

Molecular Mechanism of Suboptimal Health: Genomics Meets Glycomics

Wei Wang

MD (China), PhD (Japan), FFPH (London)

**Capital Medical University, Beijing, China
Chinese Academy of Sciences, Beijing, China
Edith Cowan University, Perth, Australia**



Suboptimal health status (SHS)

- **Marked by**

- 1) perceived health complaints,
- 2) general weakness ,
- 3) low energy levels.

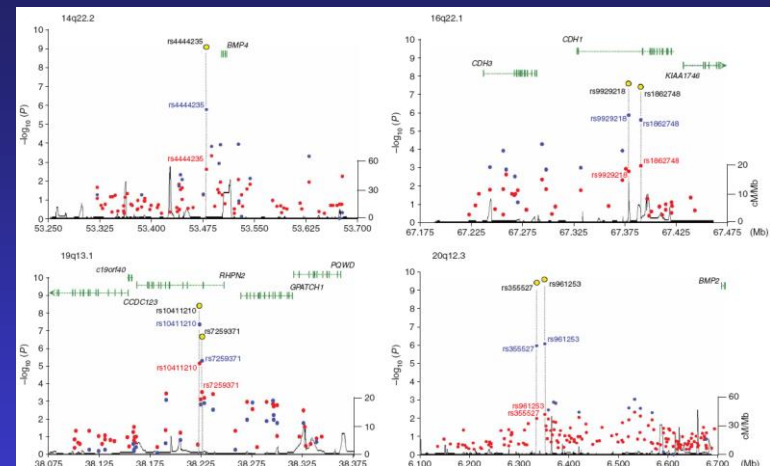
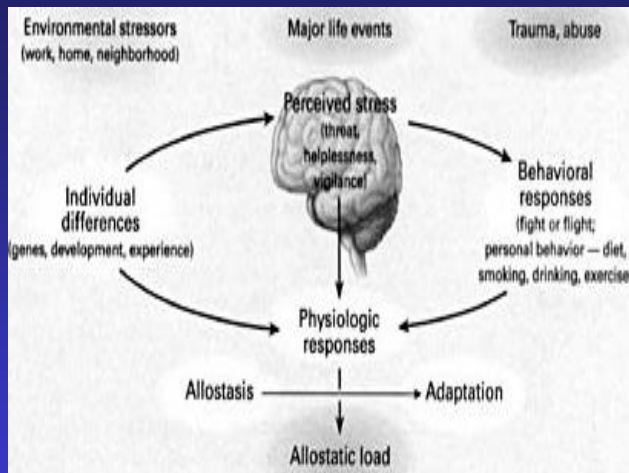
- SHS is deemed as the sub-clinical and reversible stage of chronic diseases.

Theoretical Background:

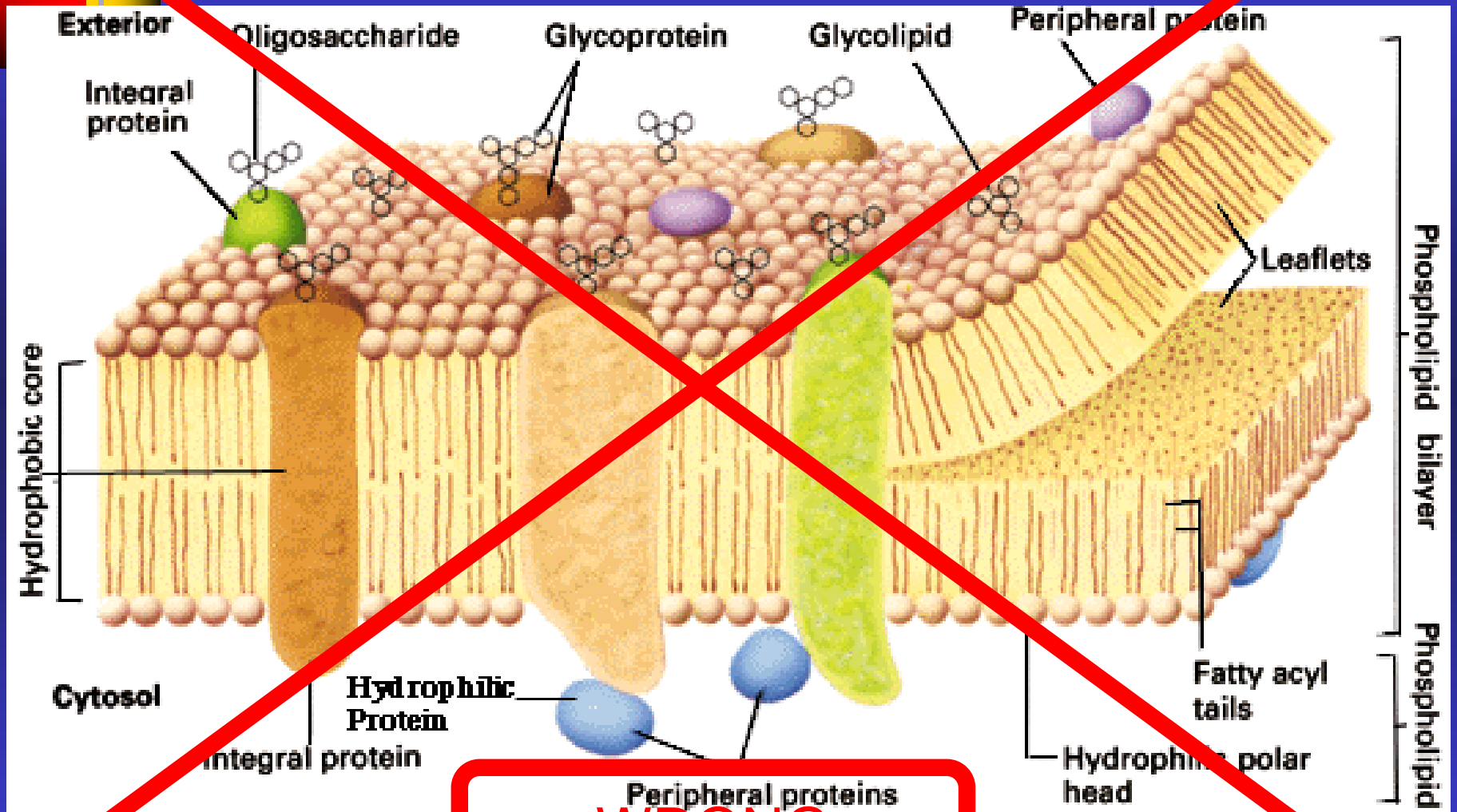
Pathophysiological:

Neuroendocrine responses activated by the **Hypothalamic-Pituitary-Adrenal (HPA)**

Molecular: Glycomics , Lipidomics ?

