Combined serum levels of multiple proteins in tPA-BDNF pathway may aid the diagnosis of five mental disorders

Suzhen Chen, MD^{1,2}, Haitang Jiang, MD^{1,2}, Yang Liu, BD³, Zhenhua Hou, MD^{1,2}, Yingying Yue, MD^{1,2}, Yuqun Zhang, MD^{1,2}, Fuying Zhao, MD^{1,2}, Zhi Xu, PhD^{1,2}, Yinghui Li, MD^{1,2}, Xiaodong Mou, PhD^{1,2}, Lei Li, MD^{1,2}, Tianyu Wang, MD^{1,2}, Jingjing Zhao, BD⁴, Chongyang Han, MD⁴, Yuxiu Sui, PhD⁴, Ming Wang, BD⁵, Zhong Yang, BD⁵, Yan Lu, BD⁶, Yifeng Zhu, BD⁶, Jianhua Li, MD⁷, Xinhua Shen, MD⁷, Fei Sun, BD⁸, Qingsong Chen, BD⁸, Huanxin Chen, PhD⁹ & Yonggui Yuan, PhD^{1,2*}

¹Department of Psychosomatics and Psychiatry, ZhongDa Hospital, Medical School of Southeast University, Nanjing 210009, PR China.

²Institute of Psychosomatics, Medical School of Southeast University, Nanjing 210009, PR China.

³Institute of Neuropsychiatric, Brain Hospital, Nanjing Medical University, Nanjing 210029, PR China.

⁴Department of Psychiatry, Brain Hospital, Nanjing Medical University, Nanjing 210029, PR China.

⁵ Department of Psychiatry, The Third People's Hospital of Changshu, Suzhou 215500, PR China.

⁶Department of Psychiatry, The Fourth People's Hospital of Zhangjiagang, Suzhou 215600, PR China.

⁷Department of Psychiatry, The Third People's Hospital of Huzhou, Huzhou 313000, PR China.

⁸Department of Psychiatry, The Second People's Hospital of Jingjiang, Taizhou 214500, PR China.

⁹Key Laboratory of Cognition and Personality, Ministry of Education; School of Psychology, Southwest University, Chongqing 400175, PR China.

*Corresponding author at: Department of Psychosomatics and Psychiatry, ZhongDa Hospital, Medical School of Southeast University, Nanjing 210009, PR China.

Tel./fax:+86 25 83285124; E-mail address: yygylh2000@sina.com(Y. Yuan).

Supplementary Table 1. Correlation analysis among tPA, PAI-1, BDNF, proBDNF, TrkB, p75NTR, BDNF/proBDNF ratio and clinical variables in different disorders.

