Growth Inhibitory Effect of Anti-cancer drug against Human Peritoneal Metastatic Pancreatic Cancer Cell Lines

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COI Disclosure Information

Lead Presenter/Responsible Researcher:

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I have no financial relationships to disclose.

Objective

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Evaluations of in vitro pharmacological effects of anticancer drugs are often conducted using cells obtained from cell banks; however, the effects of anticancer drugs on cell lines that were passaged for many years do not always coincide with their clinical effects. Furthermore, the number of established cell lines clarified as those derived from metastatic cancer is limited.

In this study, the effects of anticancer drugs were investigated using peritoneal metastatic pancreatic cancer cells (23 strains) that were established at the National Cancer Center (NCC) in the past few years and passaged within 15 generations.

Materials and Methods

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Cells

Peritoneal metastatic pancreatic cancer cells (PMPCC) :
23 strains
Pancreatic cancer cells (PCCs)(Purchased from ATCC) :
MIA PaCa-2, PANC-1, HPAC and BxPC-3

Culture conditions

Cells were cultivated statically in a CO_2 incubator set at 37.0℃ and 5.0% CO_2 under a humidified condition.

Anticancer drugs

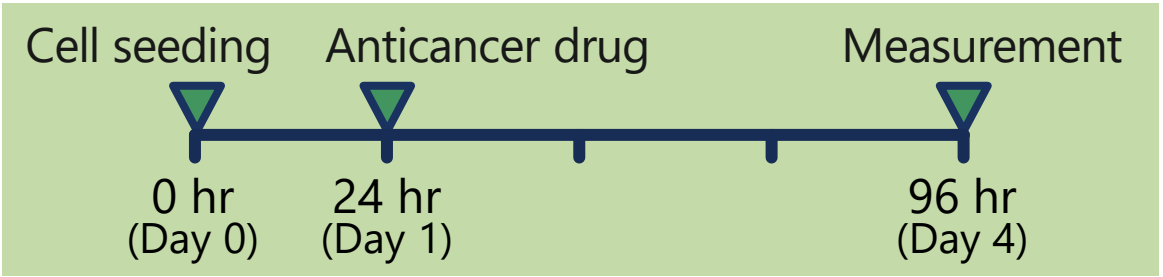
Cisplatin[a)] : 0.391 to 100 μM (common ratio 2),
Docetaxel[a)] : 3.91 to 1000 pM (common ratio 2),
Gemcitabine[a)] : 0.0000565 to 3.33 μM (common ratio 3)

a) Tokyo Chemical Industry Co., Ltd.

Evaluation of cell viability

CellTiter-Glo Luminesent Cell viability Assay (Promega K.K.)

Experimental design



Cell proliferation assay was performed three times on three separate days per cells.

Calculation of cell proliferation rate and IC_{50}

Cell proliferation rate (%)

$$= 100 \times [(T - B_4) - D_1] / [(C_4 - B_4) - D_1]$$

T: Luminescence intensity (LI) of anticancer drug, C_4: Mean LI value of the control group of Day 4, B_4: Mean LI value of the blank group of Day 4, B_1: Mean LI value of the blank group of Day 1, C_1: Mean LI value of the control group of Day 1, D_1: LI of Day 1

IC_{50} was calculated by using SAS 9.4 (SAS Institute Japan Ltd., EXSUS Version 8.1.0 [CAC Croit Corporation]

Results (1)

