SUPPLEMENTARY INFORMATION

Synthesis of compounds 5-33

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-5,6-dimethyl-4nitropyridazin-3-amine (5)

2,3-Butanedione (164mg, 1.9mmol) was dissolved in abs. ethanol (45mL). A solution of (**4**) (600mg, 1.9mmol) in abs. ethanol (5mL) and benzyltrimethyl ammonium hydroxide (318mg, 2.8 mmol) was added slowly. This mixture was stirred at room temperature for 8 hours. The solution was added into brine (80mL) and the resulting solution was extracted into ethyl acetate (60mL), the organic layer was separated, dried over $MgSO_4$ and concentrated to dryness. The crude residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted with 6:1 ethyl acetate/methanol to yield N-(2((5-((dimethylamino)methyl)furan-2-yl)methyl-thio)ethyl)-5,6-dimethyl-4-nitropyrida zin-3-amine (**6**) as an dark yellow oil (100mg, 14.4%); ^{1}H NMR(300MHz, $CDCl_3$) δ 2.23 (s, 6H, N(CH_3)$_2$), 2.25(s, 3H, CH_3Ar), 2.57(s, 3H, CH_3Ar), 2.78(t, 2H, SCH_2CH_2), 3.42(s, 2H, CCH_2S), 3.67(s, 2H, $(CH_3)_2NCH_2NCH_2$), 3.72(t, 2H, CH_2CH_2NH), 6.08(s, 2H, ArH). HRMS: Obs. M+H, 365.1529. Calc. M+H, 365.1522.

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-5,6-diethyl-4-nitro pyridazine -3-amine (6)

3,4-Hexanedione(98%) (218mg, 1.9mmol) was dissolved in abs. ethanol (45mL). A solution of (**4**) (600mg, 1.9mmol) in abs. ethanol (5mL) and benzyltrimethyl ammonium

hydroxide (318mg, 2.8 mmol) was added slowly. This mixture was stirred at room temperature for 20 hours. The solution was added to brine (80mL) to aid in extraction and the resulting solution was extracted with ethyl acetate (120mL), the organic layer was separated, dried over $MgSO_4$ and concentrated to dryness. The crude residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted with 8:1 ethyl acetate/methanol to yield N N-(2-((5-((dimethylamino)methyl)furan-2yl)methylthio)ethyl)-5,6-diethyl-4-nitropyridazin-3-amine (**6**) as a yellow solid (70mg, 9.4%); mp: 53-55ºC; ^{1}H NMR(300MHz, $CDCl_3$) δ 1.27(t, 3H, $ArCH_2CH_3$), 1.39(t, 3H, $ArCH_2CH_3$), 2.24 (s, 6H, $N(CH_3)_2$), 2.65(q, 2H, $ArCH_2CH_3$), 2.85(t, 2H, SCH_2CH_2), 2.95(q, 2H, $ArCH_2CH_3$), 3.42(s, 2H, CCH_2S), 3.73(s, 2H, $(CH_3)_2NCH_2NCH_2$), 3.78(t, 2H, CH_2CH_2NH), 5.09(br.t, 1H, ArNH), 6.09(d, 2H, ArH), 6.14(d, 2H, ArH). HRMS: Obs. M+H, 394.1922. Calc. M+H, 394.1913

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-6-methyl-4nitropyridazin-3-amine (7)

To a solution of (**4**) (1g, 3.2mmol) and pyruvic aldehyde 40% solution in water (920mg, 6.4mmol) in dichloromethane (80mL) at 0ºC, benzyltrimethyl ammonium hydroxide (795mg, 4.7mmol) was added. After being stirred for a period of 6 hours at room temperature, the organic layer was separated and washed with brine (140mL), dried over $MgSO_4$ and concentrated to dryness. The crude residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted with 6:1 ethyl acetate/methanol. Evaporation of the solvent yielded N-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio) ethyl)-6-methyl-4-nitropyridazin-3-amine (**7**) as a dark yellow oil (180mg,

16.4%); ^{1}H NMR (300MHz, $CDCl_3$) δ 2.18 (s, 6H, N(CH_3)$_2$), 2.66(s, 3H, CH_3Ar), 2.84(t, 2H, S$CH_2$$CH_2$), 3.37(s, 2H, C$CH_2$S), 3.71(s, 2H, ($CH_3$)$_2NCH_2NCH_2$), 3.88(t, 2H, $CH_2$$CH_2$NH), 6.04(d, 1H, ArH), 6.09(d, 1H, ArH), 7.70(br.s, 1H, N*H*Ar), 7.76(s, 1H, ArH). ^{13}C NMR(500MHz, $CDCl_3$) δ 20.9, 28.2, 30.9, 40.3, 44.9(2C), 55.7, 108.4, 109.6, 120.8, 131.4, 149.1, 151.0(2C), 151.9. HRMS: Obs. M+H, 352.1437. Calc. M+H, 352.1443.

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-4-nitro-6phenylpyridazin-3-amine (8) and N-(2-((5-((dimethylamino)methyl)furan-2yl)methylthio)ethyl)-4-nitro-5-phenylpyridazin-3-amine (9)

To a solution of (**4**) (1.7g, 5.4mmol) and phenylglyoxal monohydrate (820mg, 6.4mmol) in the mixture of ethanol (50mL) and water(50mL) at room temperature, sodium carbonate (446mg, 6.4mmol) was added. After being stirred for a period of 3 hours at room temperature, the solution was added to brine (40mL) to aid in extraction and the resulting solution was washed by ethyl acetate (100mL). The organic layer was separated, dried over $MgSO_4$ and concentrated to dryness. The crude residue was purified by flash column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted sequentially with 20:1 ethyl acetate/methanol, 6:1 ethyl acetate/methanol, and 4:1 ethyl acetate/methanol. Evaporation of the solvent of the first fraction yielded N-(2-((5-((dimethylamino)methyl)furan-2-yl) methylthio)ethyl)-4-nitro-6-phenyl pyridazin-3amine (**8**) as a dark orange oil (20mg, 0.9%). The second fraction gave N-(2-((5((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-4-nitro-5-phenylpy -ridazin-3amine (**9**) as an orange oil (280mg, 13.5%); (**8**) ^{1}H NMR(300MHz, $CDCl_3$) δ 2.18 (s, 6H, N(CH_3)$_2$), 2.90(t, 2H, S$CH_2$$CH_2$), 3.37(s, 2H, C$CH_2$S), 3.72(s, 2H, ($CH_3$)$_2NCH_2NCH_2$), 3.98(t, 2H, $CH_2$$CH_2$NH), 6.04(d, 1H, ArH), 6.09(d, 1H, ArH), 7.40-

7.49(m, 3H, ArH), 7.93-8.01(m, 2H, ArH), **8.32(s, 1H, ArH)**. 13C NMR(500MHz, CDCl3) δ 28.2, 31.1, 40.5, 44.9(2C), 55.8, 108.3, 109.5, **118.1**, 126.0(2C), 129.1(2C), 129.5, 131.7, 135.0, 149.4, 150.9, 151.6, 152.1. HRMS: Obs. M+H, 414.1605. Calc. M+H, 414.1600. (9) 1H NMR(300MHz, CDCl3) δ 2.25 (s, 6H, N(CH3)2), 2.90(t, 2H, SCH_2CH_2), 3.43(s, 2H, CCH_2S), 3.77(s, 2H, $(CH_3)_2NCH_2NCH_2$), 3.87(t, 2H, CH_2CH_2NH), 6.12(d, 1H, ArH), 6.17(d, 1H, ArH), 7.32-7.37(m, 2H, ArH), 7.47-7.52(m, 3H, ArH), **8.75(s, 1H, ArH**). 13CNMR(500MHz, CDCl3) δ 28.0, 30.6, 40.7, 44.6(2C), 55.4, 108.4, 127.6(3C), 129.3(3C), 130.1, 132.4, 133.1, **144.3,** 149.1, 151.3. HRMS: Obs. M+H, 414.1596. Calc. M+H, 414.1600.