Disorders	Clinical variables	tPA	PAI-1	BDNF	proBDNF	TrkB	p75NTR	BDNF/proBDNF ratio
SZ	SAPS total score	<i>r</i> =0.215, <i>P</i> =0.231	<i>r</i> =-0.108, <i>P</i> =0.542	r=-0.344, P=0.047*	<i>r</i> =0.035, <i>P</i> =0.851	<i>r</i> =-0.236, <i>P</i> =0.186	<i>r</i> =-0.020, <i>P</i> =0.920	<i>r</i> =-0.232, <i>P</i> =0.202
	SAPS comprehensive evaluation	r=0.352, P=0.044*	<i>r</i> =-0.124, <i>P</i> =0.484	<i>r</i> =-0.248, <i>P</i> =0.157	<i>r</i> =-0.022, <i>P</i> =0.903	<i>r</i> =-0.305, <i>P</i> =0.084	<i>r</i> =0.220, <i>P</i> =0.584	<i>r</i> =-0.183, <i>P</i> =0.316
	score							
	Age	<i>r</i> =0.233, <i>P</i> =0.191	<i>r</i> =-0.155, <i>P</i> =0.381	r=0.079, P=0.659	r=0.003, P=0.989	<i>r</i> =0.224, <i>P</i> =0.210	r=0.208, P=0.298	<i>r</i> =-0.095, <i>P</i> =0.605
	BMI	<i>r</i> =0.124, <i>P</i> =0.492	r=0.358, P=0.038*	<i>r</i> =-0.187, <i>P</i> =0.290	<i>r</i> =-0.161, <i>P</i> =0.378	<i>r</i> =-0.224, <i>P</i> =0.209	<i>r</i> =-0.277, <i>P</i> =0.161	<i>r</i> =-0.104, <i>P</i> =0.571
	Education	<i>r</i> =-0.007, <i>P</i> =0.970	<i>r</i> =0.098, <i>P</i> =0.581	r=0.188, P=0.286	<i>r</i> =-0.149, <i>P</i> =0.416	r=0.119, P=0.509	<i>r</i> =0.283, <i>P</i> =0.153	<i>r</i> =0.187, <i>P</i> =0.306
	Duration of illness	<i>r</i> =-0.075, <i>P</i> =0.676	r=0.022, P=0.902	<i>r</i> =-0.129, <i>P</i> =0.468	<i>r</i> =-0.121, <i>P</i> =0.510	r=0.147, P=0.414	<i>r</i> =-0.141, <i>P</i> =0.483	<i>r</i> =0.039, <i>P</i> =0.832
MDD	HDRS score	<i>r</i> =-0.125, <i>P</i> =0.511	r=0.038, P=0.840	<i>r</i> =-0.165, <i>P</i> =0.383	r=0.352, P=0.067	r=0.181, P=0.349	r=0.233, P=0.252	<i>r</i> =0403, <i>P</i> =0.033*
	Age	<i>r</i> =0.130, <i>P</i> =0.494	<i>r</i> =-0.195, <i>P</i> =0.301	<i>r</i> =-0.030, <i>P</i> =0.876	<i>r</i> =0.115, <i>P</i> =0.559	<i>r</i> =-0231, <i>P</i> =0.229	<i>r</i> =-0.171, <i>P</i> =0.403	<i>r</i> =-0.020, <i>P</i> =0.920
	BMI	r=-0.565, P=0.001*	<i>r</i> =-0.066, <i>P</i> =0.728	r=0.159, P=0.403	<i>r</i> =0.096, <i>P</i> =0.629	r=0.004, P=0.984	<i>r</i> =-0.377, <i>P</i> =0.057	<i>r</i> =-0.130, <i>P</i> =0.511
	Education	<i>r</i> =-0.190, <i>P</i> =0.315	<i>r</i> =0.206, <i>P</i> =0.274	<i>r</i> =-0.240, <i>P</i> =0.202	r=0.245, P=0.209	r=0.266, P=0.162	<i>r</i> =0.232, <i>P</i> =0.255	<i>r</i> =-0.205, <i>P</i> =0.296
	Duration of illness	<i>r</i> =0.153, <i>P</i> =0.420	<i>r</i> =-0.087, <i>P</i> =0.648	<i>r</i> =-0.115, <i>P</i> =0.546	<i>r</i> =-0.225, <i>P</i> =0.249	<i>r</i> =-0.233, <i>P</i> =0.224	<i>r</i> =-0.263, <i>P</i> =0.194	<i>r</i> =0.268, <i>P</i> =0.168
	Episodes	<i>r</i> =0.106, <i>P</i> =0.577	<i>r</i> =-0.077, <i>P</i> =0.685	r=0.106, P=0.577	<i>r</i> =0.105, <i>P</i> =0.581	r=0.017, P=0.933	r=0.026, P=0.893	<i>r</i> =-0.121, <i>P</i> =0.555
BM	YMRS score	<i>r</i> =-0.156, <i>P</i> =0.418	<i>r</i> =-0.239, <i>P</i> =0.204	r=0.222, P=0.239	<i>r</i> =0.199, <i>P</i> =0.301	r=0.187, P=0.330	<i>r</i> =0.071, <i>P</i> =0.748	<i>r</i> =-0.031, <i>P</i> =0.872