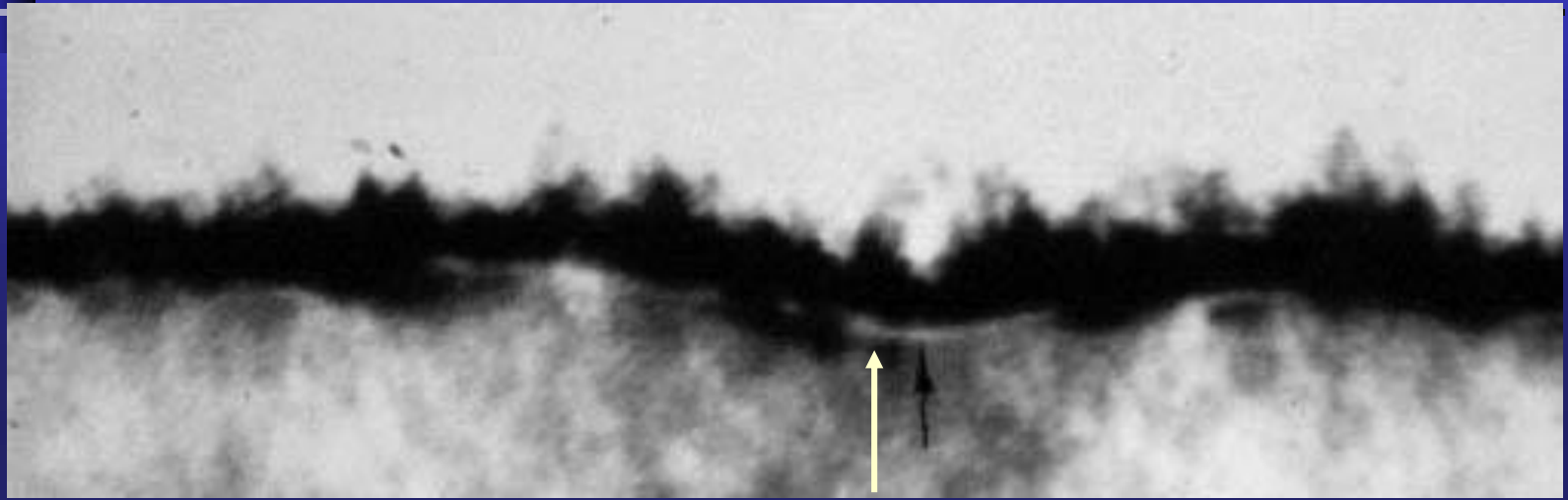


The cell membrane



WRONG

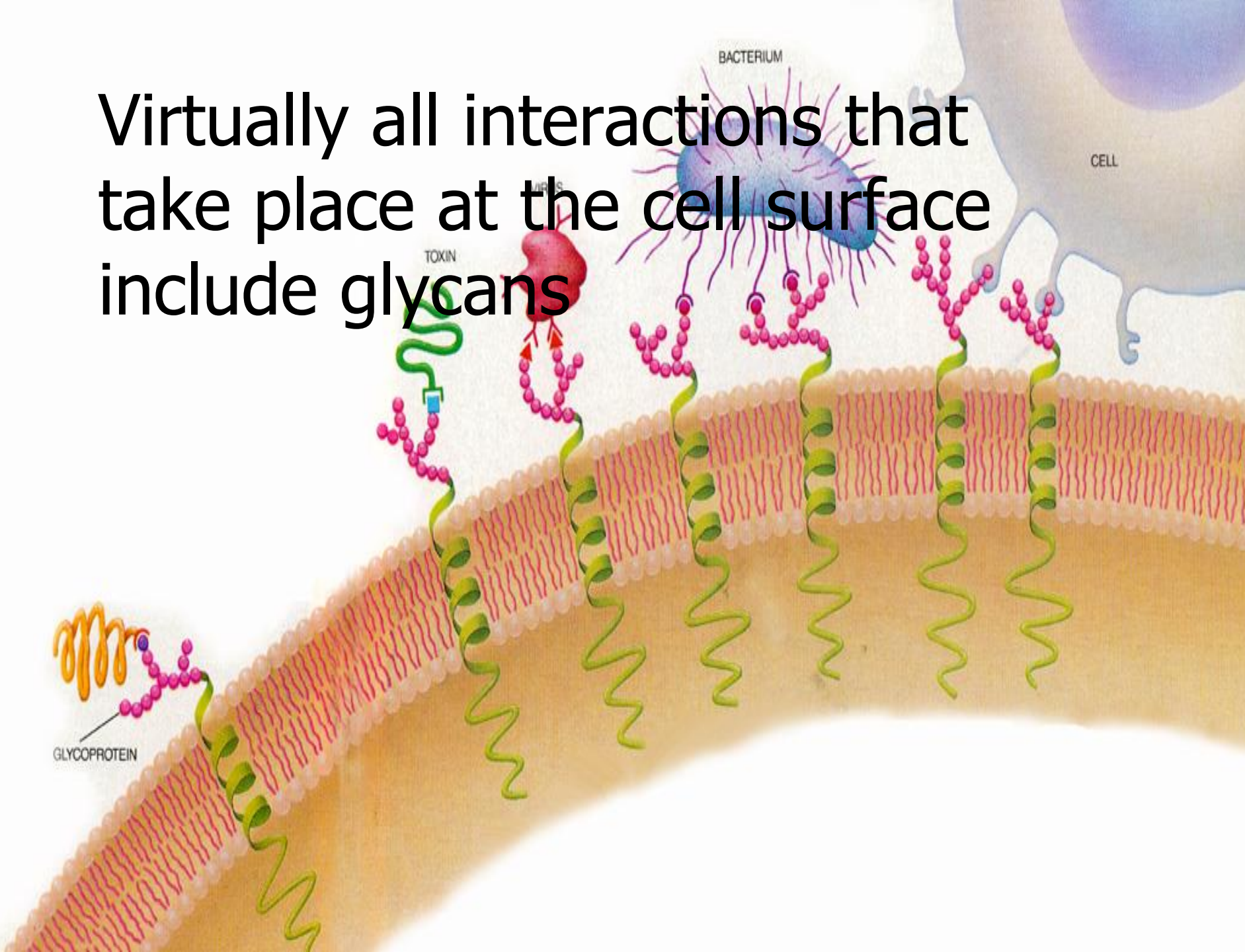
The cell surface - The real picture



lipid bilayer

*Glycocalyx surrounding a fibroblast.
Cell surface carbohydrates are stained black.*

Virtually all interactions that take place at the cell surface include glycans



Understanding of complex disease

HIGHLY POLYGENIC GENETIC BASIS (FEW RARE VARIANTS WITH LARGE EFFECTS AND MANY COMMON WITH SMALL EFFECTS)

ENVIRONMENT



“-OMICS” LEVEL (PROTEOMICS, LIPIDOMICS, GLYCOMICS, METABOLOMICS)

ENVIRONMENT



QUANTITATIVE TRAIT LEVEL
(e.g. CHOLESTEROL, BLOOD PRESSURE)

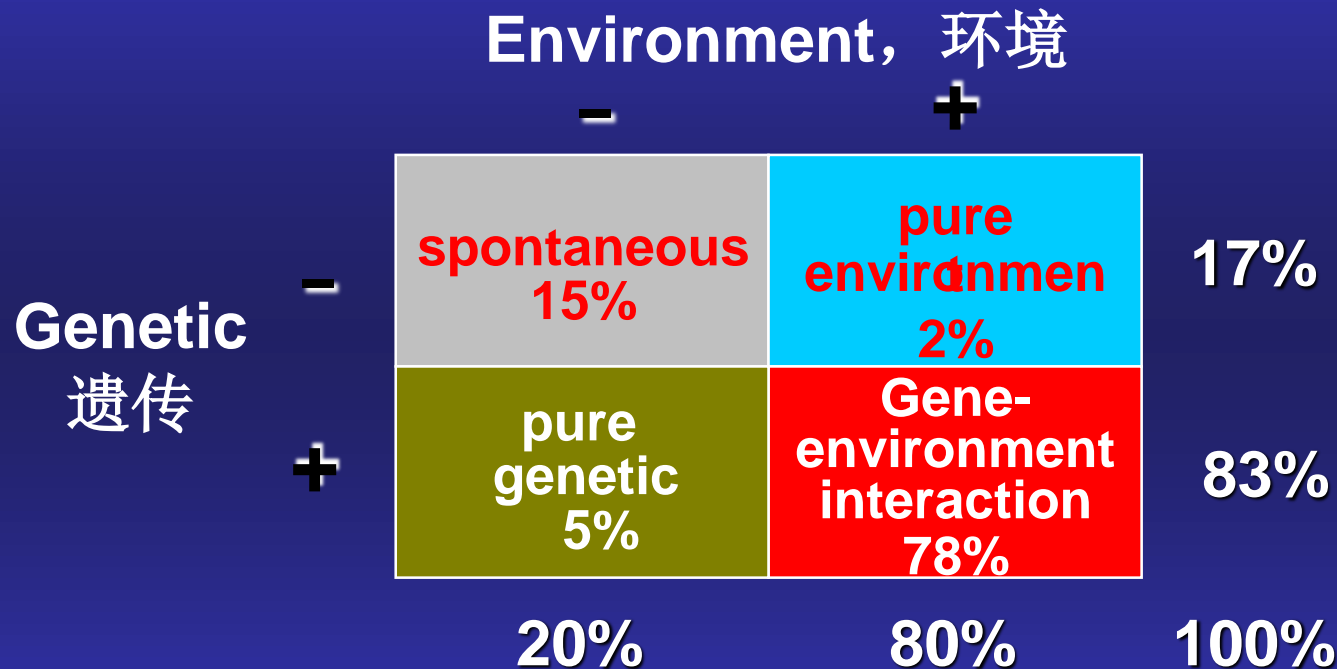
ENVIRONMENT



COMPLEX DISEASE
PHENOTYPE

基因-环境交互作用

Gene - Environment Interaction



“Genetics loads gun,
but Environments trigger”

Modernization and Evidence-based Practice of TCM Customized for Individuals with Data-intensive Diagnostics

Yun ...Wang , 2012 , CCPM, In press

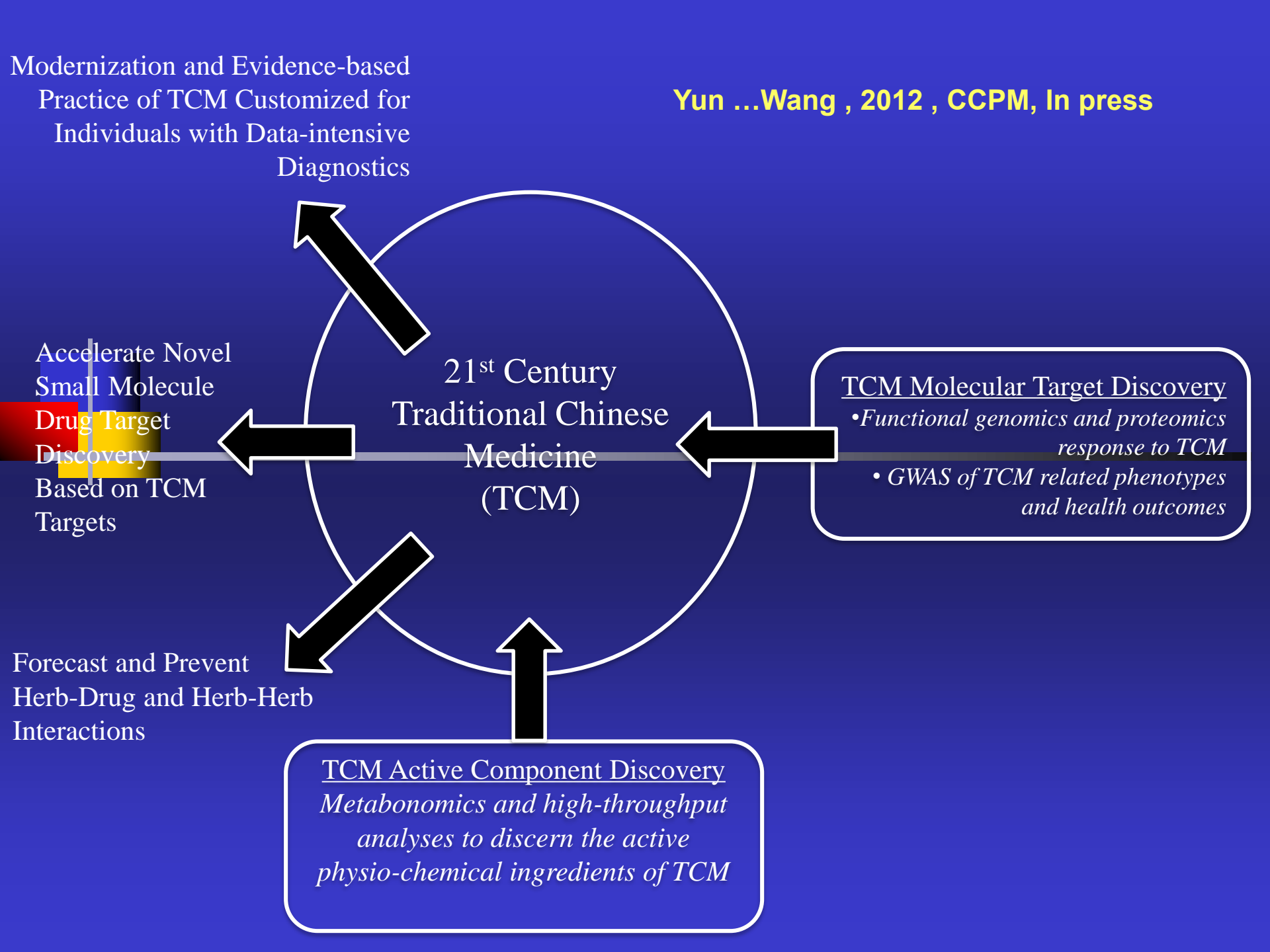
Accelerate Novel Small Molecule Drug Target Discovery Based on TCM Targets

21st Century Traditional Chinese Medicine (TCM)

TCM Molecular Target Discovery
• *Functional genomics and proteomics response to TCM*
• *GWAS of TCM related phenotypes and health outcomes*

Forecast and Prevent Herb-Drug and Herb-Herb Interactions

TCM Active Component Discovery
Metabonomics and high-throughput analyses to discern the active physio-chemical ingredients of TCM

