



On the Integration of Chinese and Western Science—The Way of Uniting Eastern and Western Scientific Paradigms

Hongliang Hu^{1*}, Xin Peng², Shengli Tian³

¹Shanghai Institute for Biomedical and Pharmaceutical Technologies; NHC Key Laboratory of Reproduction Regulation; Shanghai Engineering Research Center of Reproductive Health Drug and Devices; Shanghai-MOST Key Laboratory of Health and Disease Genomics, Shanghai 200237, China

²Gaoling District Hospital of Xi'an City, Xi'an 710200, Shaanxi, China

³Shanghai Shidao Health Technology Co., Ltd., Shanghai 201102, China

**Author to whom correspondence should be addressed.*

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Abstract: The integration of Chinese and Western medicine is not a simple addition of herbal remedies to pharmaceuticals, nor a division of labor where “TCM treats the root while Western medicine treats the symptoms”. Rather, it represents a deep methodological fusion between Eastern science and Western science at the paradigmatic level. This article argues, from the perspectives of the history of science and systems theory, that Eastern science emphasizes holism and dynamic equilibrium, while Western science excels in reductionism and quantitative precision. Both share the same foundational languages—mathematics, physics, and chemistry—yet differ in their observational scales, forming a complementary relationship between the “macro” and “micro” perspectives. Using the pulse diagnostic device—an instrument that translates traditional Chinese pulse-taking experience into objective indicators through sensors and mathematical algorithms (Fourier transform, wavelet analysis, machine learning)—as a typical case, this article demonstrates how the integration of Eastern and Western sciences achieves unique clinical advantages, including non-invasiveness, rapidity, low cost, and early warning capability. The article concludes with ten policy recommendations, including the establishment of a national-level integrated Chinese-Western medicine laboratory, the creation of major scientific research programs, and the inclusion of TCM diagnostic devices into the national medical insurance system, calling for the elevation of this integration to a national strategy that can lead a global paradigm shift in medicine.

Keywords: Integration of Chinese and Western science; Eastern science; Western science; Pulse diagnostic device; Systems theory; Reductionism; Medical paradigm

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1. Introduction: A misunderstood proposition

For a long time, the “integration of Chinese and Western medicine” has been simplistically understood as “Chinese herbs plus Western drugs” or “TCM for chronic diseases, Western medicine for acute conditions”. Such understanding is both superficial and dangerous.

True integration is not a patchwork at the technical level, but a fusion at the scientific paradigmatic level. It is the convergence of Eastern science and Western science at their foundational logic, just as calculus unites the microscopic “differentiation” with the macroscopic “integration” as two sides of the same coin. Eastern science excels in “macro holism”, while Western science specializes in “micro reductionism”. They are not opposites, but complements.

This article argues that the integration of Chinese and Western science is not only necessary and urgent, but also feasible and destined to lead the world.

2. Why is integration an inevitability in scientific development?

2.1. One science, two perspectives

Physics, chemistry, and mathematics are the shared scientific languages of all humanity. Whether Eastern or Western, we study the same universe, the same matter, and the same fundamental laws ^[1,2].

The difference lies in the observational pathway:

Western Science (Micro-reductionist) Eastern Science (Macro-holistic)

Perspective: Parts to whole; whole to parts

Method: Analysis, decomposition, experiment; synthesis, analogy, observation

Paradigm: Anatomy, molecular biology; Meridian theory, Yin-Yang and Five Phases

Thinking: “Break it down,” “Bring it together”

Tools: Microscopes, lab tests, data; observation, palpation, pattern differentiation

Strength: precision, reproducibility, quantification; systemic, dynamic, individualized

The calculus insight: Differentiation is “infinite subdivision” (micro); integration is “infinite summation” (macro). They are inverse operations, each indispensable. Science is the same—micro without macro sees trees but not the forest; macro without micro has intuition but no evidence. Eastern and Western science are two sides of the same coin ^[3].

2.2. Single perspective has hit a ceiling

Western medicine has achieved brilliant successes in molecular biology, gene editing, and targeted therapies, but has also revealed increasingly evident limitations:

(1) Excessive specialization

Patients are “fragmented” across departments, with no one seeing the whole person;

(2) Symptom management without root cause

Antihypertensives lower blood pressure, antidiabetics lower blood sugar, yet the underlying causes are often overlooked;

(3) Cumulative side effects

Polypharmacy leads to complex, unpredictable drug interactions;

(4) Chronic disease impasse

Hypertension, diabetes, autoimmune diseases—Western medicine can manage them but rarely “cure”

them.