N-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-5-methyl-4-nitro-6-phenylpyridazin-3-amine (10) and N-(2-((5-((dimethylamino)methyl)furan-2yl)methylthio)ethyl)-6-methyl-4-nitro-5-phenylpyridazin-3-amine (11)

To a solution of (**4**) (1.0g, 3.2mmol) in dichloromethane(60mL), 1-phenyl-1,2propanedione(470mg, 3.2mmol) and benzyltrimethyl ammonium hydroxide (881mg, 4.8mmol) were added slowly. After being stirred for a period of 3 hours at room temperature, the solution was washed with brine (60mL) and the organic layer was separated, dried over $MgSO_4$ and concentrated to dryness. The crude residue was purified by flash column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted with 20:1 ethyl acetate/methanol, 6:1 ethyl acetate/methanol. Evaporation of the solvent yielded N-(2-((5((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-5-methyl-4-nitro-6-phenylpyridazin-3-amine (**10**) as an orange oil (240mg, 17.7%) and N-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-6-methyl-4-nitro-5-phenylpyridazine-

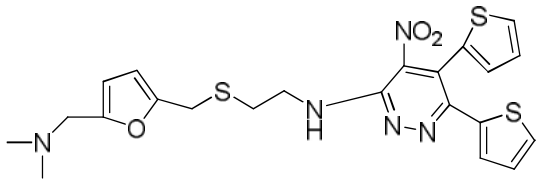
3-amine (**11**) as an orange oil (125mg, 9.2%); (**10**) ^{1}H NMR(500MHz, $CDCl_3$) δ 2.17 (s, 6H, N(CH_3)$_2$), **2.28** (s, 3H, ArCH_3), 2.82(t, 2H, SCH_2CH_2), 3.36(s, 2H, CCH_2S), 3.69(s, 2H, $(CH_3)_2NCH_2NCH_2$), 3.80(t, 2H, CH_2CH_2NH), 6.04(d, 1H, ArH), 6.08(d, 1H, ArH), 6.36 (br.s, 1H, N*H*Ar), 7.36-7.44(m, 5H, Ar'H). ^{13}C NMR(500MHz, $CDCl_3$) δ **16.4**, 28.1, 30.9, 40.5, 44.9(2C), 55.8, 108.3, 109.6, 128.5(2C), 128.9, 129.4(3C), 136.1, 136.3, 148.2, 151.0, 151.9, 155.6. HRMS: Obs. M+H, 428.1750. Calc. M+H, 428.1756. (**11**) ^{1}H NMR(500MHz, $CDCl_3$) δ 2.17 (s, 6H, N(CH_3)$_2$), **2.33**(s, 3H, ArCH_3), 2.81(t, 2H, SCH_2CH_2), 3.36(s, 2H, CCH_2S), 3.68(s, 2H, $(CH_3)_2NCH_2NCH_2$), 3.75(t, 2H, CH_2CH_2NH), 6.04(d, 1H, ArH), 6.09(d, 1H, ArH), 7.11-7.39(m, 5H, Ar'H). ^{13}C NMR(500MHz, $CDCl_3$) δ **20.5**, 28.1, 30.9, 40.5, 44.9(2C), 55.8, 108.3, 109.6, 127.6(2C), 128.3, 129.1(2C), 131.8, 132.4, 133.1, 148.1, 151.1, 151.2, 151.9. HRMS: Obs. M+H, 428.1761. Calc. M+H, 428.1756.

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-4-nitro-5,6-diphenyl pyridazin-3-amine (12)

Benzil (53.3mg, 0.25mmol) was dissolved in abs. ethanol (6mL) and water (3mL). A solution of (**4**) (80mg, 0.25mmol) in abs. ethanol (1mL) and sodium carbonate (20mg, 0.25 mmol) was added slowly. This mixture was stirred at room temperature for 5 hours. The solution was added in brine (10mL) and the resulting solution was extracted into by dichloromethane (20mL), the organic layer was separated, dried over $MgSO_4$ and concentrated to dryness. The crude residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted with 20:1 ethyl acetate/methanol. Evaporation of the solvent yielded N-(2-((5-((dimethylamino)methyl)furan-2yl)methylthio)ethyl)-4-nitro-5,6-diphenyl pyridazin-3-amine (**13**) as an orange oil (50mg, 40%); ^{1}H NMR(300MHz, CDCl3) δ 2.24 (s,

6H, $N(CH_3)_2$), 2.93(t, 2H, SCH_2CH_2), 3.42(s, 2H, CCH_2S), 3.78(s, 2H, $(CH_3)_2NCH_2NCH_2$), 3.98(t, 2H, CH_2CH_2NH), 6.12(d, 1H, ArH), 6.17(d, 1H, ArH), 7.08-7.36(m, 1H, ArH). HRMS: Obs. M+H, 490.1906. Calc. M+H, 490.1913.

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-4-nitro-5,6di(thiophen-2-yl)pyridazin-3-amine (13)



To a solution of (**4**) (315mg, 1.0mmol) in the mixture of ethanol (30mL) and water (10mL) at room temperature, 2,2'-thenil (223mg, 1.5mmol) and sodium carbonate (124mg, 1.5mmol) was added. After being stirred for a period of 8 hours at room temperature, the solution was added to brine (40mL) to aid in extraction and the resulting solution was extracted with ethyl acetate (100mL). The organic layer was separated, dried over $MgSO_4$ and concentrated to dryness. The crude residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted sequentially with 8:1 ethyl acetate/methanol, 6:1 ethyl acetate/methanol. Evaporation of the solvent yielded N-(2-((5((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-4-nitro-5,6-di(thiophen-2-yl) pyridazin-3-amine (**13**) as an orange solid (100mg, 20%), mp:53-55ºC. 1H NMR(300MHz, CDCl3) δ 2.18 (s, 6H, $N(CH_3)_2$), 2.84(t, 2H, SCH_2CH_2), 3.36(s, 2H, CCH_2S), 3.69(s, 2H, $(CH_3)_2NCH_2$), 3.77(t, 2H, CH_2CH_2NH), 5.19(br.t, 1H, ArNH), 6.05(d, 1H, ArH), 6.09(d, 1H, ArH), 6.45(d, 1H, Ar''H), 6.80(t, 1H, Ar'H), 7.03-7.08(m, 2H, Ar'H and Ar''H), 7.25(d, 1H, Ar''H), 7.50(d, 1H, Ar'H). HRMS: Obs. M+H, 502.1048. Calc. M+H, 502.1041.