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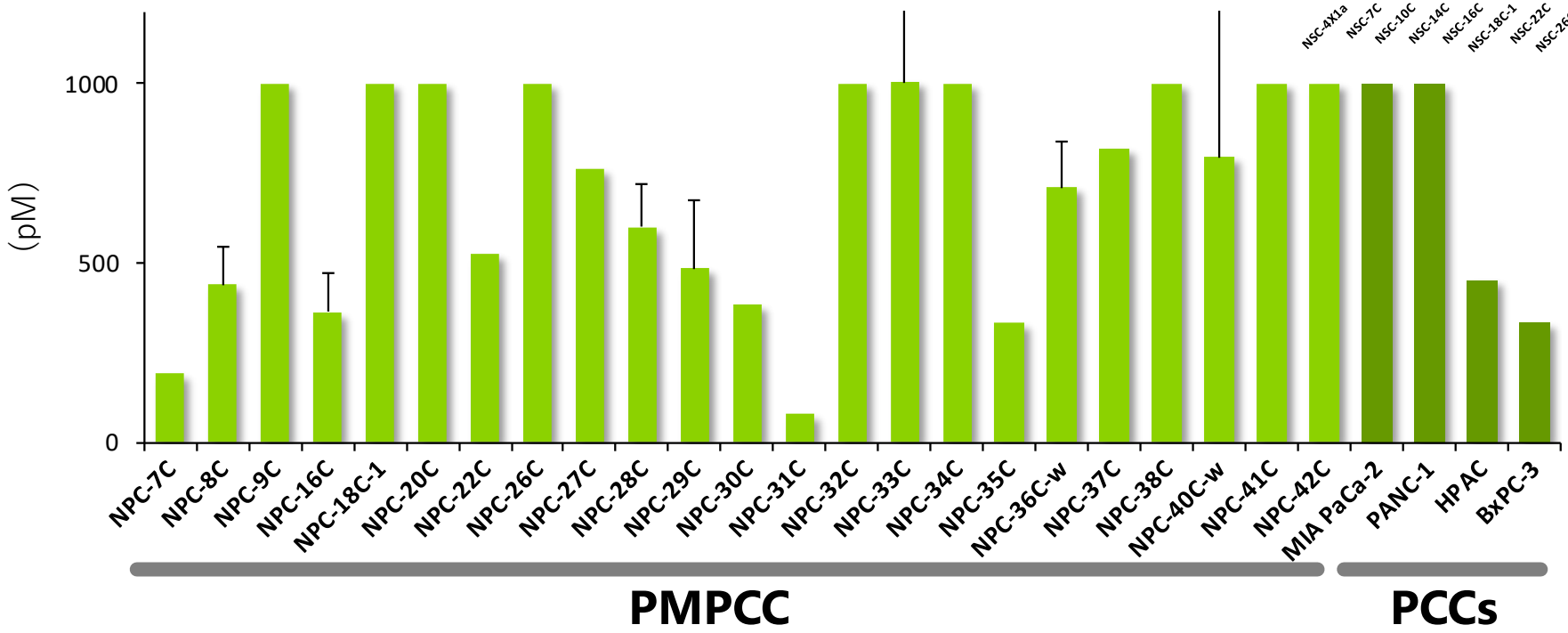
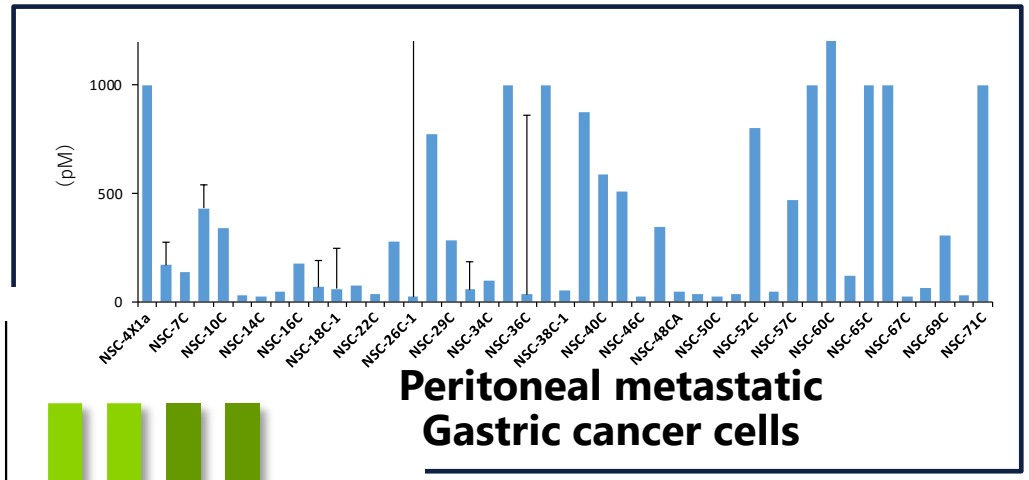
IC_{50} in cell growth inhibitory effects of Docetaxel to PMPCC and PCCs





Data represent the mean ± standard deviations. Bars without standard deviation represent duplicate data or singlicate data.