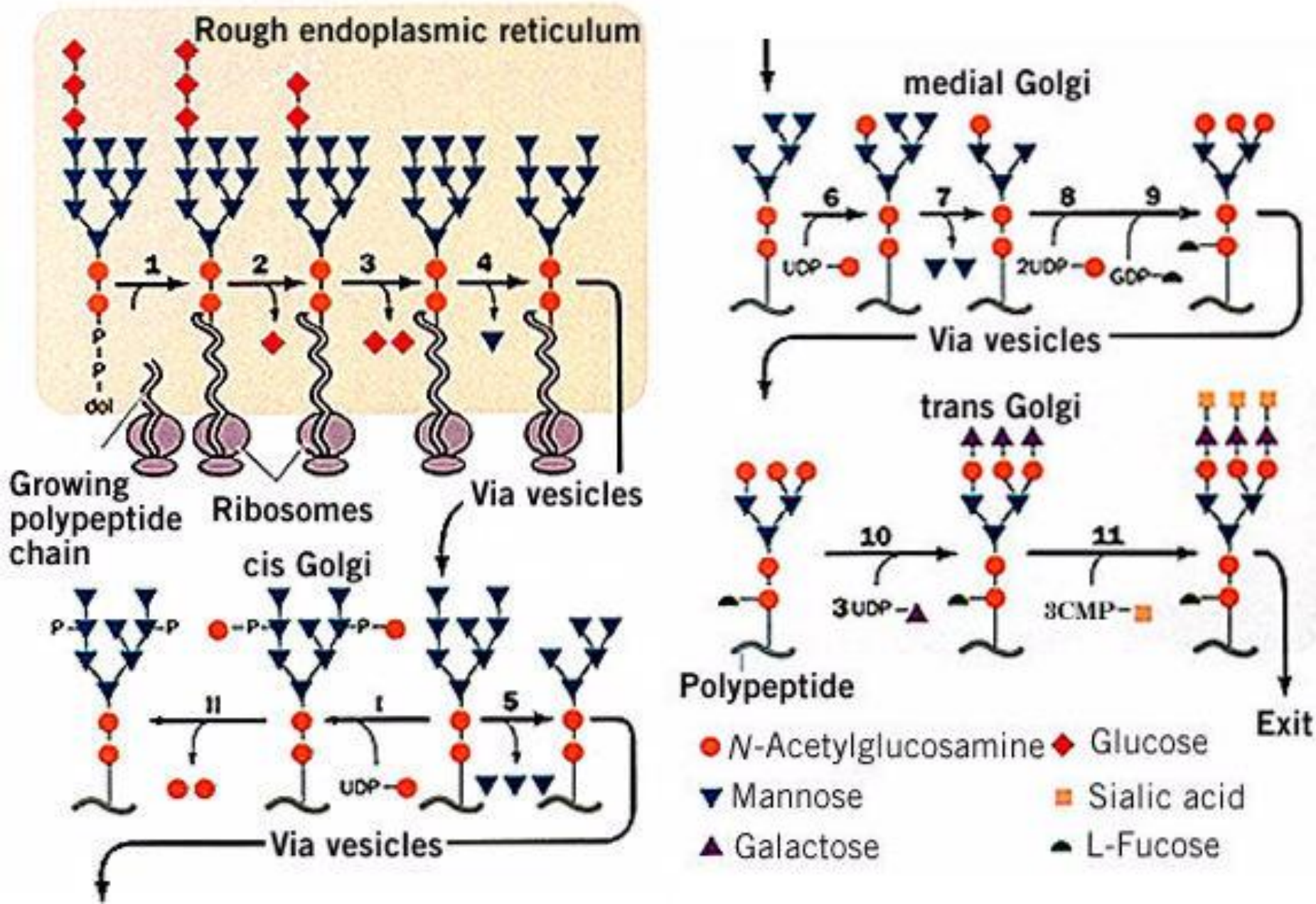


Classical idea: Linkage Analysis

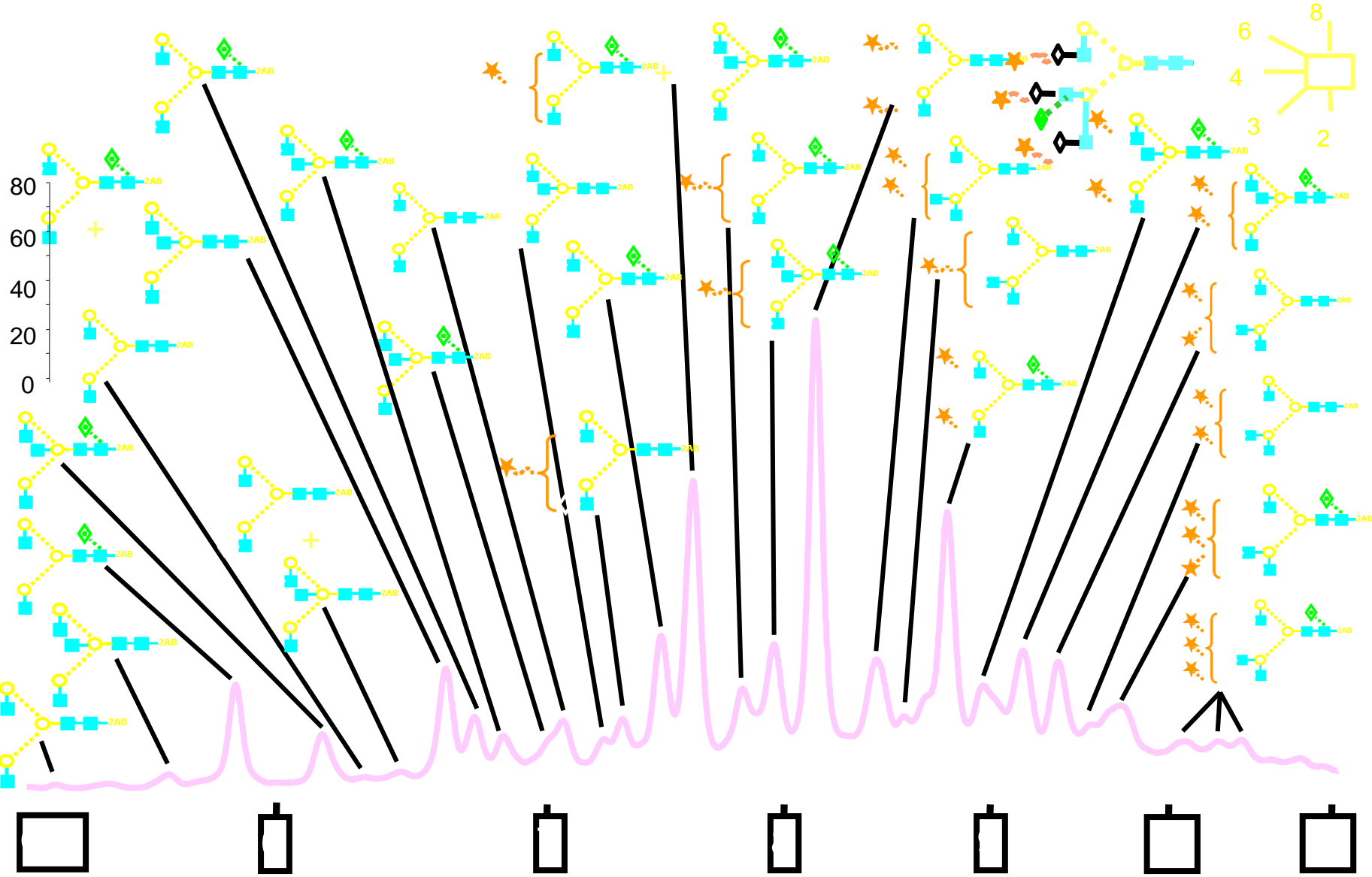


- Find “markers” in the genome and “tag” the whole genome as densely as possible;
- Find consistent associations between some of those markers and disease phenotypes
- Find genes in proximity of implicated markers – they are “disease genes”

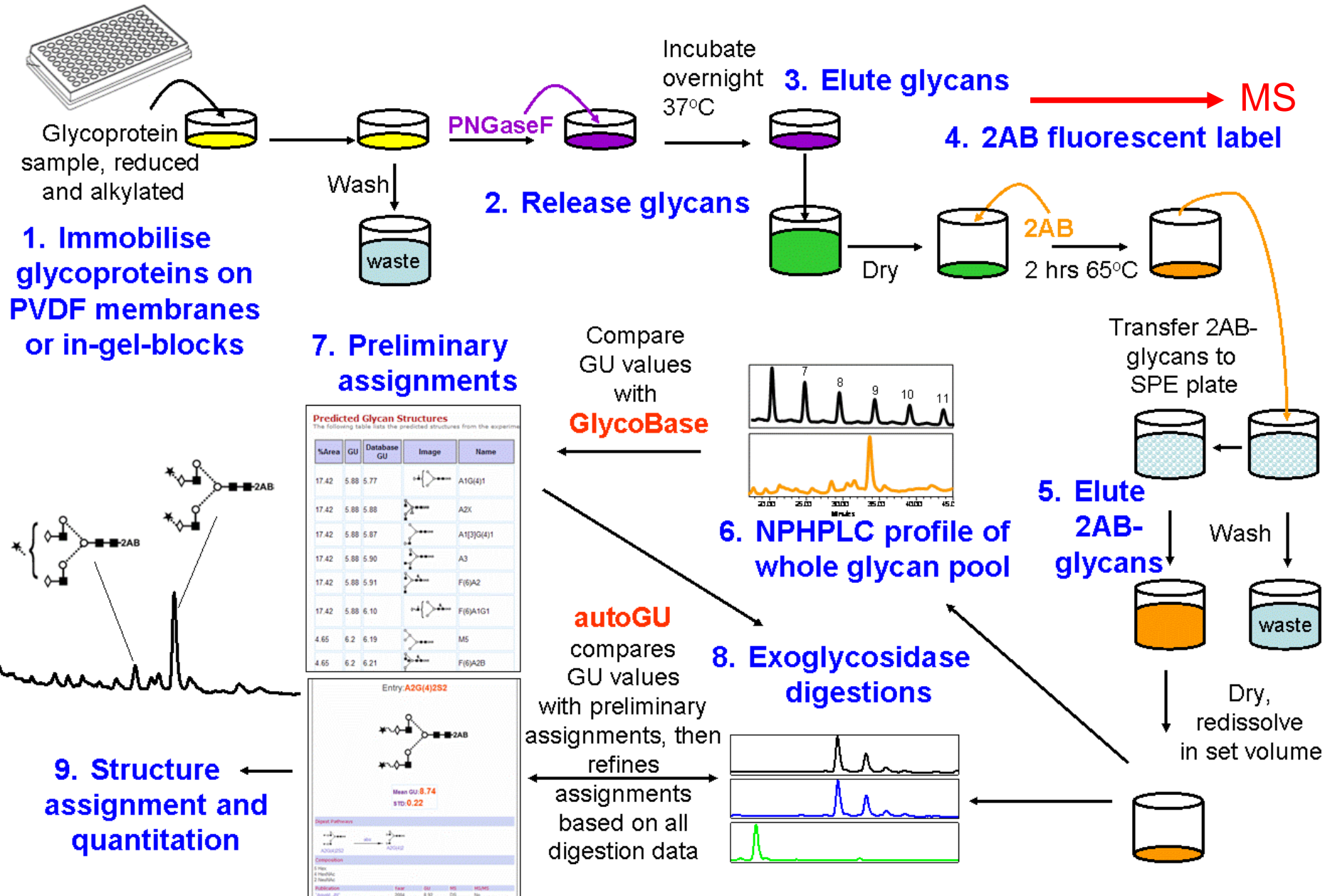
Structure and biosynthesis of glycans is very complex



Over 100 N-linked glycans can be reliably quantified in human serum



Overall strategy for HPLC-based analysis of N-glycans



Glycans:

Interesting intermediate phenotype:

- **N-glycosylation** occurs when blocks of **14 sugars** are added cotranslationally to newly synthesized **polypeptides** in the endoplasmic reticulum.
- The resulting **N-glycans** are subjected to extensive **modification** as they mature and move via the **Golgi complex** to their intra- and extracellular destinations.
- N-glycosylation is **essential** for **multicellular life** and its complete absence is embryonically lethal.