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)pyrimidin-2-amine (14)

A solution of (**2**) (120mg, 0.61mmol) in ethanol (4mL) was treated with 2-chloropyrimidine (88mg, 0.77mmol). The mixture was refluxed for 4 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted with 7:1 ethyl acetate/methanol. Evaporation of the solvent yielded N-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)pyrimidin-2-amine (**14**) as a yellow oil (15mg, 9.2%). ^{1}H NMR(300MHz, $CDCl_3$) δ 2.20 (s, 6H, N(CH_3)$_2$), 2.68(t, 2H, S$CH_2$$CH_2$), 3.38(s, 2H, C$CH_2$S), 3.50(s, 2H, ($CH_3$)$_2NCH_2$), 3.67(q, 2H, $CH_2$$CH_2$NH), 6.05(s, 2H, 2ArH), 6.46(t, 1H, ArH), 8.20 (d, 2H, 2ArH).HRMS: Obs. M+H, 293.1426. Calc. M+H, 293.1436.

2-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethylamino)nicotine nitrile(15)

A solution of (**2**) (230mg, 1mmol) in ethanol (5mL) was treated with 2-chloro3-cyanopyridine (149mg, 1mmol) and triethylamine (0.15mL). The mixture was refluxed for 7 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted with 12:1 dichloromethane/methanol. Evaporation of the solvent yielded 2-(2-((5((dimethylamino)methyl)furan-2-yl)methyl thio)ethylamino)nicotinonitrile (**15**) as a yellow oil (76mg, 22.4%); ^{1}H NMR(300MHz, $CDCl_3$) δ 2.19 (s, 6H, N(CH_3)$_2$), 2.71(t, 2H, S$CH_2$$CH_2$), 3.36(s, 2H, C$CH_2$S), 3.58(q, 2H, $CH_2$$CH_2$NH), 3.68(s, 2H, ($CH_3$)$_2NCH_2$), 5.50(br.s 1H, NHAr),

6.04(s, 1H, ArH), 6.08(s, 1H, ArH), 6.54(q, 1H, ArH), 7.58(dd, 1H, ArH), 8.20 (dd, 1H, 2ArH).HRMS: Obs. M+H, 317.1443. Calc. M+H, 317.1436.

6-Chloro-N-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio)ethyl) pyridazin-3-amine (16)

A solution of (**2**) (1g, 4.7mmol) in ethanol (20mL) was treated with 3,6-dichloropyridazine (695mg, 4.7mmol). The mixture was refluxed for 15 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted sequentially with 8:1 ethyl acetate/methanol, 6:1 ethyl acetate/methanol. Evaporation of the solvent yielded 6-chloro-N-(2-((5((dimethylamino) methyl)furan-2-yl)methylthio)ethyl)pyridazin-3-amine (**16**) as a pale yellow solid (560mg, 37%), mp:53-55ºC. ^{1}H NMR(300MHz, $CDCl_3$) δ 2.26 (s, 6H, $N(CH_3)_2$), 2.83(t, 2H, SCH_2CH_2), 3.42(s, 2H, CCH_2S), 3.55(q, 2H, CH_2CH_2NH), 3.73(s, 2H, $(CH_3)_2NCH_2$), 6.13(s, 2H, 2ArH), 6.63(d, 1H, ArH), 7.13 (d, 1H, ArH). HRMS: Obs. M+H, 327.1042. Calc. M+H, 327.1046.

N^5-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-1,2,4-oxadiazole3,5-diamine (17)

To a stirred solution of (**20**) (200mg, 0.64mmol) in ethanol (15mL), hydroxylamine hydrochloride (155mg, 2.2mmol) and triethylamine (226mg, 2.2mmol) was added. After being stirred for a period of 20 hours, the mixture was evaporated under reduced pressure. The resulting residue dissolved into dichloromethane (15mL) and washed sequentially by saturated aqueous sodium bicarbonate and brine (15mL), and then the organic layer was dried over $MgSO_4$. The

solvent was evaporated under reduced pressure and purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted with 10:1 dichloromethane/methanol. Evaporation of the solvent yielded N^5-(2-((5-((dimethylamino)methyl)furan-2-yl)methyl thio)ethyl)-1,2,4-oxadiazole-3,5-diamine (**17**) as a pale yellow solid (130mg, 68.0%); mp:73-74ºC; ^{1}H NMR(300MHz, $CDCl_3$) δ 2.30 (s, 6H, $N(CH_3)_2$), 2.85(t, 2H, SCH_2CH_2), 3.34(t,2H, CH_2CH_2NH), 3.43(s, 2H, CCH_2S), 3.73(s, 2H, $(CH_3)_2NCH_2$), 4.28 (s, 2H, $ArNH_2$), 6.13(d, 1H, ArH), 6.17(d, 1H, ArH), 7.33(br.s, 1H, NHAr). HRMS: Obs. M+H, 298.1332. Calc. M+H, 298.1337.

N^5-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-1H-1,2,4-triazole-3,5-diamine (18)

To a refluxing solution of dimethyl cyanocarbonimidodithioate (1g, 7mmol) in acetonitrile (80ml), a solution of (**2**) (1g, 4.7mmol) in acetonitrile was added slowly. After being stirred for a period of 8 hours at 90ºC, the mixture was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted with 10:1 dichloromethane/methanol. Evaporation of the solvent yielded methyl N'cyano-N-(2-((5-((dimethylamino)methyl)furan-2yl)methylthio)ethyl)carbamimidothioate (**34**) as an orange oil(200mg, 13.8%); oil(200mg, 13.8%); 1HNMR(300 MHz, CDCl3) δ 2.26 (s, 6H, N(CH3)2), 2.59 (s, 3H, NC=CSCH3), 2.75(t, 2H, SCH2CH2), 3.32(t, 2H, CH2CH2NH), 3.41(s, 2H, ArCH2S), 3.72(s, 2H, (CH3)2NCH2), 6.14(s, 2H, 2ArH).

To a stirred solution of (20) (200mg, 0.64mmol) in ethanol (15mL), hydrazine hydrate (64%) (80mg, 1.2mmol) in ethanol (5mL) was slowly added. After being refluxed for a period of 20 hours, the reaction solution was added into brine (10mL) and extracted by dichloromethane

(30mL). The organic layer was collected and dried over $MgSO_4$. The solvent was evaporated under reduced pressure and yielded N^5-(2((5-((dimethylamino) methyl)furan-2-yl)methylthio)ethyl)-1H-1,2,4-triazole-3,5diamine (**18**) as a white foam (120mg, 63.2%); mp:83-84ºC; ^{1}H NMR(300MHz, $CDCl_3$) δ 2.25(s, 1H, ArH), 2.33 (s, 6H, $N(CH_3)_2$), 2.85(t, 2H, SCH_2CH_2), 3.40-3.46(m, 4H, CH_2CH_2NH, CCH_2S), 3.73(s, 2H, $(CH_3)_2NCH_2$), 3.93 (s, 2H, $ArNH_2$), 4.96(br.s, 1H, NHAr), 6.08(d, 1H, ArH), 6.13(d, 1H, ArH). HRMS: Obs. M+H, 297.1488. Calc. M+H, 297.1497.