	Age	<i>r</i> =-0.095, <i>P</i> =0.624	<i>r</i> =-0.284, <i>P</i> =0.128	<i>r</i> =-0.281, <i>P</i> =0.132	<i>r</i> =-0.067, <i>P</i> =0.729	<i>r</i> =-0.313, <i>P</i> =0.098	<i>r</i> =-0.273, <i>P</i> =0.207	<i>r</i> =-0.388, <i>P</i> =0.037*
	BMI	<i>r</i> =-0.103, <i>P</i> =0.595	r=0.084, P=0.660	<i>r</i> =0.127, <i>P</i> =0.502	<i>r</i> =0.144, <i>P</i> =0.456	<i>r</i> =-0.201, <i>P</i> =0.297	<i>r</i> =-0.152, <i>P</i> =0.490	<i>r</i> =-0.096, <i>P</i> =0.619
	Education	<i>r</i> =-0.036, <i>P</i> =0.853	<i>r</i> =-0.046, <i>P</i> =0.809	<i>r</i> =0.070, <i>P</i> =0.714	<i>r</i> =0.147, <i>P</i> =0.446	<i>r</i> =0.194, <i>P</i> =0.314	<i>r</i> =0.043, <i>P</i> =0.844	<i>r</i> =0.114, <i>P</i> =0.557
	Duration of illness	<i>r</i> =0.264, <i>P</i> =0.166	r=0.039, P=0.836	<i>r</i> =-0.093, <i>P</i> =0.625	<i>r</i> =-0.125, <i>P</i> =0.517	<i>r</i> =0.254, <i>P</i> =0.184	r=0.503, P=0.014*	<i>r</i> =0.006, <i>P</i> =0.973
	Episodes	r=-0.423, P=0.022*	<i>r</i> =-0.099, <i>P</i> =0.601	<i>r</i> =0.004, <i>P</i> =0.983	<i>r</i> =-0.308, <i>P</i> =0.105	<i>r</i> =-0.010, <i>P</i> =0.957	<i>r</i> =-0.407, <i>P</i> =0.054	<i>r</i> =0.156, <i>P</i> =0.419
1	HDRS score	<i>r</i> =-0.098, <i>P</i> =0.532	<i>r</i> =0.219, <i>P</i> =0.164	<i>r</i> =0.156, <i>P</i> =0.320	<i>r</i> =0.158, <i>P</i> =0.329	<i>r</i> =-0.010, <i>P</i> =0.951	<i>r</i> =0.177, <i>P</i> =0.305	<i>r</i> =-0.069, <i>P</i> =0.670
	Age	<i>r</i> =0.044, <i>P</i> =0.778	r=0.013, P=0.932	<i>r</i> =-0.231, <i>P</i> =0.134	<i>r</i> =-0.063, <i>P</i> =0.694	r=-0.443, P=0.006*	<i>r</i> =-0.089, <i>P</i> =0.599	<i>r</i> =-0.168, <i>P</i> =0.290
	BMI	<i>r</i> =0.156, <i>P</i> =0.310	r=0.247, P=0.108	<i>r</i> =0.177, <i>P</i> =0.248	r=0.115, P=0.468	r=0.387, P=0.015*	r=0.429, P=0.011*	<i>r</i> =-0.048, <i>P</i> =0.763
	Education	<i>r</i> =-0.028, <i>P</i> =0.863	r=0.042, P=0.796	<i>r</i> =0.023, <i>P</i> =0.886	<i>r</i> =0.194, <i>P</i> =0.241	r=0.330, P=0.048*	<i>r</i> =0.138, <i>P</i> =0.432	<i>r</i> =-0.122, <i>P</i> =0.460
	Duration of illness	r=0.356, P=0.023*	r=0.076, P=0.630	<i>r</i> =0.031, <i>P</i> =0.843	<i>r</i> =0.054, <i>P</i> =0.738	<i>r</i> =-0.303, <i>P</i> =0.063	<i>r</i> =-0.085, <i>P</i> =0.622	<i>r</i> =-0.064, <i>P</i> =0.693