Quantitation of glycans:

- Separation of plasma N-glycans in 16 chromatographic peaks using HPLC method (**GP1-GP16**): area under peak was measured as a QT
- Enzymatic treatment with sialyase revealed 13 secondary peaks (**DG1-DG13**)
- Further 4 QTs investigated: % of glycans with 1, 2, 3 and 4 antennae (**MonoA/DiA/TriA/TetraA**)
- Final 3 composite QTs (36 in total):
 - **A2**: average of GP1 and DG1
 - **Fuc-C**: Core fucose: $DG6 / (DG5 + DG6)$
 - **Fuc-A**: Antenna fucose: $DG7 / (DG5 + DG7)$



Our key assumptions:

- **Disease phenotypes** will be too complex to be linked to individual genes using linkage approach (very low power: high genetic heterogeneity, effects of environment, large misclassification)

- **Good ideas:**

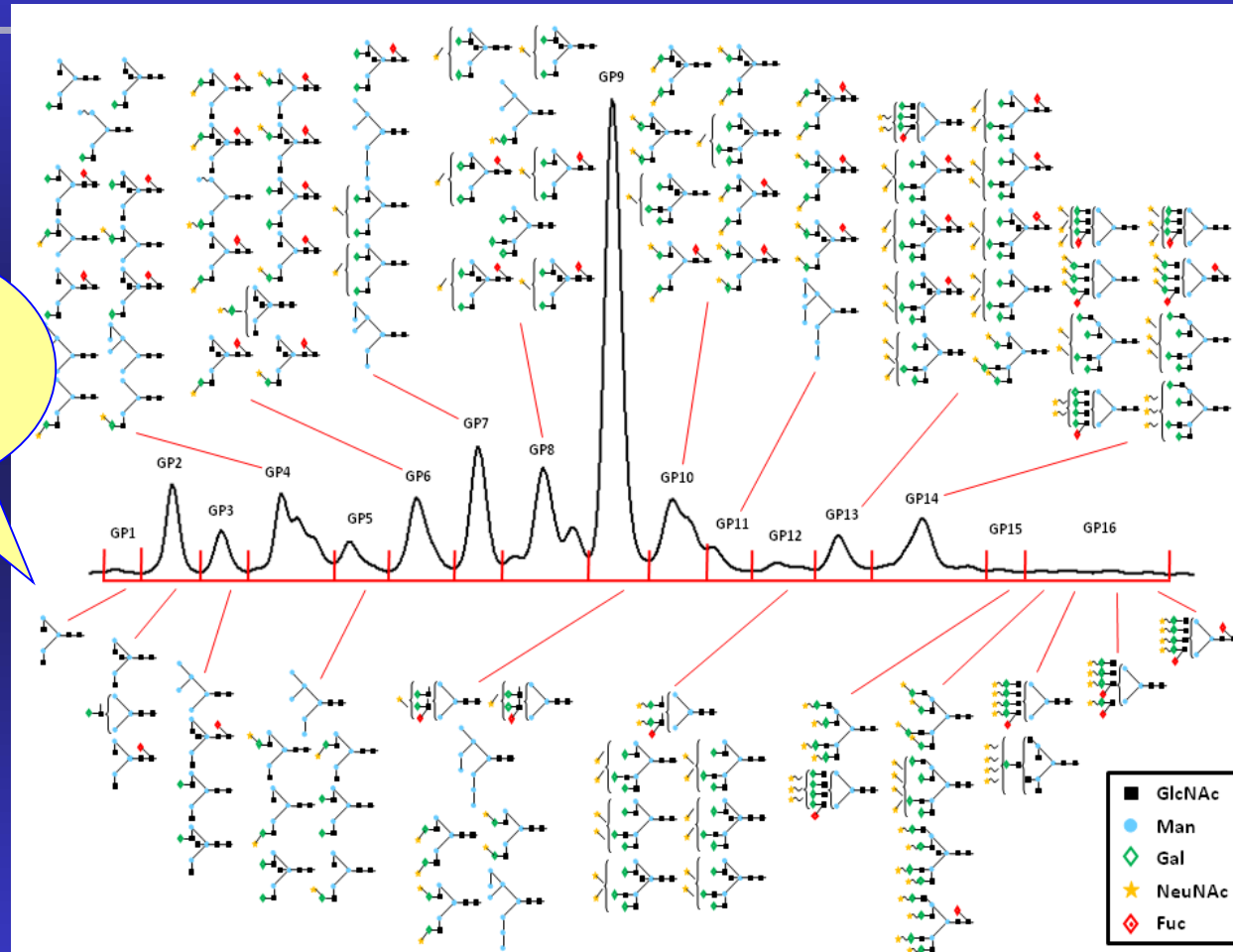
- - use intermediate phenotypes closer to genes (“omics” or many QT)

- - use isolated populations (pedigree information available; large linkage disequilibrium)

- - try to find at least some rare variants with very large effect enriched in isolates (due to founder effect and genetic drift – e.g. like BRCA1, BRCA2)

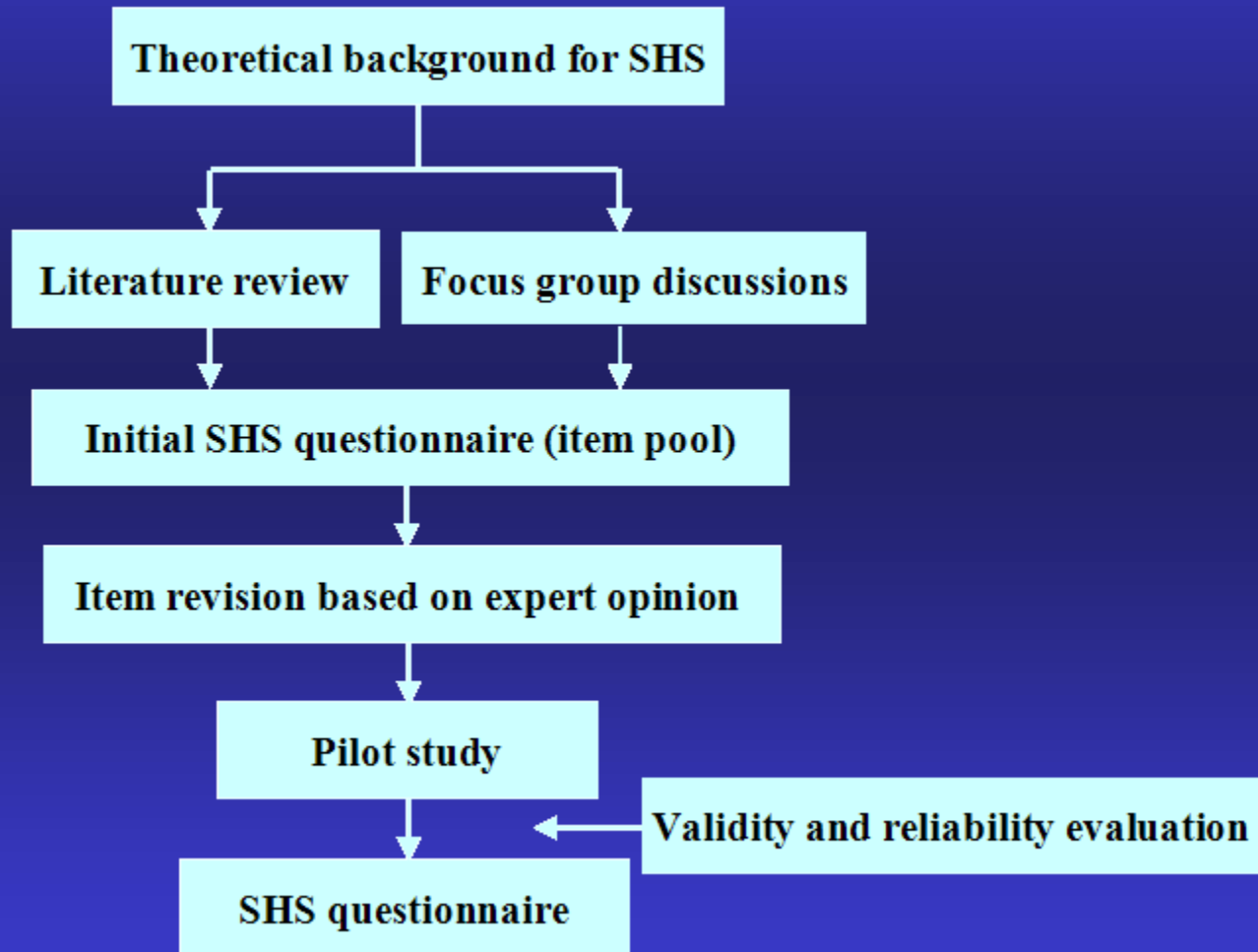
Biomarkers: Profiling of Glycans in Chinese populations

国内首
项糖基
组学研
究
(中国
人糖基
指纹图
谱)

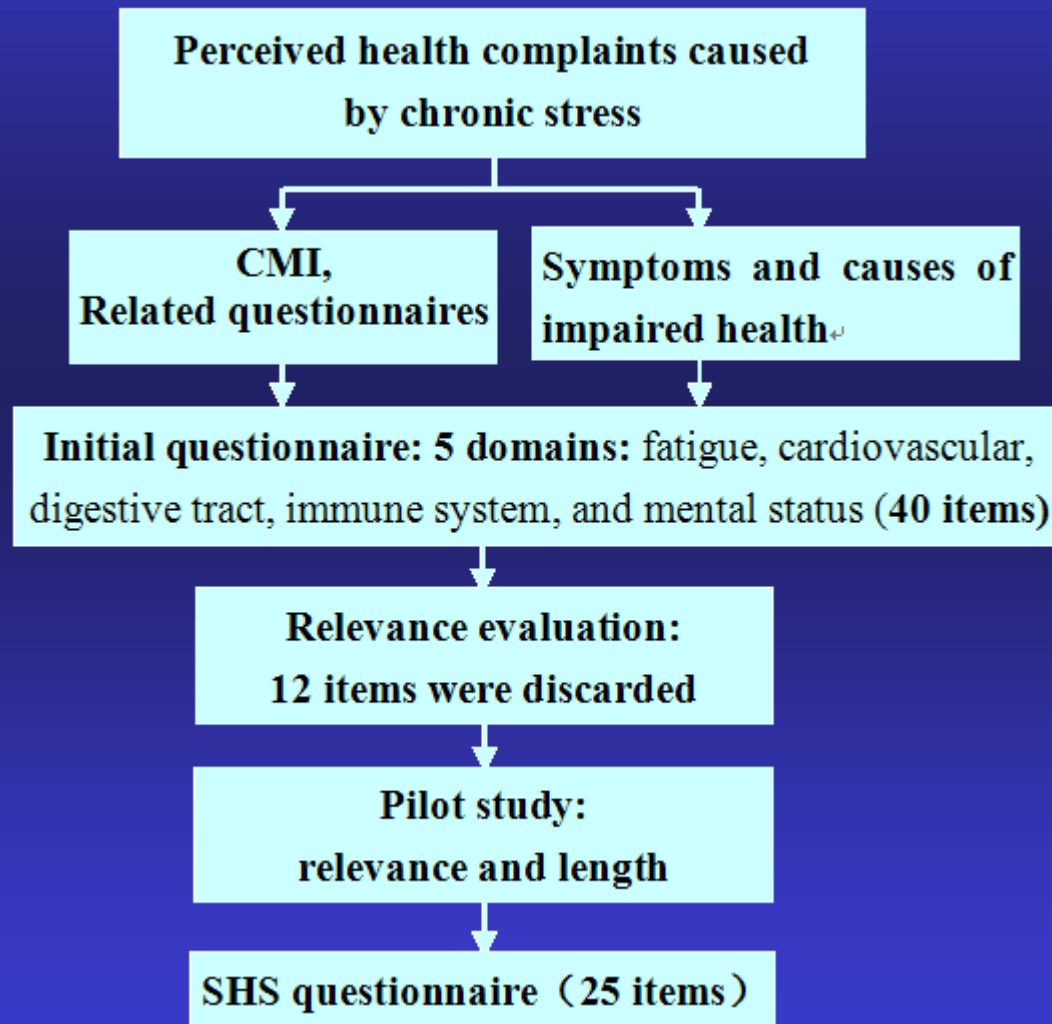


Lu ...Wang , Journal of Proteome Research, 2011;
Gordan...Wang et al, Glycobiology, 2010.