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-2-nitro-1-(piperidin-1-yl)ethenamine (19)

To the refluxing solution of piperidine (98%) (89mg, 1mmol) in acetonitrile (10ml), a solution of (3) (332mg, 1mmol) in acetonitrile (10mL) was slowly added. This mixture was stirred for 12 hours and was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted with 4:1 ethyl acetate/methanol. Evaporation of the solvent yielded (E)-N-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-2-nitro-1-(piperidin-1yl)ethenamine(**19**) as a brown oil (230mg, 62.3%); 1H NMR(300MHz, CDCl3) δ1.65(s, 6H, CH2CH2CH2CH2CH2), 2.25(s, 6H, N(CH3)2), 2.75(t, 2H, SCH2CH2), 3.15(s, 4H, CH2CH2CH2CH2CH2), 3.37(t, 2H, CH2CH2NH), 3.42(s, 2H, CCH2S), 3.74(s, 2H, (CH3)2NCH2), 6.11(d, 1H, ArH), 6.15(d, 1H, ArH), 6.47(s, 1H, NHC=CHNO2), 9.60 (br.s, 1H, $NHC{=}CHNO_2$). HRMS: Obs. M+H, 369.1967. Calc. M+H, 369.1960.

1-(2-Benzylidenehydrazinyl)-N-(2-((5-((dimethylamino)methyl)furan-2yl)methylthio) ethyl)-2-nitroethenamine (20)

A solution of (**4**) (331mg, 1mmol) in ethanol (25mL) was treated with benzaldehyde (212mg, 2mmol) and glacial acetic acid (0.05mL). The mixture was refluxed for a period of 1 hour and the solvent was evaporated under reduced pressure. The residue was dissolved in dichloromethane (20mL) and washed sequentially by saturated aqueous sodium bicarbonate (20mL) and brine (20mL). The organic layer was dried over $MgSO_4$ and purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted with 22:1 dichloromethane/methanol. Evaporation of the solvent yielded 1-(2-benzylidenehydrazinyl)-N-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio) ethyl)-2-nitroethenamine (**20**) as a yellow solid (90mg, 22.4%); mp:97-99ºC; ^{1}H NMR(300MHz, $CDCl_3$) δ 2.24 (s, 6H, $N(CH_3)_2$), 2.83(t, 2H, SCH_2CH_2), 3.29(t, 2H, SCH_2CH_2), 3.42(s, 2H, CCH_2S), 3.76(s, 2H, $(CH_3)_2NCH_2$), 6.15(s, 1H, ArH), 6.16(s, 1H, ArH), 6.83 (br.t, 1H, $CH_2NH(NH)C=CHNO_2$), 7.44-7.70(m, 5H, 5ArH), 8.07(s, 1H, N=CHAr). HRMS: Obs. M+H, 404.1750. Calc. M+H, 404.1756.

N,N-Dimethyl-1-(5-((2-(6-methyl-5-methylene-3-(nitromethylene)-2,3-dihydro-1,2,4-triazin-4(5H)-yl)ethylthio)methyl)furan-2-yl)methanamine (21)

To a solution of (**4**) (315mg, 1mmol) in ethanol (40mL), 2,3-butanedione (126mg, 1.5mmol) and glacial acetic acid(1.5mL) were added. The mixture was refluxed for a period of 1 hour, and then was treated with saturated sodium bicarbonate until the pH paper showed the pH of the solution was neutral. Ethyl acetate (40mL) was then added and the organic layer was washed by brine (30mL) and dried over $MgSO_4$. The solvent was evaporated under reduced pressure and purified

by column chromatography. The silica gel was first conditioned withdichloromethane, and then the product was eluted with 10:1 dichloromethane/methanol. Evaporation of the solvent yielded N,N-dimethyl-1-(5((2-(6-methyl-5-methylene-3-(nitromethylene)-2,3-dihydro-1,2,4-triazin-4(5H)yl)ethyl thio)methyl)furan-2-yl)methanamine (**23**) as a dark oil (200mg, 36.5%); ^{1}H NMR(300MHz, $CDCl_3$) δ 2.20 (s, 6H, N(CH_3)$_2$), 2.26 (s, 3H, NHN=CCH_3), 2.60(s, 2H, N(C=N)C=CH_2), 2.77(t, 2H, SCH_2CH$_2$), 3.38(s, 2H, CCH_2S), 3.67(s, 2H, (CH$_3$)$_2$NCH_2), 3.72(t, 2H, SCH$_2$CH_2), 6.05(d, 1H, ArH), 6.08(d, 1H, ArH), 6.53 (s, 1H, N(N)C=CHNO$_2$). HRMS: Obs. M+H, 366.1593. Calc. M+H, 366.1600.

Methyl N-2-((5-((dimethylamino)methyl)furan-2-yl)methylthio)ethyl-N'-tosylcarbamimido-thioate (22)

To a solution of toluenesulfonic acid (1g, 3.6mmol) in acetonitrile (50mL), (**2**) (778mg, 3.6mmol) in acetonitrile(5mL) was slowly added. After being refluxed for a period of 20 hours, the reaction solution was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted with 6:1 ethyl acetate/methanol. Evaporation of the solvent yielded methyl N-2-((5((dimethylamino)methyl)furan-2-yl)methylthio)ethyl-N'-tosylcarbamimidothioate (**22**) as a pale yellow solid (300mg, 18.8%); mp:103-104ºC; ^{1}H NMR(300MHz, $CDCl_3$) δ 2.32 (s, 6H, N(CH_3)$_2$), 2.36(s, 3H, N=CNHSCH_3), 2.41(s, 3H, ArCH$_3$), 2.71 (t, 2H, SCH_2CH$_2$), 3.42(t, 2H, SCH$_2$CH_2), 3.52(s, 2H, CCH_2S), 3.72 (s, 2H, (CH$_3$)$_2$NCH_2), 6.17(s, 2H, 2ArH), 7.27 (d, 2H, 2ArH), 7.80(d, 2H, 2ArH), 8.43(br.s, 1H, CH$_2$NHC=N). HRMS: Obs. M+H, 442.1293. Calc. M+H, 442.1293.

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-4-methylbenzene sulfonamide (23)

A solution of (**2**) (428mg, 2mmol) and pyridine (168mg, 2mmol) in dichloromethane (20mL) was slowly treated with p-toluenesulfonyl chloride (381mg, 2mmol). After being stirred for a period of 3 hours at 0ºC, the mixture was washed by brine (10ml), and the organic layer was separated, dried over $MgSO_4$ and concentrated to dryness. The crude residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted sequentially with 20:1 dichloromethane/methanol and 10:1 dichloromethane /methanol. Evaporation of the solvent yielded N-(2-((5-((dimethylamino)methyl) furan-2-yl)methylthio)ethyl)-4-methylbenzenesulfonamide(**23**) as a yellow oil (80mg, 10.9%); ^{1}H NMR(300MHz, $CDCl_3$) δ 2.26 (s, 6H, $N(CH_3)_2$), 2.42(s, 3H, $ArCH_3$), 50(t, 2H, SCH_2CH_2), 3.03(t, 2H, CH_2CH_2NH), 3.37(s, 2H, CCH_2S), 3.63(s, 2H, $(CH_3)_2NCH_2$), 6.08(d, 1H, ArH), 6.13(d, 1H, ArH), 7.29 (d, 2H, 2ArH), 7.73(d, 2H, 2ArH). HRMS: Obs. M+H, 369.1301. Calc. M+H, 369.1306.

