CLAIMS

WHAT IS CLAIMED IS:

1. Use of a therapeutic agent that causes a difference in expression or activity of protein kinase, membrane associated tyrosine/threonine 1 (PKMYT1) or WEE1 G2 checkpoint kinase (WEE1), in the manufacture of a medicament for treating cancer in a subject having or suspecting of having said cancer, wherein said cancer comprises a cell comprising a difference in expression or activity of Protein Phosphatase 2 (PP2A) or a PP2A subunit, or comprises a mutation or deletion of a nucleic acid encoding said PP2A subunit as compared to a non-cancer control; and wherein a therapeutically effective amount of the therapeutic agent is to be administered to the subject.

2. The use of claim 1, wherein said cell comprises said difference in expression or activity of Protein Phosphatase 2 (PP2A) or said PP2A subunit.

3. The use of claim 2, wherein said difference in expression or activity of PP2A or said subunit comprises a decrease in said expression or activity.

4. The use of claim 1, wherein said cell comprises said mutation or deletion of said nucleic acid encoding said PP2A subunit.

5. The use of claim 1, further comprising identifying said cancer as comprising said cell comprising said difference in expression or activity of PP2A or said PP2A submit, or as comprising said mutation or deletion of said nucleic acid encoding said PP2A subunit.

6. The use of claim 1, wherein said therapeutic agent comprises a small molecule, a protein, or a nucleic acid.

7. The use of claim 6, wherein said therapeutic agent comprises a small molecule.

8. The use of claim 7, wherein said small molecule comprises a PKMYT1 inhibitor.

9. The use of claim 8, wherein said PKMYT1 inhibitor comprises 5-((5-methoxy-2-((4-morpholinophenyl)amino)pyrimidin-4-yl)amino)-2-methylphenol, *N*-(2-chloro-6-methylphenyl)-2-((6-(4-(2-hydroxyethyl)piperazin-1-yl)-2-methylpyrimidin-4-yl)amino)thiazole-5-carboxamide (dasatinib), 4-((2,4-dichloro-5-methoxyphenyl)amino)-6-methoxy-7-(3-(4-methylpiperazin-1-yl)propoxy)quinoline-3-carbonitrile (bosutinib), *N*-(5-chlorobenzo[*d*][1,3]dioxol-4-yl)-7-(2-(4-methylpiperazin-1-yl)ethoxy)-5-((tetrahydro-2*H*-pyran-4-yl)oxy)quinazolin-4-amine (saracatinib), (*E*)-*N*-(4-((3-chloro-4-fluorophenyl)amino)-3-cyano-7-ethoxyquinolin-6-yl)-4-(dimethylamino)but-2-enamide (pelitinib), *N*-(3-chlorophenyl)-6,7-dimethoxyquinazolin-4-amine (tyrphostin AG 1478), 6-

(2,6-dichlorophenyl)-2-((4-(2-(diethylamino)ethoxy)phenyl)amino)-8-methylpyrido[2,3-*d*]pyrimidin-7(8*H*)-one (PD-0166285), 6-(2,6-dichlorophenyl)-8-methyl-2-((4-morpholinophenyl)amino)pyrido[2,3-*d*]pyrimidin-7(8*H*)-one (PD-173952), 6-(2,6-dichlorophenyl)-8-methyl-2-((3-(methylthio)phenyl)amino)pyrido[2,3-*d*]pyrimidin-7(8*H*)-one (PD-173955), or 6-(2,6-dichlorophenyl)-2-((4-fluoro-3-methylphenyl)amino)-8-methylpyrido[2,3-*d*]pyrimidin-7(8*H*)-one (PD-180970).

10. The use of claim 7, wherein said small molecule comprises a WEE1 inhibitor.

11. The use of claim 10, wherein said WEE1 inhibitor comprises 6-(2,6-dichlorophenyl)-2-((4-(2-(diethylamino)ethoxy)phenyl)amino)-8-methylpyrido[2,3-*d*]pyrimidin-7(8*H*)-one (PD-0166285), 2-allyl-1-(6-(2-hydroxypropan-2-yl)pyridin-2-yl)-6-((4-(4-methylpiperazin-1-yl)phenyl)amino)-1,2-dihydro-3*H*-pyrazolo[3,4-*d*]pyrimidin-3-one (MK-1775), 9-hydroxy-4-phenylpyrrolo[3,4-*c*]carbazole-1,3(2*H*,6*H*)-dione (PD-407824), 6-butyl-4-(2-chlorophenyl)-9-hydroxypyrrolo[3,4-*c*]carbazole-1,3(2*H*,6*H*)-dione, or 6-(2-chloro-6-fluorophenyl)-2-((2,4,4-trimethyl-1,2,3,4-tetrahydroisoquinolin-7-yl)amino)imidazo[1,2-*a*]pyrimido[5,4-*e*]pyrimidin-5(6*H*)-one.

12. The use of claim 1, wherein said cell comprises said difference in expression or activity of said PP2A subunit, or comprises said mutation or deletion of said nucleic encoding said PP2A; and

wherein said PP2A subunit is selected from the group consisting of 65 kDa regulatory subunit A alpha (PPP2R1A), 65 kDa regulatory subunit A beta (PPP2R1B), 55 kDa regulatory subunit B alpha (PPP2R2A), 55 kDa regulatory subunit B beta (PPP2R2B), 55 kDa regulatory subunit B gamma (PPP2R2C), 55 kDa regulatory subunit B delta (PPP2R2D), 72/130 kDa regulatory subunit B (PPP2R3A), 48 kDa regulatory subunit B (PPP2R3B), regulatory subunit B" subunit gamma (PPP2R3C), regulatory subunit B' (PPP2R4), 56 kDa regulatory subunit alpha (PPP2R5A), 56 kDa regulatory subunit beta (PPP2R5B), 56 kDa regulatory subunit gamma (PPP2R5C), 56 kDa regulatory subunit delta (PPP2R5D), 56 kDa regulatory subunit epsilon (PPP2R5E), catalytic subunit alpha (PPP2CA), and catalytic subunit beta (PPP2CB).

13. The use of claim 12, wherein said PP2A subunit comprises PPP2R1A.

14. The use of claim 12, wherein said PP2A subunit comprises PPP2R2A.

15. The use of claim 1, wherein a therapeutically effective amount of a second therapeutic agent comprising an anti-cancer agent is to be further administered to said subject.

16. The use of claim 1, wherein said cancer comprises a cancerous tissue comprising said cell.

17. The use of claim 16, wherein said cancerous tissue comprises breast tissue, pancreatic tissue, uterine tissue, bladder tissue, colorectal tissue, prostate tissue, liver tissue, or ovarian tissue.

18. The use of claim 16, wherein said cancerous tissue is liver tissue.

19. The use of claim 16, wherein said cancerous tissue is ovarian tissue.

20. The use of claim 1, wherein said subject has said cancer, and said administration reduces proliferation or viability of said cancer.