Developing the SHS questionnaire



Developing the SHS questionnaire



Sub-health Status Questionnaire (SHSQ-25)

How often is it, that you (your)	1	2	3	4	5
1. were exhausted without physical actives significantly increasing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. fatigue could not be substantially alleviated by rest.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. were languid when working.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. suffered from headaches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. suffered from dizziness.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. eyes were aching and tired.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. suffered from sore throat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. muscles or joints felt stiff.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. have pains in shoulder/ neck / waist.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. have heavy feeling in legs when walking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. got out of breath while sitting still.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. suffered from sore throat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. were bothered by heart palpitation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. got poor appetite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. suffered from an upset stomach.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. suffered from indigestion.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. got tender fever or cold in-tolerance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. had difficulty in falling asleep.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. had trouble with waking up during night.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. had trouble with impairment in short memory.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. could not respond quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. had difficulty in concentration.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. were distracted for no reason.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. were keyed up or jittery.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. were caught with colds in the past 3 month.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



● Reliability and validity

● Reliability

- Test-retest reliability: ICC
- Internal consistency: IIC, Chronbach's α

● Validity

- Discriminant validity: significant coefficient (T)
- Construction validity
 - Exploratory Factor Analysis, EFA
 - Confirmatory Factor Analysis, CFA
- Discriminative ability
- Convergent validity



Results

Reliability

Table 1 Results for five subscales of the 25-item SHSQ

Subscale		Chronbach's α	IIC	ICC
Fatigue	9	0.85	0.505-0.645	0.778-0.971
Cardiovascular system	3	0.75	0.571-0.602	0.837-0.921
Digestive tract	3	0.73	0.563-0.602	0.920-0.935
Immune system	3	0.62	0.518-0.573	0.911-0.929
Mental status	7	0.86	0.555-0.718	0.811-0.942
Total items	25	0.92	-	0.845

Results

Discriminant validity

Table 2 Discriminant validity of the SHSQ-25

Item	Higher score group (n=758)		Lower score group (n=749)		t	P value
	Mean	SD	Mean	SD		
T1	1.98	0.71	3.26	0.92	29.96	<0.001
T2	1.96	0.98	3.07	0.72	24.85	<0.001
T3	2.23	0.68	3.04	0.72	22.21	<0.001
T4	1.39	0.57	2.63	0.87	32.38	<0.001
T5	1.18	0.38	2.61	0.85	41.79	<0.001
T6	1.68	0.78	3.16	1.11	29.77	<0.001
T7	1.42	0.63	2.76	1.03	30.32	<0.001
T8	1.31	0.58	2.89	1.03	36.36	<0.001
T9	1.59	0.71	3.34	0.89	41.80	<0.001
T10	1.33	0.58	2.80	1.04	33.76	<0.001
T11	1.13	0.33	2.52	0.96	37.54	<0.001
T12	1.02	0.14	2.23	0.93	35.12	<0.001
T13	1.02	0.14	2.23	0.93	35.12	<0.001
T14	1.07	0.24	2.18	0.92	32.02	<0.001
T15	1.18	0.41	2.57	0.94	36.86	<0.001
T16	1.18	0.41	2.57	0.94	36.86	<0.001
T17	1.16	0.41	2.52	0.96	35.60	<0.001
T18	1.15	0.39	2.59	1.08	34.37	<0.001
T19	1.26	0.64	2.72	1.09	31.55	<0.001
T20	1.38	0.65	3.01	0.84	41.97	<0.001
T21	1.28	0.57	2.89	0.85	42.94	<0.001
T22	1.22	0.47	2.80	0.87	43.70	<0.001
T23	1.29	0.52	2.90	0.86	43.69	<0.001
T24	1.31	0.59	2.84	0.81	41.38	<0.001
T25	2.00	0.79	2.72	0.79	17.69	<0.001



Results

Discriminative ability

Table 3 Scores of SHS of white-collar workers, blue-collar workers and college students

Subscale	White-collar workers (n=1696)	Blue-collar workers (n=655)	College students (n=219)	<i>F</i>_(2, 2567)	<i>P</i> value
Fatigue	20.70 ± 5.50*	17.98 ± 5.59 [†]	15.69 ± 5.97 [‡]	64.27	<0.001
Cardiovascular system	3.81 ± 2.28	3.80 ± 2.51 [†]	2.89 ± 1.43 [‡]	15.98	<0.001
Digestive tract	3.96 ± 2.24*	3.27 ± 2.46 [†]	2.28 ± 1.55 [‡]	16.20	<0.001
Immune system	3.31 ± 2.07*	2.73 ± 1.84	2.56 ± 1.39 [‡]	29.08	<0.001
Mental status	15.64 ± 5.20*	12.48 ± 4.88 [†]	11.29 ± 3.86 [‡]	43.00	<0.001
Total items	47.42 ± 14.25*	40.17 ± 13.74 [†]	34.68 ± 11.72 [‡]	123.99	<0.001

Results

Exploratory Factor Analysis, EFA

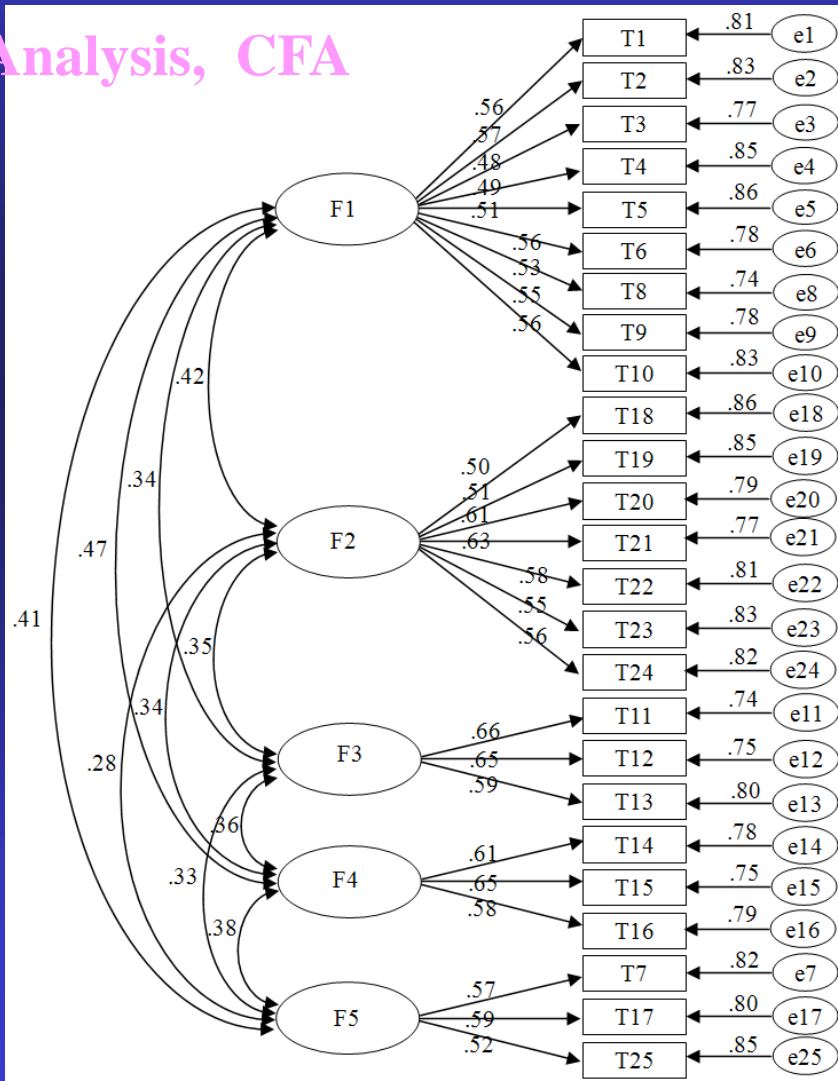
Table 3. Loadings of variables on factors (bold print) emerging from factors analysis (maximum-likelihood method with the promax rotation)^a