2'-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethylcarbamoyl) biphenyl-2-carboxylic acid (24)

A solution of (**2**) (428mg, 1mmol) in toluene (35mL) was treated with diphenic anhydride (448mg, 2mmol). The mixture was refluxed in a flask fitted with a Dean–Stark tube for 1 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted with 10:1 dichloromethane /methanol. Evaporation of the solvent yielded 2'-(2-((5((dimethylamino)methyl)furan-2-yl)methylthio)ethylcarbamoyl)biphenyl-2-carboxy lic acid

(**24**) as a white solid (80mg, 9.2%); mp:103-105ºC; ^{1}H NMR(300MHz, $CDCl_3$) δ 2.32 (s, 6H, N(CH_3)$_2$), 3.01-3.22 (m, 4H, SCH_2CH_2), 3.45(s, 2H, CCH_2S), 77(s, 2H, (CH_3)$_2$NCH_2), 5.98(d, 1H, ArH), 6.16(d, 1H, ArH), 7.00-7.07(m, 2H, ArH, Ar'H), 7.21-7.30 (m, 4H, 2ArH, 2Ar'H), 7.52 (d, 1H, ArH), 7.78(d, 1H, Ar'H), 8.44(br.t, 1H, COOH). HRMS: Obs. M+H, 439.1697. Calc. M+H, 439.1691.

N-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-2-(2,3-dimethyl phenylamino)benzamide (25)

To a solution of 2-(1H-benzotriazol-1-yl)-1,1,3,3-tetramethyluronium (HBTU) (195mg, 0.46mmol), mefenamic acid (152mg, 0.63mmol), and triethylamine(47mg, 0.7mmol) in acetonitrile (35mL), a solution of (**2**) (110mg, 0.51mmol) in acetonitrile(5mL) was added. After being stirred for a period of 15 hours at room temperature, the reaction suspension was filtered and the filtration was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned ethyl acetate, and then the product was eluted with 8:1 ethyl acetate/methanol. Evaporation of the solvent yielded N-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-2-(2,3-dimethylphenylamino)benzamide (**25**) as a pale yellow oil (200mg, 89.0%); ^{1}H NMR(300MHz, $CDCl_3$) δ 2.18(s, 3H, Ar'CH_3), 2.31(s, 3H, Ar'CH_3), 2.37 (s, 6H, N(CH_3)$_2$), 2.80 (t, 2H, SC$H_2$$CH_2$), 3.51(q, 2H, SCH_2CH_2), 3.61(s, 2H, CCH_2S), 3.75(s, 2H, (CH_3)$_2$NCH_2), 6.18(d, 1H, ArH), 6.25(d, 1H, ArH), 6.68-7.45(m, 8H, ArH, ArNHAr'), 9.03(br.s, 1H, NHCO). HRMS: Obs. M+H, 438.2219. Calc. M+H, 438.2215.

2-(2-(2,6-Dichlorophenylamino)phenyl)-N-(2-((5-((dimethylamino)methyl)furan-

2-yl)methylthio)ethyl)acetamide (26)

To a solution of (**2**) (110mg, 0.51mmol) in acetonitrile (5mL), 2-(1Hbenzotriazol-1-yl)-1,1,3,3-tetramethyluronium (HBTU) (195mg, 0.46mmol), diclofenac acid(152mg, 0.51mmol), and triethylamine(47mg, 0.7mmol) were added. After being stirred for a period of 18 hours at room temperature, the reaction suspension was filtered and the filtration was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted with 6:1 ethyl acetate/methanol. Evaporation of the solvent yielded 2-(2-(2,6-dichlorophenylamino)phenyl)-N-(2-((5-((dimethylamino)methyl)furan-2-yl)methyl thio)ethyl)acetamide (**26**) as a pale yellow foam (60mg, 23.8%); ^{1}H NMR(300MHz, $CDCl_3$) δ 2.33 (s, 6H, $N(CH_3)_2$), 2.65 (t, 2H, SCH_2CH_2), 3.34(t, 2H, SCH_2CH_2), 3.56(s, 2H, CCH_2S), 3.69(s, 4H, $(CH_3)_2NCH_2$, $COCH_2Ar$), 6.13(d, 1H, ArH), 6.22(d, 1H, ArH), 6.52 (br.d, 2H, ArH, ArNHAr'), 6.90-7.36(m, 6H, ArH). HRMS: Obs. M+H, 492.1282. Calc. M+H, 492.1279.

1-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)pyrrolidine-2,5-dione (27)

A solution of (**2**) (216mg, 1mmol) in toluene (10mL) was treated with succinic anhydride (101mg, 1mmol) and dimethylaminopyridine (183mg, 1.5mmol). The mixture was refluxed in a flask fitted with a Dean–Stark trap for 3 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted sequentially with 30:1 dichloromethane /methanol and 20:1 dichloromethane /methanol. Evaporation of the solvent yielded 1-(2-((5((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)pyrrolidine-2,5-dione (**27**) as a yellow

oil (190mg, 63.6%); ^{1}H NMR(300MHz, $CDCl_3$) δ 2.24 (s, 6H, N(CH_3)$_2$), 2.68(t, 2H, SCH_2CH_2), 2.72(s, 4H, COCH_2CH_2CO), 3.43(s, 2H, CCH_2S), 3.70(t, 2H, CH_2CH_2NH), 3.74(s, 2H, (CH_3)$_2$NCH_2), 6.11(d, 1H, ArH), 6.17(d, 1H, ArH). HRMS: Obs. M+H, 297.1273. Calc. M+H, 297.1273.

1-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-3-methylpyrrolidine-2,5-dione (28)

The mixture of 2-methylsuccinic acid (2.0g, 15mmol) and acetic anhydride (10.8g, 90mmol) was refluxed for 4 hours and then was evaporated under reduced pressure. The resulting residue was purified by recrystallization in toluene (3mL) in the freezer to yield 2-methyl succinic anhydride as a white solid (1.5g, 88.2%). ^{1}H NMR(300MHz, $CDCl_3$) δ 1.47 (s,3H, CH_3CHCO), 2.56-3.24(m,3H, CH_3CHCH_2CO). A solution of (**2**) (214mg, 1mmol) in toluene (20mL) was treated with succinic anhydride (228mg, 2mmol) and dimethylaminopyridine (183mg, 1.5mmol). The mixture was refluxed in a flask fitted with a Dean–Stark trap for 2 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted sequentially with 30:1 dichloromethane /methanol and 20:1 dichloromethane /methanol. Evaporation of the solvent yielded 1-(2-((5((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-3-methylpyrrolidine-2,5-dione (**28**) as a yellow oil (100mg, 63.6%); 1H NMR(300MHz, CDCl3) δ 2.24 (s, 6H, N(CH_3)$_2$), 2.31-2.37(m, 1H, COCHCH_2CO), 2.68(t, 2H, SCH_2CH_2), 2.84-2.98(m, 3H, CH_3CHCH_2CO), 2.72(s, 2H, COCHCH_2CO), 3.43(s, 2H, CCH_2S), 3.70(t, 2H, SCH_2CH_2NH), 3.74(s, 2H, (CH_3)$_2$NCH_2), 6.11(d, 1H, ArH), 6.17(d, 1H, ArH). HRMS: Obs. M+H, 311.1433. Calc. M+H, 311.1429.