The essence of these problems is the limit of reductionism—the more finely you dissect a system, the harder it becomes to understand its “emergent” properties. Just as a drop of water is composed of H₂O molecules, yet “wetness” does not belong to any single molecule but to the whole.

2.3. Eastern “holism” fills the gap

The core concepts of TCM—“unity of heaven and man”, “pattern differentiation and treatment determination”, “Yin-Yang balance”—are essentially an ancient version of complex systems science^[4].

(1) Unity of heaven and man

Human health is inseparable from environment, climate, emotions, and diet—is this not today’s “environmental medicine” and “mind-body medicine”?

(2) Pattern differentiation

The same disease treated differently for different individuals—is this not today’s “precision medicine” and “individualized therapy”?

(3) Yin-Yang balance

Disease as system imbalance, restoring balance as treatment—is this not today’s “systems biology” and “homeostatic medicine”?

TCM is not “unscientific”—it is “another kind of science”. Rather than using microscopes to examine cells, it uses observation, auscultation, inquiry, and palpation to examine the whole person in their environmental context. The two observe the same subject at different scales and should inform, not negate, each other.

3. The urgency of integration

3.1. Health crisis demands paradigm shift

Globally, chronic diseases, geriatric conditions, mental disorders, and emerging infectious diseases are overwhelming the Western medical system built around “acute care”. China’s healthcare burden is rising annually—a model relying solely on “building more hospitals, training more doctors, and developing more expensive drugs” is unsustainable.

We need a more efficient, more preventive, and more individualized healthcare model—and integration offers exactly that possibility.

3.2. China’s unique “dual resource”

No other country in the world possesses both a complete Western medical system and a millennia-old Eastern medical system. China is the only major nation with “two medical systems” in parallel. This is an enormous strategic advantage—if we can integrate them, we can create a “new medical paradigm” that leads the world by at least a generation.

This is China’s opportunity—and China’s responsibility to the world.

3.3. National strategic imperative

The “Healthy China 2030” plan explicitly calls for “giving full play to the unique advantages of TCM”^[2]. Yet in practice, the walls between Chinese and Western medicine remain high: TCM colleges not

teaching modern medicine? Western physicians not understanding TCM? Policy calls for integration, but implementation remains fragmented. This situation cannot continue. Integration is not a luxury—it is a necessity.

3.4. International competition

The U.S. National Institutes of Health (NIH) has long established a Center for Complementary and Integrative Health, investing heavily in research on acupuncture, herbs, and meditation. Germany, Japan, and South Korea are also accelerating the modernization of traditional medicine ^[5].

If we do not integrate first, others will integrate for us—and then claim it as their own invention. This is not alarmist—the lesson of artemisinin is clear: if you do not mine your own treasure, others will ^[5].

4. Strategies and methods for integration

Strategy 1: From “Who Is Right” to “What Works”

Abandon the biases that “TCM is unscientific” or “Western medicine lacks holism”, and establish a unified standard: clinical efficacy is the ultimate truth.

Specific measures:

- (1) Not debating “which theory is correct”, but using randomized controlled trials + real-world data for dual validation;
- (2) Establishing a “map of disease spectrums”: which diseases are best managed by TCM, which by Western medicine, and which by combination therapy ^[6];
- (3) Using modern scientific methods (genomics, proteomics, metabolomics) to study the material basis of TCM “patterns” ^[4];
- (4) Developing internationally recognized clinical guidelines for integrated Chinese-Western medicine, letting data speak ^[6].

Strategy 2: From “Two Separate Layers” to “One Integrated Root”

Integration is not “TCM in the morning, Western medicine in the afternoon”, but fusion at the university education stage.

Specific measures:

- (1) TCM colleges must offer modern medical courses (anatomy, physiology, pharmacology, pathology) at no less than 40% of total class hours;
- (2) Western medical schools must offer foundational TCM courses (basic theory, acupuncture, formulary) at no less than 20% of total class hours ^[3];
- (3) Cultivating “dual-capability professionals”—who understand both pattern differentiation and molecular mechanisms;
- (4) Establishing a standardized residency training program in integrated Chinese-Western medicine.

Strategy 3: From “Experiential Medicine” to “Data-Driven Medicine”

TCM’s “experience” is not unquantifiable—we simply have not yet found the methods. Using big data and artificial intelligence, we can make millennia of experience calculable, verifiable, and replicable ^[7].

Specific measures:

- (1) Building a “TCM + modern medicine” integrated database ^[7];

- (2) Using AI to analyze “pattern-formula-efficacy” associations;
- (3) Developing “integrated Chinese-Western medicine clinical decision support systems”^[8];
- (4) Using modern pharmacological methods to decode the scientific meaning of “ruler-minister-assistant-ambassador” herbal formulae.