Item no. ^a	Abbreviated item label ^a	Factors ^a					Communalities ^a
		1 ^a	2 ^a	3 ^a	4 ^a	5 ^a	
1 ^a	Exhaustion ^a	0.745 ^a	-0.032 ^a	-0.028 ^a	0.022 ^a	0.049 ^a	0.560 ^a
2 ^a	Fatigue alleviation ^a	0.606 ^a	-0.047 ^a	0.125 ^a	0.004 ^a	0.004 ^a	0.385 ^a
3 ^a	Languid when working ^a	0.684 ^a	0.071 ^a	-0.089 ^a	-0.060 ^a	0.055 ^a	0.487 ^a
4 ^a	Headaches ^a	0.457 ^a	0.065 ^a	0.050 ^a	0.001 ^a	0.127 ^a	0.232 ^a
5 ^a	Dizziness ^a	0.391 ^a	0.104 ^a	0.105 ^a	0.057 ^a	0.140 ^a	0.198 ^a
6 ^a	Eyes aching and tired ^a	0.548 ^a	0.022 ^a	-0.053 ^a	-0.013 ^a	0.081 ^a	0.310 ^a
7 ^a	Sore throat ^a	0.022 ^a	-0.019 ^a	0.002 ^a	0.059 ^a	0.533 ^a	0.288 ^a
8 ^a	Muscles or joints felt stiff ^a	0.832 ^a	-0.065 ^a	-0.025 ^a	-0.026 ^a	-0.040 ^a	0.699 ^a
9 ^a	Ache in shoulder/neck /waist ^a	0.843 ^a	-0.003 ^a	-0.089 ^a	-0.068 ^a	0.006 ^a	0.723 ^a
10 ^a	Heavy feeling in legs ^a	0.563 ^a	0.030 ^a	0.176 ^a	-0.004 ^a	0.055 ^a	0.352 ^a
11 ^a	Out of breath ^a	-0.007 ^a	-0.038 ^a	0.650 ^a	-0.058 ^a	0.003 ^a	0.427 ^a
12 ^a	Chest congestion ^a	0.052 ^a	0.137 ^a	0.694 ^a	0.225 ^a	-0.085 ^a	0.561 ^a
13 ^a	Heart palpitation ^a	-0.009 ^a	-0.040 ^a	0.570 ^a	-0.058 ^a	0.006 ^a	0.330 ^a
14 ^a	Poor appetite ^a	-0.026 ^a	-0.042 ^a	-0.042 ^a	0.647 ^a	0.003 ^a	0.423 ^a
15 ^a	Upset stomach ^a	0.090 ^a	0.247 ^a	0.058 ^a	0.636 ^a	-0.086 ^a	0.484 ^a
16 ^a	Indigestion ^a	-0.028 ^a	-0.041 ^a	-0.038 ^a	0.454 ^a	0.020 ^a	0.210 ^a
17 ^a	Tender fever ^a	0.209 ^a	-0.066 ^a	-0.005 ^a	0.258 ^a	0.387 ^a	0.264 ^a
18 ^a	Difficulty falling asleep ^a	-0.023 ^a	0.472 ^a	0.078 ^a	0.157 ^a	0.057 ^a	0.257 ^a
19 ^a	Waking up during night ^a	0.056 ^a	0.510 ^a	0.056 ^a	0.105 ^a	-0.044 ^a	0.279 ^a
20 ^a	Impairment in short memory ^a	0.021 ^a	0.860 ^a	-0.047 ^a	-0.139 ^a	-0.071 ^a	0.767 ^a
21 ^a	Respond unquickly ^a	0.059 ^a	0.830 ^a	-0.020 ^a	-0.102 ^a	-0.069 ^a	0.708 ^a
22 ^a	Difficulty in concentration ^a	-0.113 ^a	0.818 ^a	-0.012 ^a	0.010 ^a	0.057 ^a	0.685 ^a
23 ^a	Distracted for no reason ^a	-0.014 ^a	0.575 ^a	0.046 ^a	0.093 ^a	0.143 ^a	0.362 ^a
24 ^a	Keyed up or jittery ^a	-0.071 ^a	0.611 ^a	0.019 ^a	0.141 ^a	0.172 ^a	0.428 ^a
25 ^a	Catch colds ^a	0.142 ^a	0.076 ^a	-0.045 ^a	-0.039 ^a	0.771 ^a	0.624 ^a

Results

Confirmatory Factor Analysis, CFA

χ^2	1324.818
Df	478
χ^2 / Df	2.772
GFI	0.915
AGFI	0.900
RMSEA	0.056





Determinants of SHS

Table 4 Linear regression analysis of determinants of SHS

Factor	B	S_B	\tilde{B}	t	P
Position competition	7.495	0.289	0.399	25.977	0.000
Over workload	5.500	0.277	0.304	19.854	0.000
Physical activities	-3.445	0.337	0.129	-7.891	0.000
Personal relationship	-2.924	0.346	-0.124	-8.460	0.000
Occupation	-3.101	0.324	-0.122	-8.213	0.000
Gender	3.127	0.448	0.121	8.104	0.000
Age	0.128	0.024	0.081	5.298	0.000
Education	-1.117	0.235	-0.073	-4.754	0.000
Relax during work	-1.347	0.298	-0.066	-4.522	0.000
Drinking	-1.531	0.495	-0.049	-3.094	0.002

$R^2=0.475$, $Adj R^2=0.473$ 。

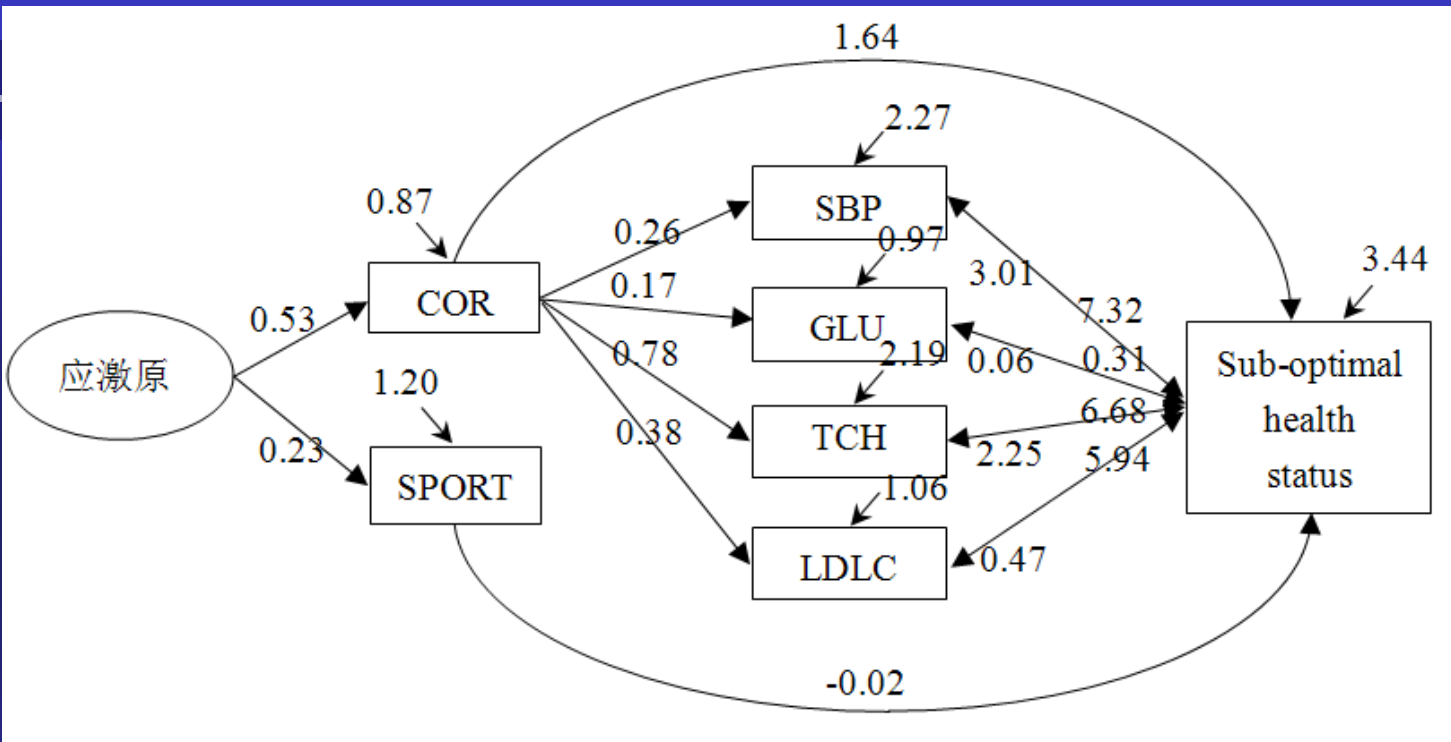
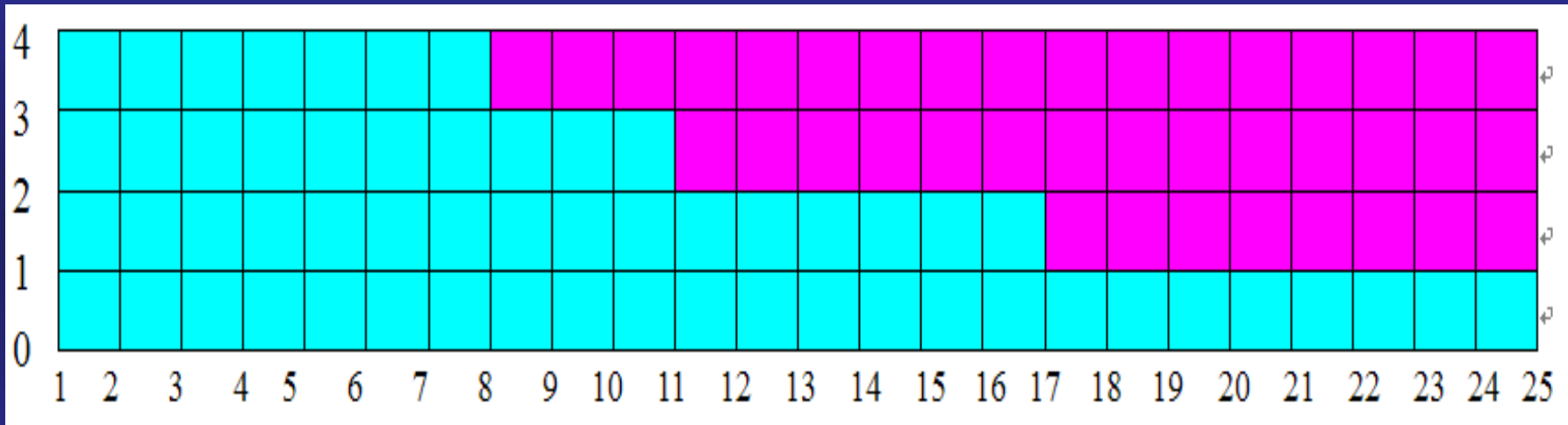


Fig 7 SHS –Blood Pressure, Lipids and Glucose levels

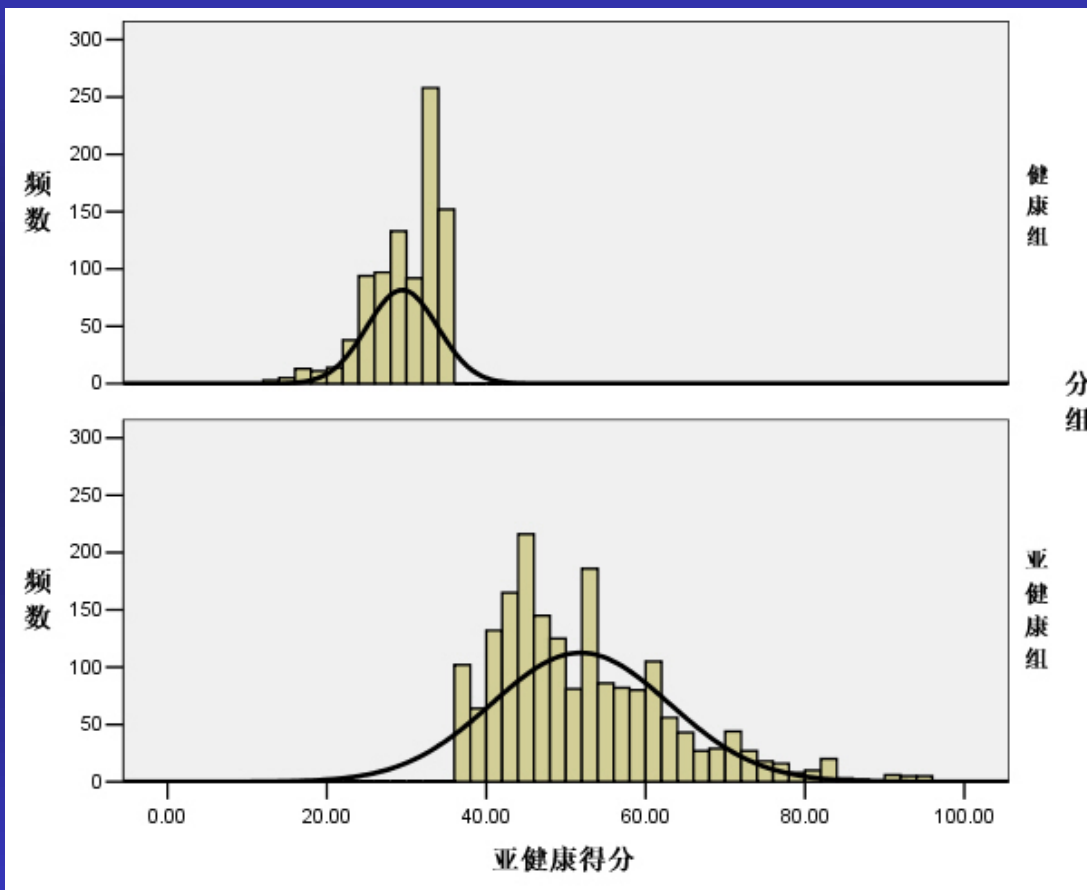
χ^2	df	GFI	AGFI	RMSEA (95%CI)
201.0025	17	0.9999	0.9989	0.1699 (0.1133, 0.2338)