2-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)isoindoline-1,3-dione (29)

A solution of (**2**) (428mg, 2mmol) in toluene (30mL) was treated with phthalic anhydride (296mg, 2mmol). The mixture was refluxed in a flask fitted with a Dean– Stark trap for 2 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted with 20:1 dichloromethane /methanol. Evaporation of the solvent yielded 2-(2-((5-((dimethylamino)methyl) furan-2-yl)methyl thio)ethyl)isoindoline-1,3-dione (**29**) as a clear yellow oil (500mg, 72.0%). ^{1}H NMR(300MHz, $CDCl_3$) δ 2.24 (s, 6H, $N(CH_3)_2$), 2.7(t, 2H, SCH_2CH_2), 3.42(s, 2H, CCH_2S), 3.78(s, 2H, $(CH_3)_2NCH_2$), 3.87(t, 2H, CH_2CH_2NH), 6.11(d, 1H, ArH), 6.20(d, 1H, ArH), 7.73(m, 2H, ArH), 7.84 (m, 2H, ArH). HRMS: Obs. M+H, 345.1280. Calc. M+H, 345.1273.

2-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-4-nitroisoindoline -1,3-dione (30)

A solution of (**2**) (312mg, 1.5mmol) in toluene (40mL) and dimethyformamide (3mL) was treated with 4-nitrophthalic anhydride (868mg, 4.5mmol) and triethylamine (300mg, 3mmol). The mixture was refluxed in a flask fitted with a Dean–Stark trap for 16 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted with 20:1 dichloromethane /methanol. Evaporation of the solvent yielded 2-(2-((5((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-4-nitroiso indoline-1,3-dione (**30**) as a yellow oil (137mg, 24.2%); ^{1}H NMR(300MHz, $CDCl_3$) δ 2.19 (s, 6H, $N(CH_3)_2$), 2.72(t, 2H,

SC*H*$_2$CH$_2$), 3.36(s, 2H, CC*H*$_2$S), 3.70(s, 2H, (CH$_3$)$_2$NC*H*$_2$), 3.83(t, 2H, CH$_2$C*H*$_2$NH), 6.05(d, 1H, ArH), 6.12(d, 1H, ArH), 7.85 (t, 1H, ArH), 8.04(s, 1H, ArH), 8.07 (s, 1H, ArH). HRMS: Obs. M+H, 390.1125. Calc. M+H, 390.1123.

2-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-5-nitroisoindoline -1,3-dione (31)

A solution of (**2**) (312mg, 1.5mmol) in toluene (30mL) and dimethyformamide (3mL) was treated with 4-nitrophthalic anhydride (869mg, 4.5mmol). The mixture was refluxed in a flask fitted with a Dean–Stark trap for 2 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted with 20:1 dichloromethane /methanol. Evaporation of the solvent yielded 2-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio) ethyl)-5nitroisoindoline-1,3-dione (**31**) as a yellow solid (170mg, 30.0%), mp: 53-55ºC; ^{1}H NMR(300MHz, CDCl$_3$) δ 2.25 (s, 6H, N(C*H*$_3$)$_2$), 2.80(t, 2H, SC*H*$_2$CH$_2$), 3.43(s, 2H, CC*H*$_2$S), 3.77(s, 2H, (CH$_3$)$_2$NC*H*$_2$), 3.93(t, 2H, CH$_2$C*H*$_2$NH), 6.11(d, 1H, ArH), 6.19(d, 1H, ArH), 8.05 (q, 1H, ArH), 8.60-8.68 (m, 2H, ArH). HRMS: Obs. M+H, 390.1127. Calc. M+H, 390.1123.

2-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-1H-benzo[de]isoquinoline-1,3(2H)-dione (32)

A solution of (**2**) (214mg, 1mmol) in toluene (35mL) was treated with 1,8naphthalic anhydride (400mg, 2mmol). The mixture was refluxed in a flask fitted with a Dean–Stark trap for 3 hours and then was evaporated under reduced pressure. The resulting residue was purified by column

chromatography. The silica gel was first conditioned with ethyl acetate, and then the product was eluted sequentially with 6:1 ethyl acetate/methanol and 4:1 ethyl acetate /methanol. Evaporation of the solvent yielded 2-(2-((5-((dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-1H-benzo[de] isoquinoline-1,3(2H)-dione (**32**) as a pale yellow solid (280mg, 71.1%); mp:96-97ºC; ^{1}H NMR(300MHz, $CDCl_3$) δ 2.24 (s, 6H, $N(CH_3)_2$), 2.85(t, 2H, SCH_2CH_2), 3.43(s, 2H, CCH_2S), 3.86(s, 2H, $(CH_3)_2NCH_2$), 4.40(t, 2H, CH_2CH_2N), 6.10(d, 1H, ArH), 6.25(d, 1H, ArH), 7.77 (t, 2H, ArH, Ar'H), 8.23(d, 2H, ArH, Ar'H), 8.61(d, 1H, ArH, Ar'H). HRMS: Obs. M+H, 395.1421. Calc. M+H, 395.1429.

2-(2-((5-((Dimethylamino)methyl)furan-2-yl)methylthio)ethyl)-5-nitro-1H-benzo [de]isoquinoline-1,3(2H)-dione (33)

A solution of (**2**) (214mg, 1mmol) in toluene (35mL) was treated with 3-nitro1,8-naphthalic anhydride (486mg, 2mmol). The mixture was refluxed in a flask fitted with a Dean–Stark trap for 3 hours and then was evaporated under reduced pressure. The resulting residue was purified by column chromatography. The silica gel was first conditioned with dichloromethane, and then the product was eluted sequentially with 30:1 dichloromethane /methanol and 20:1 dichloromethane /methanol. Evaporation of the solvent yielded 2-(2-((5-((dimethylamino) methyl)furan-2-yl)methylthio)ethyl)-5-nitro-1H-benzo[de]isoquinoline-1,3(2H)-dione (**33**) as a pale yellow solid (250mg, 57.1%); mp: 118-120°C; ^{1}H NMR(300MHz, $CDCl_3$) δ 2.25 (s, 6H, $N(CH_3)_2$), 2.86(t, 2H, SCH_2CH_2), 3.42(s, 2H, CCH_2S), 3.85(s, 2H, $(CH_3)_2NCH_2$), 4.42(t, 2H, CH_2CH_2N), 6.11(d, 1H, ArH), 6.25(d, 1H, ArH), 7.95 (t, 1H, ArH), 8.43(d, 1H, ArH), 8.79 (d, 1H, ArH), 9.14(d, 1H, NO_2Ar'H), 9.33(d, 1H, NO_2Ar'H). HRMS: Obs. M+H, 440.1281. Calc. M+H, 440.1280.

Computational Chemistry

Accelrys Discovery Studio 2.5 molecular modeling package was utilized for this study.