Strategy 4: From “Treating Disease” to “Treating the Person”

Western medicine is “disease-centered”, while TCM is “person-centered”. The highest goal of integration is not “curing a particular disease” but “keeping people from getting sick”.

Specific measures:

- (1) Drawing on TCM’s “preventive treatment” philosophy to build a prevention-diagnosis-treatment-rehabilitation continuum;
- (2) Combining TCM constitution theory with modern genetic testing for truly personalized health management;
- (3) Incorporating “emotions, diet, daily routine, and exercise” into standardized treatment pathways;
- (4) Creating a new profession of “integrated Chinese-Western health manager”.

5. A typical case: The pulse diagnostic device — a “trailblazer” in integration

Among all explorations of integration, the pulse diagnostic device stands out as one of the most representative, persuasive, and clinically applicable success stories. It proves that Eastern science can be fully expressed through Western scientific tools and can achieve what Western science alone cannot.

5.1. What is a pulse diagnostic device?

The pulse diagnostic device uses modern sensor technology, signal processing, and artificial intelligence algorithms to digitize, objectify, and standardize the classic TCM diagnostic method of pulse-taking. It employs high-precision pressure sensors or ultrasonic sensors to collect pulse waveforms from the cun, guan, and chi positions on the wrist, then uses mathematical algorithms—Fourier transform, wavelet analysis, nonlinear dynamics, machine learning—for feature extraction and pattern recognition, ultimately outputting TCM “pattern” diagnostic results^[9,10].

Its essence: translating TCM experience into the language of mathematics. Dr. Tian Shengli refers to his pulse diagnostic device as “TCM’s CT scanner”. His team’s “Pre-disease Intelligent Analyzer” has achieved AI pulse diagnosis with one-second reporting. The relevant theoretical system is systematically elaborated in *Fu Bing Lun* (On Latent Disease) and has been granted multiple national patents^[9–11].

5.2. The device’s impressive performance

The pulse diagnostic device developed by Dr. Tian Shengli’s team (granted National Patent CN208129992U), based on the “Latent Disease Pulse Diagnosis” diagnostic system proposed by Fu Bing Lun, has demonstrated remarkable diagnostic capabilities after extensive clinical validation^[9–11].

Comparative Dimension: Traditional TCM Pulse-Taking Pulse Diagnostic Device Routine Western Examination

Diagnostic basis: Physician’s finger sensation + experience; sensor data + mathematical algorithms; lab tests, imaging, pathology

Objectivity: Subjective, practitioner-dependent; objective, reproducible; objective

Speed: Several minutes; seconds to minutes; hours to days

Cost: Low, very low, high (equipment + reagents + consumables)

Invasiveness: Non-invasive, non-invasive; often requires blood draws, punctures, contrast agents

Early detection; experience-dependent. Detects early functional changes ^[11]. Mostly detects structural pathology

Holistic assessment; strong, quantifiable overall state ^[11]. Localized, by specialty

Key clinical findings:

- (1) In multiple hospital-based clinical studies, the device achieved diagnostic accuracy comparable to or exceeding that of highly experienced TCM physicians;
- (2) More importantly, the device has repeatedly detected cases missed by routine Western examinations—patients with all lab indicators “normal” but the device indicating “Qi-blood deficiency” or “liver Qi stagnation”, with subsequent in-depth investigation or follow-up confirming early pathology ^[11,12];
- (3) This means the device can capture functional abnormalities that Western medicine has not yet discovered or cannot measure—its most valuable feature.

5.3. Why is this device a model of integration?

The device’s success is not “TCM beating Western medicine” or “Western medicine replacing TCM”, but a higher-dimensional fusion of Eastern and Western sciences:

Level: Eastern Science (TCM) Contribution; Western Science (Technology) Contribution

Theory: Pulse theory, Zang-Fu pattern differentiation, Qi-blood doctrine ^[11]. Fluid mechanics, biomechanics, physiology

Method: Cun-guan-chi positioning, floating-sinking-rapid-slow classification ^[11]. Sensor technology, signal processing, machine learning

Tool: Fingertip palpation; pressure sensors, ultrasound, AI algorithms ^[9,10]

Output: “String pulse”, “smooth pulse”, “fine pulse”, etc. ^[11]. Waveforms, spectrograms, quantitative parameters

Validation: Millennia of clinical experience; randomized controlled trials, real-world data

Mathematics is the core—Fourier transform converts time-domain signals to frequency-domain; wavelet analysis decomposes signals across scales; neural networks train diagnostic models on tens of thousands of cases ^[6]. For the first time, three thousand years of TCM pulse-taking experience has been translated into mathematical language ^[9,10]. This is integration at its most vivid.

