The concern and prospective between precision medicine and traditional Chinese medicine

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Traditional Chinese medicine (TCM) has a historical based-theory which has been adopted in oriental countries. It is gradually being noted by the western world for the limitation of reductionism of mainstream medicine and TCM is often seen as more accessible and more acceptable to people.

It is clear that the unifying systems theory of TCM could complement the western medicine; thus; TCM has raised the public's attention and more and more issues are worth discussion (1,2). As precision medicine is so hot thus some scholars now try bridge western medicine and TCM by precision medicine and there could be some concern and perspective towards this issue.

Concern and perspective

"Zheng" oriented and "Disease" oriented

TCM is based on Zheng, a kind of symptom complex while western medicine is based on disease orientation. From the view of TCM, a patient with a disease, for instance, hepatitis could present with different Zheng in a different stage and need to be treated accordingly. However, it is difficult to define Zheng by western medicine though some research has made effort in this issue (3,4). We notice that some research trying to approach qi from molecular view point (5,6). An inspiring example is that Jin *et al.* even define the qi-deficiency and blood deficiency related pathway and protein by applying biomedical methods in TCM formula (7). It is worth encouraging yet so far we don't have

globalized standard Zhang classification. Other methods include the using of a database of TCM or bio information to approach related molecular mechanism (8,9). We deem it a step to connect the TCM and western medicine and worth for further evaluation to connect the concept of Zheng and western medicine.

TCM herb vs. precision medicine

Many studies have tried to clarify pathways of some Chinese herbs which aim to find effective compounds or new drugs (10,11). Though developing a new drug from the decoction (mix herbs) is hard to define the active components, especially the diverse effects from combine myriad herbs (12,13) Actually, TCM works in an artistic way; several-herbs' permutations and combinations will generate different effects in varied TCM syndromes. Though this part is difficult to approach through current study design in the field of mainstream medicine; we are still delighted to see more and more scholars try bridging TCM and western medicine via precision medicine and bioinformatics. Just as the former American president Obama has addressed: "*Recognizing that there is no "one size fits all" approach is an un-ignorable step for it aims to tailor treatment and prevention strategies to people's unique characteristics, including their genome sequence, microbiome composition, health history, lifestyle, and diet.*" This statement is just consistent with TCM's individualized care. We can, therefore, imagine that there will be a spark when TCM meets precision medicine.

Additionally, biomarkers, which are stars in recent years, intrigue researcher interests from western medicine to Chinese medicine. An article published in 2018 *Sci Rep* tries to differentiate TCM syndromes of HIV/AIDS by using bioinformatics and biomarkers identification (14); Liu *et al.* also try to apply miRNA-target network analysis to identify potential biomarkers for TCM syndrome development evaluation in hepatitis B related liver cirrhosis (15); similar publish are growing rapidly in recent years (16,17). Though it is an inspiring and encouraging phenomenon in bridging precision medicine and TCM; yet the existing dilemma is there are no definite and standardized criteria for TCM syndrome definition between these researches. Though some TCM syndrome research has been investigated based on disease oriented (3,18,19); a worldwide convinced edition is still lacking. Two Chinese form constitution or TCM syndrome classification have been published yet not well applied in all related research (20,21). Aside from the standardization of TCM syndrome or "Zheng", precision medicine might be a cue for bridging effect of herb and of which population or TCM syndrome is a response to certain herbs (22,23).

Acupuncture vs. precision medicine

Acupuncture is widely accepted and studied than herbs for many electrophysiology related study have focused in this field (24,25). Though neuromas study has proved the efficacy and safety of acupuncture; we observed that a certain population or people with the certain constitution are more sensitive to this treatment. Therefore, it intrigues scholars to further investigate it and some research start to find out if any bio information is linked to the effect of acupuncture (26). Some research has proved the efficacy of acupuncture in aromatase inhibitor-related arthralgia in breast cancer (27,28). A further study published recently demonstrates that specific genetic variations at loci rs4680 and rs2369049 are associated with response to acupuncture-type intervention for management of arthralgia (29). Albeit the study sample size is too small to draw a definite conclusion, the idea to locate the biomarkers of which population is responsive to acupuncture is novel. Another issue within acupuncture and precision medicine is whether the meridians are existing and corresponding to a certain biomarker? Should we focus on meridian stimulation or acupoints stimulation when applying for precision medicine in the acupuncture- related study?

Conclusions

To sum up, personalized medicine has been stressed in recent years albeit it is an old lesson. Mapping the molecular pathway for each Chinese herb or finding biomarkers for targeted population or specific TCM syndrome help to fill the gap between TCM and mainstream medicine and only with these evidence-based study can we integrate the holism and reductionism. Actually, taking a purely holistic approach will result in some bias and criticism, especially when quality control of medicinal products and the reproducibility of results comes into question. On the other side; pure precision medicine approach cannot totally cover the essence of TCM; especially hard to explain the concept such as excess and deficiency; Yin-Yang; TCM syndrome and multi-effect between mixing herbs. Consequently, a middle way might be considered in order to make the best of East and West and brings them together for the benefit of all.

What needs more attention is: from the viewpoint of health economics, finding the relationship between bio information and acupuncture or TCM treatment might promote the evidence-based study of TCM; yet the cost of gene study must be high and could not be widely available in the real world. Thus, how to conduct a practical and promising study to link the precision medicine and TCM will be a task worth deep deliberation.

Footnote

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