The computational definition of the binding site in 2H9Y

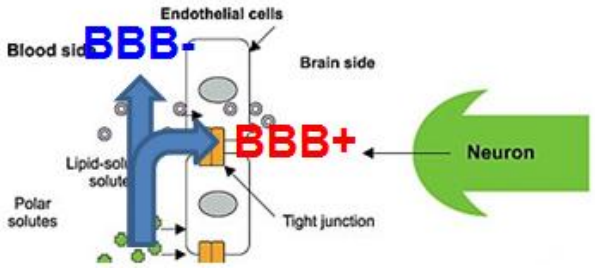
The ligand co-crystalized with AChE 2H9Y is m-(N,N,N-trimethylamino)- 2,2,2-trifluoro-1,1-dihydroxyethylbenzene, which only binds to the CAS of AChE. The binding site defined by this ligand only covers the CAS side and is not large enough for the docking studies. In order to define a proper binding site covering both the CAS and the PAS in 2H9Y, another AChE protein structure (1EVE1) co-crystalized with donepezil was utilized since this inhibitor binds to both the CAS and the PAS of the AChE structure and is currently the most utilized pharmaceutical treatment for Alzheimer's disease. The structure of 2H9Y was superimposed with 1EVE in order to position donepezil in the active site of 2H9Y. When donepezil was selected as the ligand, the binding site sphere covering both CAS and PAS was determined by using "Find Sites as Volume as Selected Ligand" tool in the structure of 2H9Y.

Computational preparation of docking ligands

In order to prepare ligands for docking they were generated using the sketcher in the Accelrys Discovery Studio Client 2.5 molecular modeling package. All the hydrogen atoms were added to define the correct ionization and tautomeric states. The CHARMm force field was then applied to the each molecule to assign atom types and partial charges prior to saving in .dsv format. The "Smart Minimizer" energy minimization algorithm was used for the minimization procedure with a 0.1 kcal/(mol×Å) energy gradient during a maximum 2000-step cycle of minimization.

Molecular docking procedure

The Ligand dock (CDOCKER) protocol in the Accelrys Discovery Studio Client 2.5 molecular modeling package was used for the molecular docking calculation. The number of top hits was set to 10 and default settings were used in all other parameters including random conformations, orientations to refine and simulation annealing. The ligand-receptor interactions are estimated according to the CHARMm force field scores including the CDOCKER Energy, a combination of internal ligand strain energy and receptor-ligand interaction energy. The CDOCKER Energy is reported as a negative value, and where a more negative value indicates a more favorable binding. The docking algorithm supports flexible docking for the ligand, which is independent of its initial conformation, and provides flexibility of the receptor.



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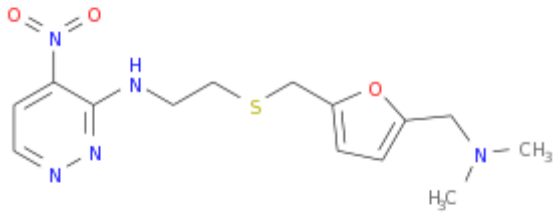

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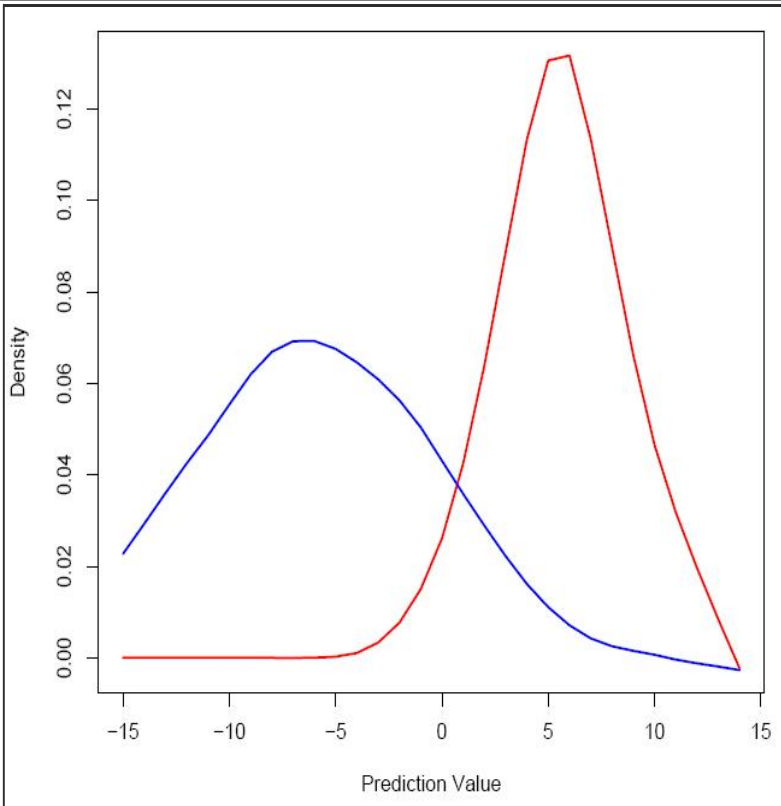

Threshold of BBB-/BBB+ Score is 0

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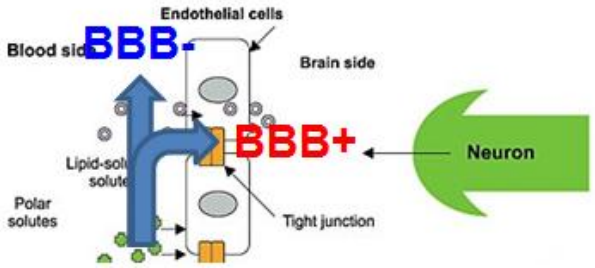

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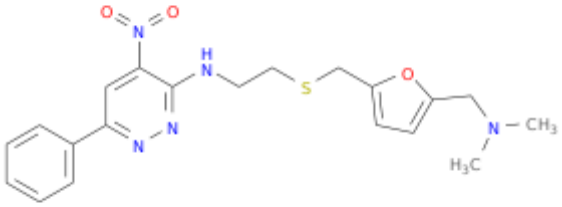

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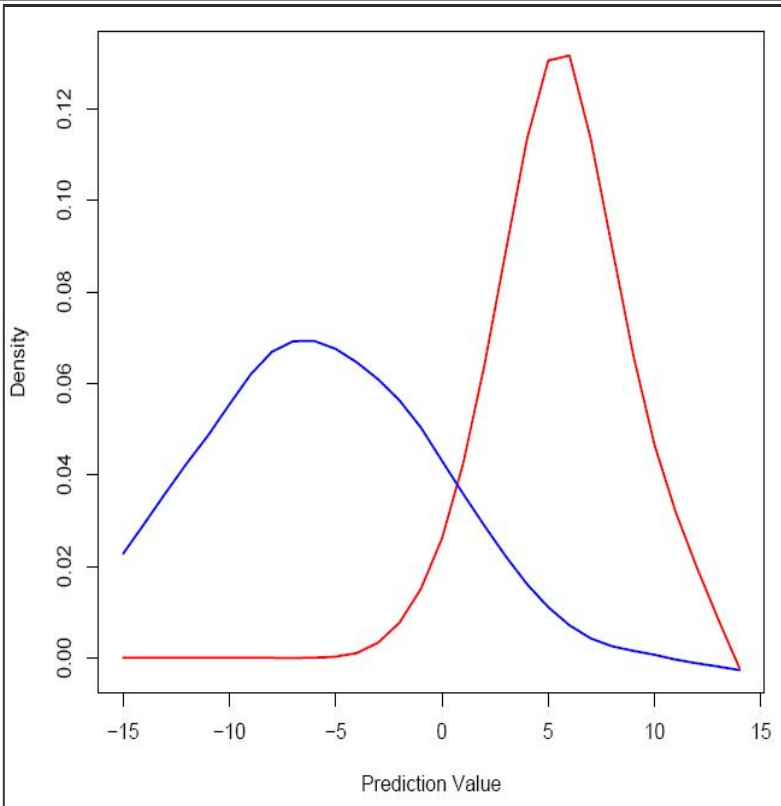

