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Supplementary Information (SI)

Regioselective Synthesis of Novel 2,3,4,4a-tetrahydro-1*H*-carbazoles and their Cholinesterase Inhibitory Activities

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Spectral Data

























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Supplementary Information (SI)


















































































Kinetic data (Steady-state inhibition) of AChE inhibitory activity

Fig. 1 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of ACh, incubated with compounds **2a** at three different concentrations, such as 0.05, 0.1, and 0.2 mM. (b-c): The 1/Vmax *versus* various concentrations of the inhibitors, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot.. The Ki = 0.065 ± 0.066 and 0.29 ± 0.035 mM was evaluated by Dixon plot.



Fig. 3 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of ACh, incubated with compound **2c** at three different concentrations, such as 0.05, 0.1, and 0.2 mM. (b-c): The $1/V_{max}$ versus various concentrations of the inhibitor, interception to X axis K_i ' for the secondary re-plot of the Line-Weaver Burk plot. The $K_i = 0.019 \pm 0.012$ mM was evaluated by Dixon plot.



Fig. 2 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of ACh, incubated with compound **2b** at three different concentrations, such as 0.05, 0.1, and 0.2 mM; (b-c): The $1/V_{max}$ versus various concentrations of the inhibitor, interception to X axis shows $K_i' = 0.135$ mM for the secondary re-plot of the Line-Weaver Burk plot. The $K_i = 0.045 \pm 0.066$ mM was evaluated by Dixon plot.



Fig. 4 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of ACh, a substrate, incubated with compound **20** at three different concentrations, such as 0.05, 0.1, and 0.2 mM. (b-c): The $K_i = 0.03 \pm 0.014$ mM was evaluated by Dixon- and secondary re-plot of the Line-Weaver Burk plot.



b. Dixon plot

c. Secondary Line-Weaver Burk plot

Fig. 5 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of ACh, incubated with compound 2q at three different concentrations, such as 0.05, 0.1, and 0.2 mM. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X-axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.036± 0.024 mM was evaluated by Dixon plot.

Kinetic data (Steady-state inhibition) of BChE inhibitory activity





a. Line-Weaver Burk plot



b. Dixon plot

c. Secondary Line-Weaver Burk plot

Fig. 6 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh incubated with compound **2a** at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.17 mM, Vmax= 4.54 mM/L/min, and slope value is 0.037. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.046 ± 0.005 mM was evaluated by Dixon plot.



Fig. 9 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh, a substrate, incubated with compound **2d** at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.22 mM, Vmax 4.95mM/L/min, and slope value is 0.045. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.026 ± 0.0017 mM was evaluated by Dixon plot.



b. Dixon plot

c. Secondary Line-Weaver Burk plot

Fig. 8 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh incubated with compound **2c** at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.37 mM,. Vmax= 6.43 mM/L/min, and slope value is 0.057. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.043 ± 0.025 mM was evaluated by Dixon plot.





Fig. 7 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh incubated with compound **2b** at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.36 mM, Vmax= 12.04 mM/L/min, and slope value is 0.03. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.106 ± 0.07 mM was evaluated by Dixon plot.



b. Dixon plot

c. Secondary Line-Weaver Burk plot

Fig. 10 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh incubated with compound **2g** at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.18 mM, Vmax= 3.99 mM/L/min, and slope value is 0.049. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.036 ± 0.005 mM was evaluated by Dixon- and secondary re-plot



Fig. 11 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh incubated with compound **2i** at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.20 mM, Vmax 7.80 mM/L/min, and slope value is 0.026. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.066± 0.028 mM was evaluated by Dixon plot.


Fig. 13 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh incubated with compound **2m** at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.23 mM, Vmax= 6.98 mM/L/min, and slope value is 0.033. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.086 ± 0.011 mM was evaluated by Dixon plot.





a. Line-Weaver Burk plot





c. Secondary Line-Weaver Burk plot

Fig. 12 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh incubated with compound **2l** at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.32 mM, Vmax = 4.66 mM/L/min, and slope value is 0.068. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.101± 0.128 mM was evaluated by Dixon plot.



b. Dixon plot

c. Secondary Line-Weaver Burk plot

Fig. 14 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh incubated with compound **20** at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.38 mM, Vmax = 17.98 mM/L/min, and slope value is 0.009. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.076 ± 0.016 mM was evaluated by Dixon plot.



b. Dixon plot

c. Secondary Line-Weaver Burk plot

Fig. 15 (a): The Line-Weaver Burk plot of the initial velocities *versus* the reciprocal of BCh incubated with compound 2q at three different concentrations, such as 0.05, 0.1, and 0.2 mM with Km = 0.28 mM, Vmax= 1.86 mM/L/min, and slope value is 0.014. (b-c): The 1/Vmax *versus* various concentrations of the inhibitor, interception to X axis shows Ki' for the secondary re-plot of the Line-Weaver Burk plot. The Ki = 0.21± 0.137 mM was evaluated by Dixon plot.

Supplementary Information (SI)