	Episodes	r=0.206, P=0.358	<i>r</i> =143, <i>P</i> =.526	<i>r</i> =.003, <i>P</i> =.989	<i>r</i> =.266, <i>P</i> =.244	<i>r</i> =288, <i>P</i> =.205	<i>r</i> =112, <i>P</i> =.649	<i>r</i> =074, <i>P</i> =.751
	PDSS score	<i>r</i> =0.279, <i>P</i> =0.136	<i>r</i> =-0.118, <i>P</i> =0.535	<i>r</i> =-0.039, <i>P</i> =0.837	<i>r</i> =-0.263, <i>P</i> =0.176	r=0.393, P=0.035*	<i>r</i> =0.260, <i>P</i> =0.210	<i>r</i> =-0.001, <i>P</i> =0.998
	HARS crore	<i>r</i> =-0.080, <i>P</i> =0.675	r=0.156, P=0.409	r=0.026, P=0.892	<i>r</i> =0.091, <i>P</i> =0.645	<i>r</i> =-0.045, <i>P</i> =0.817	<i>r</i> =0.141, <i>P</i> =0.502	<i>r</i> =-0.020, <i>P</i> =0.920
	Age	<i>r</i> =0.062, <i>P</i> =0.746	<i>r</i> =-0.160, <i>P</i> =0.397	<i>r</i> =-0.039, <i>P</i> =0.836	<i>r</i> =-0.281, <i>P</i> =0.147	<i>r</i> =-0.296, <i>P</i> =0.119	<i>r</i> =-0.304, <i>P</i> =0.139	r=0.406, P=0.032*
	BMI	r=0.076, P=0.690	r=0.313, P=0.092	<i>r</i> =-0.041, <i>P</i> =0.831	<i>r</i> =0.117, <i>P</i> =0.554	<i>r</i> =-0.345, <i>P</i> =0.067	r=-0.546, P=0.005*	<i>r</i> =0.073, <i>P</i> =0.712
	Education	<i>r</i> =-0.267, <i>P</i> =0.154	r=0.328, P=0.076	<i>r</i> =-0.182, <i>P</i> =0.335	<i>r</i> =0.277, <i>P</i> =0.153	<i>r</i> =-0.047, <i>P</i> =0.807	<i>r</i> =0.094, <i>P</i> =0.656	r=-0.391, P=0.040*
	Duration of illness	<i>r</i> =0.021, <i>P</i> =0.912	r=0.042, P=0.826	<i>r</i> =-0.319, <i>P</i> =0.086	<i>r</i> =-0.119, <i>P</i> =0.548	<i>r</i> =-0.102, <i>P</i> =0.598	<i>r</i> =-0.194, <i>P</i> =0.353	<i>r</i> =-0.086, <i>P</i> =0.663

BD

PD

Note: Abbreviations: SZ, schizophrenia; MDD, major depressive disorder; BM, bipolar mania; BD, bipolar depression; PD, panic disorder; BMI, body mass index; SAPS, Scale for Assessment Positive Symptom; HARS, Hamilton Anxiety Rating Scale; HDRS, 17-item Hamilton Depression Rating Scale; YMRS, Young Mania Rating Scale; PDSS, Panic Disorder Severity Scale. tPA, tissue plasminogen activator; PAI-1, plasminogen activator inhibitor-1; BDNF, brain-derived neurotrophic factor; pro-BDNF, precursor-BDNF; TrkB, tropomyosin-related kinase B; p75NTR, neurotrophin receptor p75.