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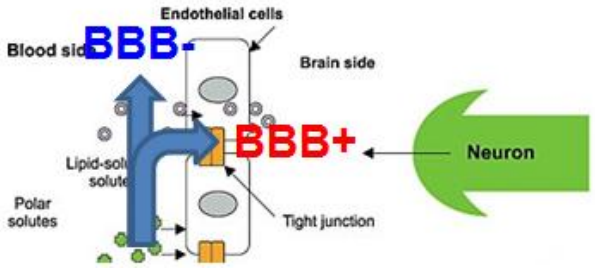

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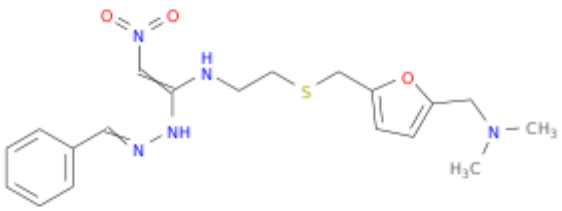

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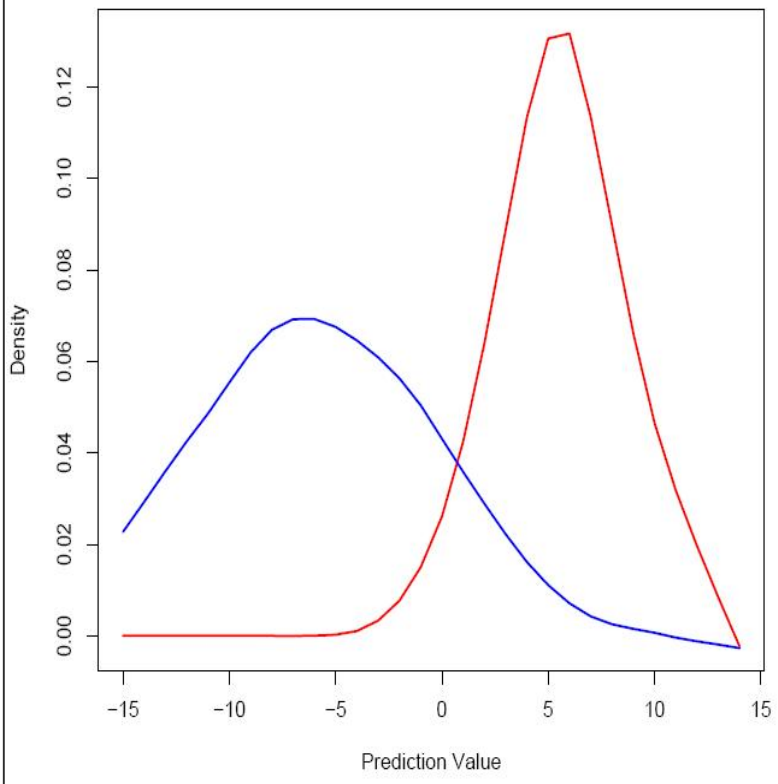

Threshold of BBB-/BBB+ Score is 0

This compound is predicted as BBB-

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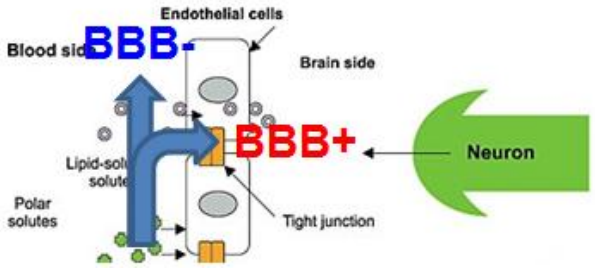

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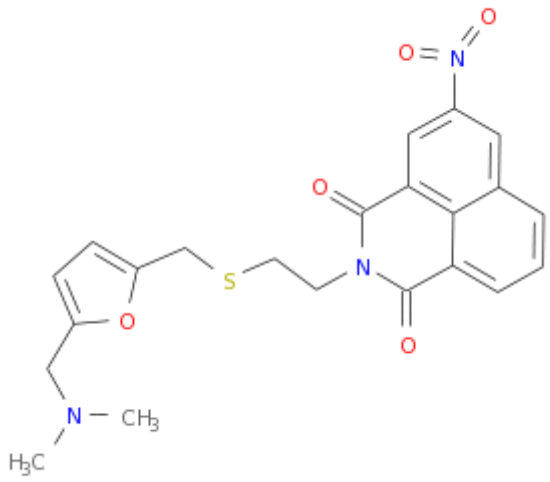
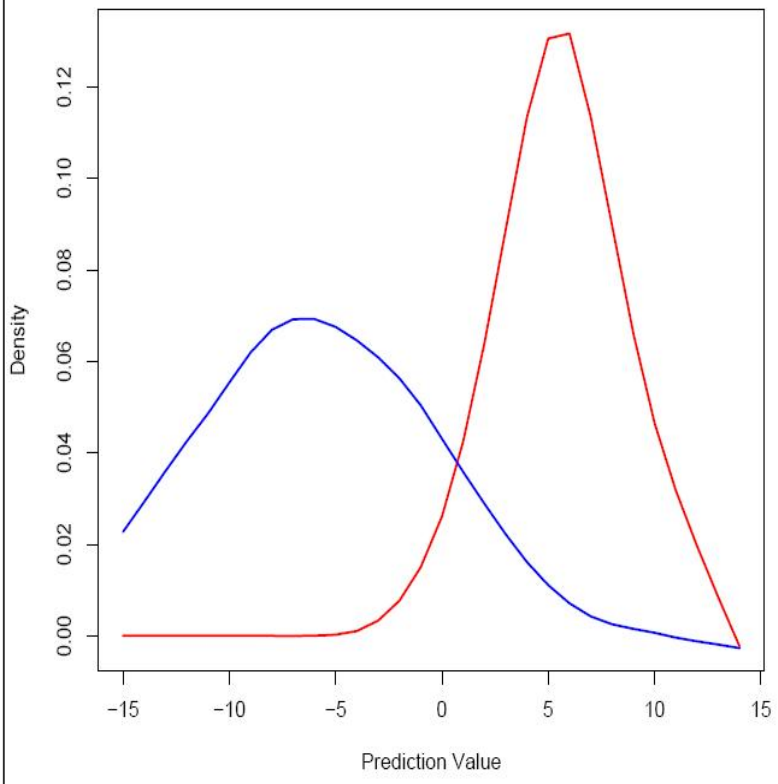
Return



Query Structure

AdaBoost_MACCSFP BBB Score: 5.498



Threshold of BBB-/BBB+ Score is 0

This compound is predicted as BBB+

Return