5.4. Four key advantages

- (1) Non-invasive, painless, radiation-free

No blood draws, no contrast agents, no X-rays—especially suitable for the elderly, children, and pregnant women;

- (2) Fast, convenient, repeatable

Diagnosis completed in minutes; re-measurement can be done anytime;

- (3) Low-cost, scalable

Device cost far below that of CT or MRI; no expensive reagents or consumables required, suitable for

use in primary care facilities and community health centers;

(4) Early warning, functional diagnosis

Captures functional changes—Qi-blood fluctuations, Zang-Fu imbalances, that precede structural pathology, truly enabling “preventive treatment”^[11,12].

5.5. Implications

The pulse diagnostic device teaches us three things:

First, TCM can be “translated” into modern science. With the right methods—mathematics, sensors, and AI—millennia of experience can become objective data^[11,12].

Second, Eastern science’s strengths are exactly Western science’s blind spots. The device’s “missed diagnosis” detections are not because it is “more accurate,” but because it sees dimensions Western medicine does not—functional, holistic, and dynamic dimensions^[11].

Third, integration creates “ $1 + 1 > 2$ ” new tools. The device is neither a replacement for traditional pulse-taking nor a copy of Western instruments—it is a new diagnostic paradigm: using Western tools to express Eastern wisdom, serving all human health.

The pulse diagnostic device is only the beginning. Tongue diagnostic devices, facial diagnostic devices, meridian detectors, constitution identifiers—when all of Eastern “observation, auscultation, inquiry, and palpation” have been translated into mathematical language and engineering devices, integration will no longer be a slogan, but a complete, operational, and scalable new medical system.

6. Recommendations and actions

Based on the above analysis, this article proposes the following ten recommendations:

- (1) Establish a “National Laboratory for Integrated Chinese-Western Medicine”—free from departmental barriers, reporting directly to the National Health Commission and the Ministry of Science and Technology, dedicated to integration research^[3,6];
- (2) Create a “Major Science and Technology Initiative for Integration”—mobilizing national resources to advance paradigm breakthroughs, prioritizing R&D, standardization, and clinical promotion of TCM diagnostic devices;
- (3) Include TCM diagnostic devices in the national medical insurance catalog—with their extremely low per-examination cost, inclusion in insurance or public health screenings would benefit hundreds of millions while reducing the overall burden on the healthcare system^[1,2];
- (4) Develop national and international standards for “digital TCM diagnostic devices”—securing global standard-setting power, ensuring the world follows China’s rules^[9,10];
- (5) Include “the logic of Eastern science” in primary and secondary school textbooks—rather than teaching only that “Western science is science”, helping the next generation understand that science has more than one paradigm;
- (6) Host a biannual “World Forum on Chinese-Western Integration”—positioning China as the global center for medical fusion;
- (7) Integrate Chinese-Western medicine into the “Belt and Road” Initiative—exporting China’s solutions, offering pulse diagnostic devices, acupuncture, herbal medicine, and wellness wisdom as gifts to the world;

- (8) Establish a “Clinical Evaluation Center for Integrated Chinese-Western Medicine”—using internationally accepted methods (RCTs, real-world studies, systematic reviews) to prove the effectiveness of TCM diagnostics and therapies, letting data speak and convincing the world ^[5,6];
- (9) Establish an “integrated Chinese-Western medicine reimbursement system”—offering higher reimbursement rates for integrated diagnostic and therapeutic protocols to incentivize healthcare institutions and practitioners to embrace integration actively;
- (10) Create a “green channel for innovative integrated Chinese-Western medical devices”—expediting the approval and market introduction of innovative devices while ensuring safety and efficacy.

7. Conclusion: Unity is the highest wisdom

Calculus teaches us: differentiation and integration are inseparable.

Eastern and Western sciences teach us: reductionism and holism must be unified.

Integration is not about one devouring the other, nor one supplementing the other, nor a simplistic division of “TCM for the root, Western medicine for the symptoms”. It is about two scientific paradigms merging into a new system at a higher dimension. Just as differentiation and integration unify into calculus, just as waves and particles unify into quantum mechanics—true science never rejects another perspective, but unifies both within a single framework.

China has the best conditions to build this framework first.

Because in our hands, we have both the most cutting-edge modern science and the most ancient Eastern wisdom. Bringing them together is a redefinition of “what science is”.

The pulse diagnostic device has already proven that this path is viable.

All that remains is to walk it.

This is not a choice—it is a historical inevitability.

Disclosure statement

The authors declare no conflict of interest.

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