Results (2)

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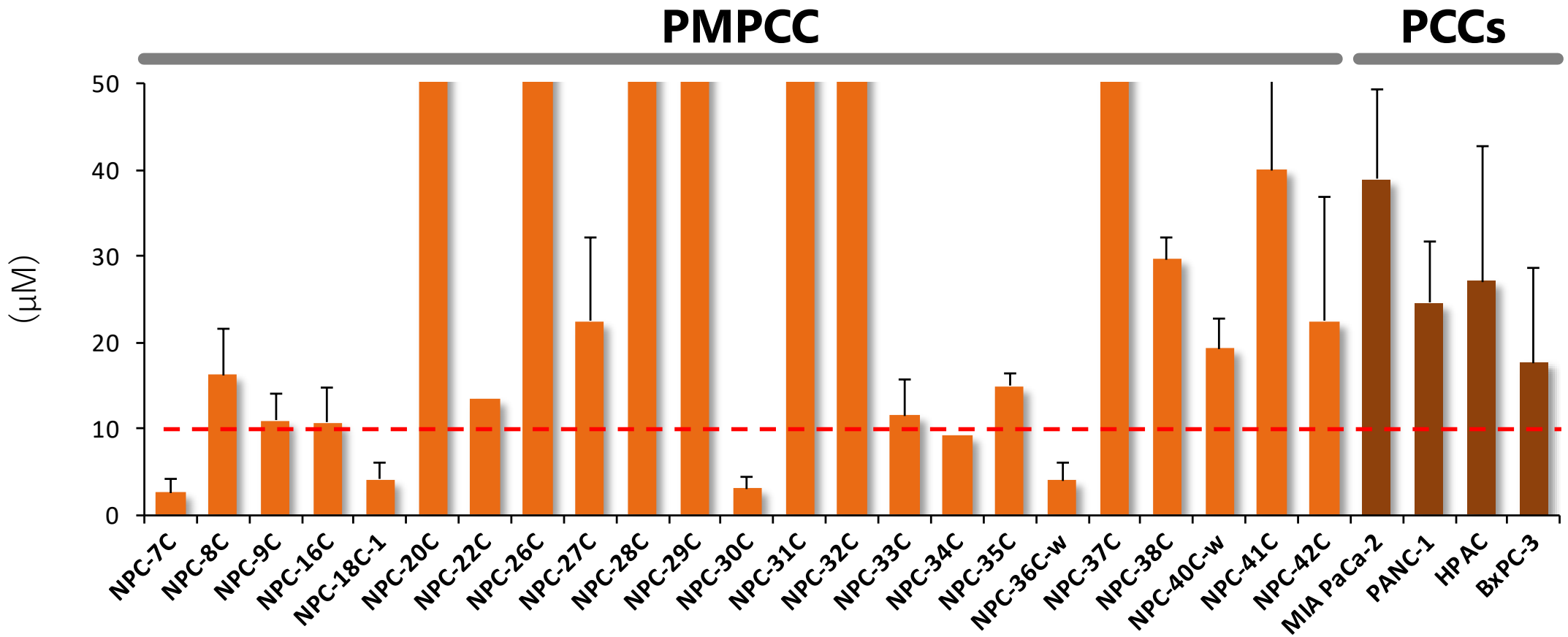
IC_{50} in cell growth inhibitory effect of Cisplatin to PMPCC and PCCs



Data represent the mean ± standard deviations. Bars without standard deviation represent duplicate data or singlicate data.