Criteria of SHS



Criteria : SHS score ≥ 35

Distribution of the SHS score



Prevalence: 67.5%

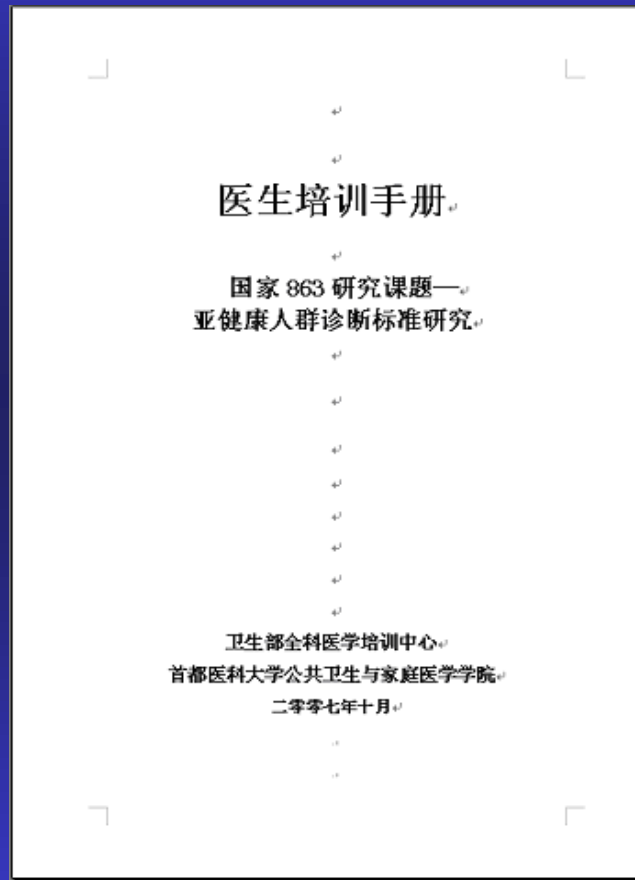
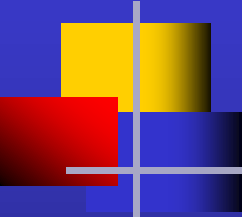


National survey



150 township samples in 28 province

Beijing, Tianjin, Shanghai, Chongqing, Neimenggu, Hebei, Shanxi, Shanxi, Liaonin, Jilin, Heilongjiang, Anhui, Zhejiang, Jiangsu, Shandong, Henan, Fujian, Hubei, Hunan, Guangdong, Guangxi, Jiangxi, Yunnan, Guizhou, Sichuan, Gansu, Xinjiang.



Validisation a questionnaire according to the suboptimum status of health SHSQ-25 for Russia. The first results of research

МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ И СОЦИАЛЬНОГО РАЗВИТИЯ САМАРСКОЙ ОБЛАСТИ
ГБОУ ВПО «САМАРСКИЙ ГОСУДАРСТВЕННЫЙ МЕДИЦИНСКИЙ УНИВЕРСИТЕТ» МИНИСТЕРСТВО
ЗДРАВООХРАНЕНИЯ И СОЦИАЛЬНОГО РАЗВИТИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ
САМАРСКАЯ ОБЛАСТНАЯ АССОЦИАЦИЯ ВРАЧЕЙ
МЕДИЦИНСКАЯ КОМПАНИЯ «ИДК»



В.И. Купаев – заведующий кафедрой семейной медицины СамГМУ, д.м.
О.Ю. Борисов - врач общей практики Красноярской Ц.
Е.Ю. Марутина - заочный аспирант кафедры семейной медицины СамГМУ

02.12.11.



Опросник для оценки субоптимального статуса здоровья человека *SHSQ-25*

1- никогда или почти никогда; 2-редко; 3- часто; 4- очень часто; 5- всегда

№	Как часто это происходит с Вами?	1	2	3	4	5
1	Усталость, не связанная с увеличением физической активности					
2	Усталость, сохраняющаяся после отдыха					
3	Сонливость во время работы					
4	Головная боль					
5	Головокружение					
6	Боль или усталость в глазах					
7	Боли в горле (ангина)					
8	Скованность в мышцах или суставах					
9	Боли в шее, плечах, пояснице					
10	Чувство тяжести в ногах при ходьбе					
11	Одышка в покое					
12	Стеснение в груди					
13	Сердцебиение					
14	Плохой аппетит					
15	Изжога					
16	Тошнота					
17	Снижение толерантности к простуде					
18	Бессонница (проблемы с засыпанием)					
19	Просыпаетесь среди ночи					
20	Затруднения с кратковременной памятью (снижение памяти)					
21	Снижение скорости реакции					
22	Трудности с концентрацией внимания					
23	Отвлекаетесь без причины					
24	Нервничаете или впадаете в панику					
25	Страдали простудой за последние 3 месяца					
		1	2	3	4	5



Quantitative traits measured

ANTHROPOMETRICAL MEASUREMENTS

Body height, Body weight, Abdomen circumference, Hip circumference

PHYSIOLOGICAL MEASUREMENTS

Systolic blood pressure, Diastolic blood pressure, Peak flow, Pulse rate

BIOCHEMICAL MEASUREMENTS

Uric acid, Total cholesterol, HDL, LDL, Albumin, C-reactive protein, Glyco-Hb

ANATOMICAL MEASUREMENTS

Bone mineral density

NEUROPSYCHOLOGY / COGNITION

Word fluency, Digit-symbol test, Attention Test (List of numbers)

ANXIETY AND DEPRESSION

General Health Questionnaire, SHSQ 25

ENVIRONMENT/QUESTIONNAIRE ITEMS

Family disease history, Menstruation, Menarche, Pregnancy, Oral contraceptives, Smoking, Alcohol, Diet, Socioeconomic status

Bio-markers

- CRP
- HbA1c
- U-Albumin
- D-Dimer



Data bank

Total data with open Question translated 20080922 updated.sav - SPSS Data Editor

File Edit View Data Transform Analyze Graphs Utilities Window Help

1: CP17A1A

	SCODE	CP1 A	CP2	CP3	CP5	CP7A	CP7B	CP8	CP9	CP10	CP12	CP13	CP14	CP15 MON1	CP15D AY1	CP16H OUR	CP16 MIN1	CP17T RY1	CP17A A1A	CP17A 1B	CP17A 2A	CP17A 2B
1	11010300301	7	1	11	0	939	忠实里西区2号楼7层右6	2	5	5	2	2	2	3	14	9	23	1				
2	11010300302	1	1	11	0	329	忠实里西区7号楼21层右9	2	5	5	2	1	1	3	14	10	38	5	1	1	2	1
3	11010300303	2	1	11	0	360	忠实里西区5号楼1层右6	2	5	5	2	2	2	3	14	14	14	5	2	1	1	1
4	11010300304	3	1	11	0	318	忠实里西区7号楼20层右14	2	5	5	2	1	1	3	14	13	12	5	1	1	2	1
5	11010300305	4	1	11	0	210	忠实里西区7号楼14层右2	2	5	5	2	2	2	3	14	12	0	5	1	1	2	1
6	11010300306	1	1	15	0	1894	广和东里甲2号3单元4层右2	2	5	5	2	1	1	3	15	14	17	5	2	1	2	1
7	11010300307	13	1	15	0	1235	广渠门外大街28号院9号楼18	2	5	5	2	1	1	3	15	9	15	1				
8	11010300308	2	1	15	0	1553	广渠门外大街28号院7号楼4层	2	5	5	2	2	2	3	15	10	24	5	1	1	2	1
9	11010300309	3	1	15	0	626	广渠门外大街28号院14号楼8	2	5	5	2	1	1	3	15	12	40	5	1	1	2	1
10	11010300310	4	1	15	0	540	广渠门外大街28号院13号楼18	2	5	5	2	1	1	3	15	11	35	5	1	1	2	1
11	11010300311	5	1	7	0	130	崇文区花市枣苑1号楼15层右4	2	8	1	2	2	2	3	8	12	46	5	1	1	2	1
12	11010300312	6	1	7	0	640	崇文区花市枣苑5号楼8层右1	2	1	1	2	2	2	3	8	15	10	5	2	1	1	1
13	11010300313	7	1	7	0	902	崇文区花市枣苑8号楼11门4层	2	7	9	2	2	2	3	8	18	9	5	1	1	2	1
14	11010300314	8	1	7	0	977	崇文区花市枣苑8号楼11门25层	2	4	4	2	2	2	3	8	16	55	5	2	1	1	1
15	11010300315	9	1	7	0	676	崇文区花市枣苑5号楼12层右1	2	5	5	2	1	1	3	8	13	20	5	1	1	2	1
16	11010300316	1	1	10	0	90	居民楼3号楼5层右6	2	5	5	2	1	1	3	9	10	20	5	1	1	2	1
17	11010300317	2	1	10	0	19	居民楼4号楼21门1层右2	2	5	5	2	1	1	3	9	13	8	5	1	1	2	1
18	11010300318	3	1	10	0	248	居民楼1号楼5层右2	2	5	5	2	1	1	3	9	12	4	5	1	1	2	1
19	11010300319	4	1	10	0	273	居民楼1号楼7层右9	2	5	5	2	1	1	3	9	16	20	5	1	1	2	1
20	11010300320	5	1	10	0	165	居民楼3号楼13层右9	2	5	5	2	2	2	3	10	15	4	5	1	1	2	2
21	11010500901	7	1	1	0	413	公寓A20层右6	2	5	5	2	1	2	1	6	10	0	5	2	3		
22	11010500902	8	1	1	0	240	公寓A3层右3	2	4	4	2	2	2	1	6	10	3	5	1	3		
23	11010500903	10	1	1	0	455	女生宿舍2层右18	2	5	5	2	2	2	1	6	12	0	5	1	1	2	1
24	11010500904	4	1	1	0	614	安翔里20楼4111层右2	2	5	5	2	2	2	1	6	11	0	5	1	1	2	1
25	11010500905	5	1	1	0	351	安祥里21楼A座13层右1	2	5	5	2	2	2	1	6	12	10	5	1	1	2	1
26	11010500906	6	1	5	0	9	云冈烟酒1户	2	2	2	2	1	2	1	6	14	0	1				
27	11010500907	4	1	5	0	184	华严北里12号楼31门4层右2	2	5	5	2	2	2	1	6	14	28	5	1	1	2	1
28	11010500908	12	1	5	0	7	云冈商务酒店右1	2	5	5	2	1	1	1	6	14	10	1				
29	11010500909	9	1	5	0	4	外国专家大厦A座右4	2	5	5	2	1	1	1	6	17	0	1				
30	11010500910	5	1	5	0	516	华严北里20号楼11门1层右1	2	4	4	2	2	2	1	6	16	5	5	2	1	1	1
31	11010500911	1	1	20	0	19	民工住房1右3	2	1	1	2	2	2	1	13	15	0	1				
32	11010500912	2	1	20	0	14	北京建工集团奥体中路经理部	2	1	1	2	2	2	1	13	14	50	1				
33	11010500913	3	1	20	0	30	民工住房4右2	2	1	1	2	2	2	1	13	16	35	1				
34	11010500914	4	1	20	0	40	民工住房5右4	2	1	1	2	2	2	1	13	16	30	1				
35	11010500915	5	1	20	0	10	北京建工集团奥体中路经理部	2	1	1	2	2	2	1	13	18	20	1				
36	11010500916	11	1	34	0	39	北辰物业管理	2	2	2	2	1	1	1	14	17	50	1				
37	11010500917	2	1	34	0	1049	安慧里2区8楼2层右5	2	5	5	2	1	2	1	15	17	3	5	1	1	2	1
38	11010500918	1	1	34	0	991	安慧里2区7号楼21层右1	2	5	5	2	1	2	1	15	20	0	5	1	1	2	1
39	11010500919	14	1	34	0	2	北辰购物中心右2	2	4	4	2	2	2	1	15	19	0	1				
40	11010500920	15	1	34	0	41	百货专卖平房右2	2	2	2	2	2	2	1	14	16	0	1				
41	11010502101	2	1	1	0	544	北平里16号楼2单元3层右2	2	5	5	2	1	1	3	28	14	25	5	1	1	2	1
42	11010502102	4	1	1	0	345	北平里15号楼2单元3层右1	2	5	5	2	1	1	3	28	13	31	5	2	1	1	1
43	11010502103	5	1	1	0	80	北平里6号楼5层右2	2	5	5	2	1	1	3	28	11	25	5	1	1	2	1

