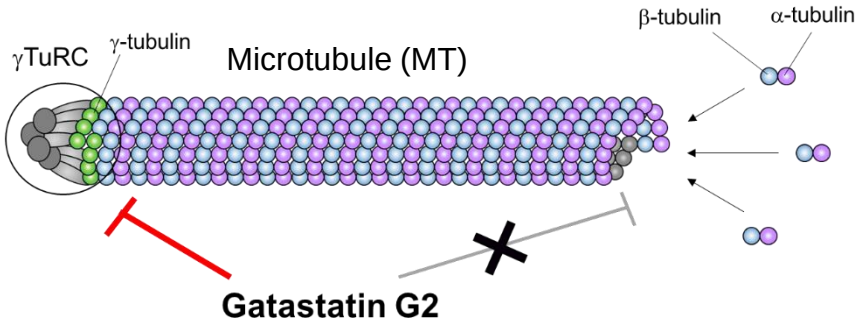
Among the member of the tubulin family, α-, β-, and γ-tubulins are ubiquitously expressed.
α- and β-tubulins form heterodimers (α/β-tubulin) and polymerized to microtubules (MTs).
On the other hand, γ-tubulin is not a component of MTs but plays a role to form γ-tubulin ring complex (γTuRC). γTuRC plays an important role as an initiation point of MT polymerization from centrosome.
However, the molecular mechanism of γ-tubulin-based MT initiation and regulation is still unclear.

Gatastatin?

Gatastatin was originally discovered in 2015 as the world's first γ-tubulin-specific inhibitor.
In 2020, a superior derivative of Gatastatin, called second generation Gatastatin (Gatastatin G2) was identified by Dr. Usui group at University of Tsukuba.
Gatastatin G2 shows about ten-folds higher inhibition activity than Gatastatin in cell-based experiments but has little effects on α/β-tubulin polymerization.



Microtubule/Centrosome/Chromosome



Features

- Specific inhibitor for γ-tubulin.
- Little effect on α/β-tubulin polymerization.
- Block nucleation of microtubule from centrosome.
- Induces abnormal chromosome alignment and multipolar formation in mitotic cells.
- Useful for functional analysis of γ-tubulin in mitosis.
- Immediate inhibitory effect compared with gene regulation approach, such as RNAi.

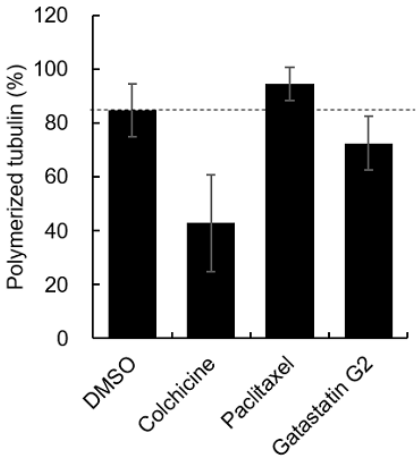
Original Paper

Shintani *et al., ACS Med. Chem. Lett.*, **11**, 1125-1129 (2020)

Specificity

Effect of Gatastatin G2 on MT polymerization *in vitro*

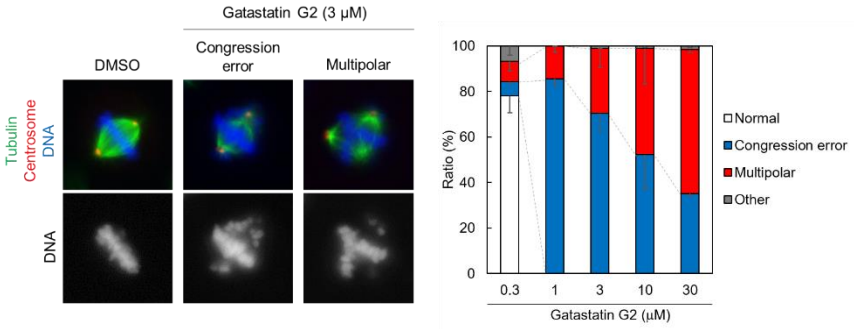
Purified tubulin (1 mg/ml) from porcine brain was polymerized by 0.8 M glutamate for 30 min at 37°C with or without 10 μM colchicine (an inhibitor of MT), 10 μM paclitaxel (an activator of MT polymerization) and 30 μM Gatastatin G2. Polymerized and unpolymerized tubulins were separated by ultracentrifugation.
Polymerization ratio (%) was estimated by SDS-PAGE. Colchicine clearly inhibited MT polymerization, paclitaxel promoted MT polymerization but Gatastatin G2 showed little effect on MT polymerization.



Application Data

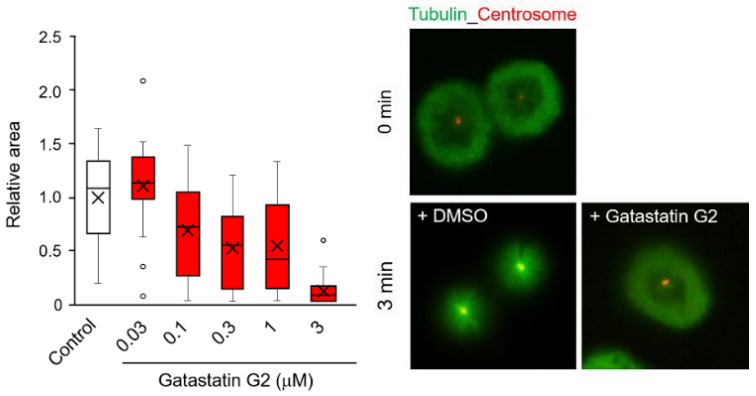
Gatastatin G2 induced abnormal spindle formation in mitotic cells

Gatastatin G2 treated HeLa cells were fixed and stained with anti-α-tubulin (spindle fibers), anti-pericentrin (centrosome) and DAPI (chromosomal DNAs). The resulting spindle morphology was classified and quantified.
At the lower concentration of Gatastatin G2, misaligned chromosomes were mainly observed. On the other hand, high concentration often induced multipolar spindle formation rather than congression error. Multipolar induction was clearly dose-dependently observed. This experiment suggests γ-tubulin regulates both chromosome movement and normal bipolar formation in mitotic cells.



Gatastatin G2 blocks centrosome-derived MT formation in mitotic cells

HeLa cells were cultured and subsequently treated with *S*-trityl-*L*-cysteine (STLC) Then, the cells were washed with ice-cold medium and incubated on ice to depolymerized MT. The cells were treated with 1% DMSO, or 0.03-3 μM Gatastatin G2 for 15 min on ice. After drug treatment, the cell media was exchanged with warm (30°C) media containing drugs and the cells were further cultured at 30°C for 3 min. The cells were fixed and stained with anti-α-tubulin and anti-pericentrin for centrosomes. Gatastatin G2 clearly inhibited MT initiation from centrosomes dose-dependently in mitotic cells.



Product Information

[Manufacturer : FNA]

Product Name	Code	Size	Storage
Gatastatin G2 <γ-Tubulin Inhibitor>	FDV-0040	0.1 mg	-20℃

NOTE

※ All products here are research use only, not for diagnostic use.
※ Specs might be changed for improvement without notice.
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