Results (3)

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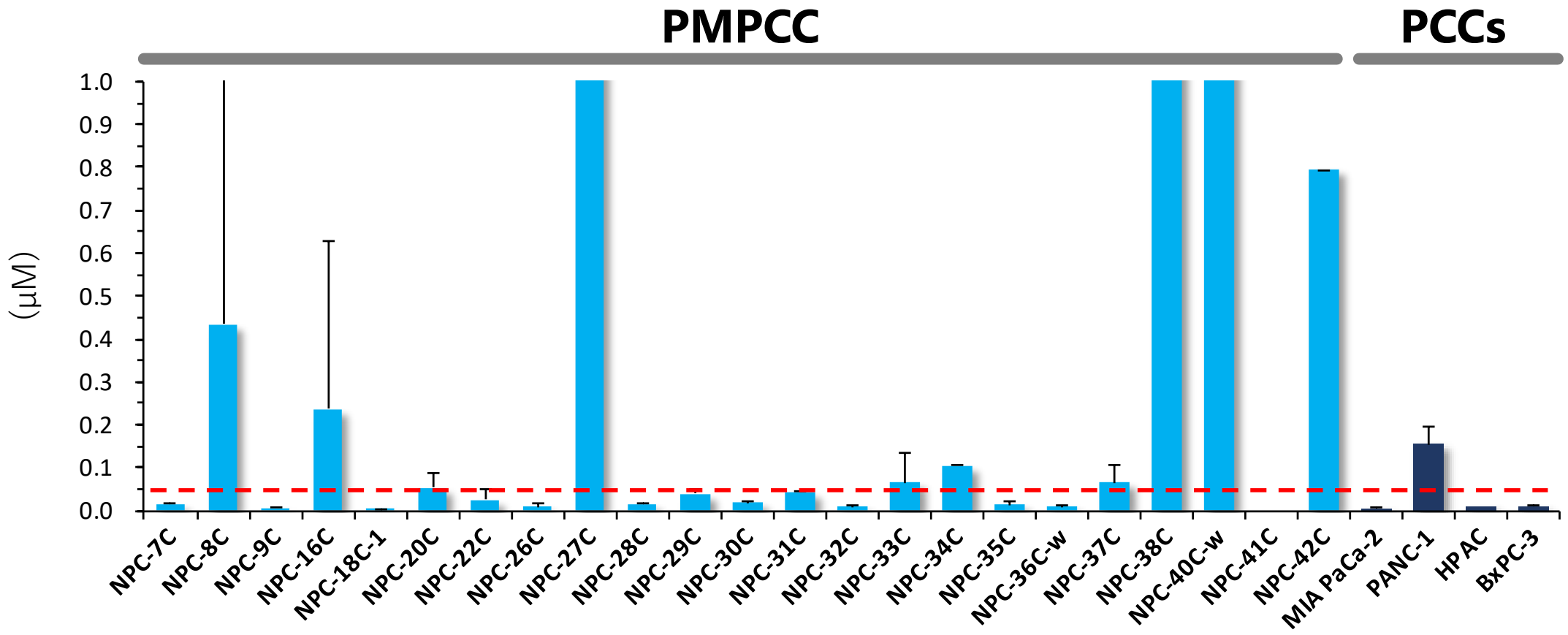
IC_{50} in cell growth inhibitory activity of Gemcitabine to PMPCC and PCCs



Data represent the mean ± standard deviations. Bars without standard deviation represent duplicate data or singlicate data.

Results and Conclusion

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- **An effect of docetaxel was noted in one of 23 strains, that of cisplatin was noted in 8 out of 23 strains, but the effect was weak in 15 strains as with docetaxel, and that of gemcitabine was noted in 15 out of 23 strains, but effect was weak in 7 strains.**
- **Comparing these results with the effect of anticancer drugs on PMPCC, it was clarified that docetaxel has almost no effect on PMPCC.**
  Also, the number of PMPCC that showed an effect on gemcitabine was higher than that on cisplatin.
- **An effect of docetaxel was noted in 2 of 4 PCCs, that of cisplatin was noted all of PCCs, and that of gemcitabine noted 3 of 4 PCCs.**
  It was thought that cell lines were sensitive to anticancer drugs.

We have concluded that a panel test using 23 PMPCC is useful and valid.