Information area

SPSS Processor is ready

开始 亚健康验收 亚健康答疑4 附件3 - Mic... 文档1 - Mi... Doc1 - Mic... Total data ... 9:04

Data bank

Total data with open Question translated 20080922 updated.sav - SPSS Data Editor

File Edit View Data Transform Analyze Graphs Utilities Window Help

1: CP17A1A

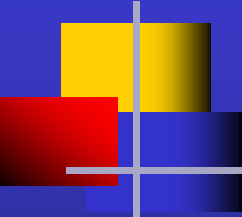
	SCODE	CP1 A	CP2	CP3	CP5	CP7A	CP7B	CP8	CP9	CP10	CP12	CP13	CP14	CP15 MON1	CP15D AY1	CP16H OUR	CP16 MIN1	CP17T RY1	CP17A A1A	CP17A 1B	CP17A 2A	CP17A 2B
1	11010300301	7	1	11	0	939	忠实里西区2号楼7层右6	2	5	5	2	2	2	3	14	9	23	1				
2	11010300302	1	1	11	0	329	忠实里西区7号楼21层右9	2	5	5	2	1	1	3	14	10	38	5	1	1	2	1
3	11010300303	2	1	11	0	360	忠实里西区5号楼1层右6	2	5	5	2	2	2	3	14	14	14	5	2	1	1	1
4	11010300304	3	1	11	0	318	忠实里西区7号楼20层右14	2	5	5	2	1	1	3	14	13	12	5	1	1	2	1
5	11010300305	4	1	11	0	210	忠实里西区7号楼14层右2	2	5	5	2	2	2	3	14	12	0	5	1	1	2	1
6	11010300306	1	1	15	0	1894	广和东里甲2号3单元4层右2	2	5	5	2	1	1	3	15	14	17	5	2	1	2	1
7	11010300307	13	1	15	0	1235	广渠门外大街28号院9号楼18	2	5	5	2	1	1	3	15	9	15	1				
8	11010300308	2	1	15	0	1553	广渠门外大街28号院7号楼4层	2	5	5	2	2	2	3	15	10	24	5	1	1	2	1
9	11010300309	3	1	15	0	626	广渠门外大街28号院14号楼8	2	5	5	2	1	1	3	15	12	40	5	1	1	2	1
10	11010300310	4	1	15	0	540	广渠门外大街28号院13号楼18	2	5	5	2	1	1	3	15	11	35	5	1	1	2	1
11	11010300311	5	1	7	0	130	崇文区花市枣苑1号楼15层右4	2	8	1	2	2	2	3	8	12	46	5	1	1	2	1
12	11010300312	6	1	7	0	640	崇文区花市枣苑5号楼8层右1	2	1	1	2	2	2	3	8	15	10	5	2	1	1	1
13	11010300313	7	1	7	0	902	崇文区花市枣苑8号楼11门4层	2	7	9	2	2	2	3	8	18	9	5	1	1	2	1
14	11010300314	8	1	7	0	977	崇文区花市枣苑8号楼11门25层	2	4	4	2	2	2	3	8	16	55	5	2	1	1	1
15	11010300315	9	1	7	0	676	崇文区花市枣苑5号楼12层右1	2	5	5	2	1	1	3	8	13	20	5	1	1	2	1
16	11010300316	1	1	10	0	90	居民楼3号楼5层右6	2	5	5	2	1	1	3	9	10	20	5	1	1	2	1
17	11010300317	2	1	10	0	19	居民楼4号楼21门1层右2	2	5	5	2	1	1	3	9	13	8	5	1	1	2	1
18	11010300318	3	1	10	0	248	居民楼1号楼5层右2	2	5	5	2	1	1	3	9	12	4	5	1	1	2	1
19	11010300319	4	1	10	0	273	居民楼1号楼7层右9	2	5	5	2	1	1	3	9	16	20	5	1	1	2	1
20	11010300320	5	1	10	0	165	居民楼3号楼13层右9	2	5	5	2	2	2	3	10	15	4	5	1	1	2	2
21	11010500901	7	1	1	0	413	公寓A20层右6	2	5	5	2	1	2	1	6	10	0	5	2	3		
22	11010500902	8	1	1	0	240	公寓A3层右3	2	4	4	2	2	2	1	6	10	3	5	1	3		
23	11010500903	10	1	1	0	455	女生宿舍2层右18	2	5	5	2	2	2	1	6	12	0	5	1	1	2	1
24	11010500904	4	1	1	0	614	安翔里20楼4111层右2	2	5	5	2	2	2	1	6	11	0	5	1	1	2	1
25	11010500905	5	1	1	0	351	安祥里21楼A座13层右1	2	5	5	2	2	2	1	6	12	10	5	1	1	2	1
26	11010500906	6	1	5	0	9	云冈烟酒1户	2	2	2	2	1	2	1	6	14	0	1				
27	11010500907	4	1	5	0	184	华严北里12号楼31门4层右2	2	5	5	2	2	2	1	6	14	28	5	1	1	2	1
28	11010500908	12	1	5	0	7	云冈商务酒店右1	2	5	5	2	1	1	1	6	14	10	1				
29	11010500909	9	1	5	0	4	外国专家大厦A座右4	2	5	5	2	1	1	1	6	17	0	1				
30	11010500910	5	1	5	0	516	华严北里20号楼11门1层右1	2	4	4	2	2	2	1	6	16	5	5	2	1	1	1
31	11010500911	1	1	20	0	19	民工住房1右3	2	1	1	2	2	2	1	13	15	0	1				
32	11010500912	2	1	20	0	14	北京建工集团奥体中路经理部	2	1	1	2	2	2	1	13	14	50	1				
33	11010500913	3	1	20	0	30	民工住房4右2	2	1	1	2	2	2	1	13	16	35	1				
34	11010500914	4	1	20	0	40	民工住房5右4	2	1	1	2	2	2	1	13	16	30	1				
35	11010500915	5	1	20	0	10	北京建工集团奥体中路经理部	2	1	1	2	2	2	1	13	18	20	1				
36	11010500916	11	1	34	0	39	北辰物业管理	2	2	2	2	1	1	1	14	17	50	1				
37	11010500917	2	1	34	0	1049	安慧里2区8楼2层右5	2	5	5	2	1	2	1	15	17	3	5	1	1	2	1
38	11010500918	1	1	34	0	991	安慧里2区7号楼21层右1	2	5	5	2	1	2	1	15	20	0	5	1	1	2	1
39	11010500919	14	1	34	0	2	北辰购物中心右2	2	4	4	2	2	2	1	15	19	0	1				
40	11010500920	15	1	34	0	41	百货专卖平房右2	2	2	2	2	2	2	1	14	16	0	1				
41	11010502101	2	1	1	0	544	北平里16号楼2单元3层右2	2	5	5	2	1	1	3	28	14	25	5	1	1	2	1
42	11010502102	4	1	1	0	345	北平里15号楼2单元3层右1	2	5	5	2	1	1	3	28	13	31	5	2	1	1	1
43	11010502103	5	1	1	0	80	北平里6号楼5层右2	2	5	5	2	1	1	3	28	11	25	5	1	1	2	1

Information area

SPSS Processor is ready

开始 亚健康验收 亚健康答疑4 附件3 - Mic... 文档1 - Mi... Doc1 - Micr... Total data ... 9:04

Suboptimal health



Gene	VS	Environment
Nature	VS	Nurture
Genomics	VS	Genetics
Public Health	VS	Individulized Medicine
City	VS	Rural
Rich	VS	Poor
Health	VS	Disability
Developed	VS	Developing
Migrants	VS	Residences



Yan et al. J Epidemiology 2009; Zheng et al. Public Health Genomics 2009; Lan et al. J Hum Genet 2009; Wang et al. NEJM 2010; Chen et al. Lancet 2010; Peng et al PLoS ONE 2010, Wang et al, JAMA 2011; Wang et al. Nature Reviews Cancer 2011, Nature Preceding, Wang 2011, Lu et al J Proteom Research, 2011

澳门全民健康

香港大学公共卫生学院成立 - 2010年

新加坡大学公共卫生学院成立 - 2011年

澳门公共卫生学院成立 - 2012年???!!!

