ABSTRACT

Background: Acupuncture its traditional form is based upon the stimulation of well defined points on the body by insertion of metal needles, such needling is considered necessary influenced biological mechanism by intrinsic and extrinsic activation after acupuncture points stimulation. Many clinical report therapeutic effect acupuncture treatment of Diabetes Mellitus especially Non Insulin dependent, the effectiveness of mild or middle type of disease is better that severe one and accompanying with controlling diet and doing more exercise will contribute recovery. Methods: Modern research indicates that acupuncture treatment can control blood sugar level, mainly by adjusting insulin molecular level, enhance insulin secretion and re control insulin by regulating central nervous system. Of the all, the improved function of the receptor of insulin target cells is probably the most important one. Results: The basic research approach to animal laboratory (rabbit, rat and mice) by electro stimulation, streptozotocin and alloxan monohydrate injection visualizing correlation cell pancreas morphofunction, insulin receptor and electrical profile of specific pancreas point in body surface. Conclusion: Relationship between biophysical, morphological and physiological study of acupuncture points in diabetic animal and diabetic patient to base acupuncture model as alternative treatment to diabetes mellitus.

Key words: acupuncture, alternative treatment, diabetes mellitus

INTRODUCTION

The phenomena of stimulus transmission from one area cannot be separated from the existence of stimulus transmission after given some treatment on the area. These phenomena are called signals transduction. The formation of the signals from cell collection whose specific activity can be explained by biophysics and biology molecular approaches because of the existence of electric changes and the concentration from several molecules as well as the condition of the cells partitions.
Acupuncture is based on the stimulation of well-defined points on the body by insertion of metal needles, such needling is considered necessary influenced biological mechanism by intrinsic and extrinsic activation after acupuncture points stimulation.

Many clinical reports demonstrate the therapeutic effects of acupuncture treatment of Diabetes Mellitus especially Non Insulin Dependent, the effectiveness of mild or moderate type of diabetes is better that in severe one and accompanying with controlling diet and doing more exercise will contribute recovery.

Modern research indicates that acupuncture treatment can control blood sugar level, mainly by adjusting insulin molecular level, enhance insulin secretion and re control insulin by regulating central nervous system. Of the all, the improved function of the receptor of insulin target cells is probably the most important one.

The basic research approach to animal laboratory (rabbit, rat and mice) by electrode stimulation, streptozotocin and alloxan monohydrate injection visualizing correlation β cell pancreas morphofunction, insulin receptor and electrical profile of specific pancreas point in body surface.

Relationship between biophysical, morphology and physiological study of acupuncture points in diabetic animal and diabetic patient is to base acupuncture model as alternative treatment to diabetes mellitus.

**Concept of Traditional Acupuncture**

Acupuncture is a way of treatment which exploits stimuli out of the acupoint to influence bioenergy circulation based on the philosophical balance of the relationship between surface of the body and organ through specific meridian system. Meridian system is a pathway between the surface of the body and the organ inside the body. In one meridian, there are some acupoints which can be used as the entrance of stimuli leading to the meridian.

In the meridian, there are ± 365 acupoints in which these acupoints can be stimulated to recover the psychological organs. There are many ways to stimulate the acupoints; from the simple one namely through finger tip acupuncture to the usage of sophisticated technology such as ultra sound and laser ray. There are also various kinds of acupuncture

**Figure 1. Acupuncture map seen from the front and rear**

**Figure 2. Large Intestine Meridian**
Bioenergy is called 'Chi' in Chinese and it circulates in the meridian system and if it goes through acupuncture it was not thoroughly explained by experts of the Airlangga University Research Institution in 1993. It was described as "Stimuli in the biological process caused by biological and non-biological stimuli on the acupoints".

This bioenergy phenomenon is complicated and it is not sufficient to explain it by providing a model in order to describe dynamic energy on the acupoints which is also based on Yin Yan philosophy. Therefore, besides the research of physiological acupuncture which emerges the changes of organ target as morph-functional model. It is also prominent to have biomolecular and biophysics approaches which are done to prove the existence of acupoints, specific activity of the acupoints, the existence of ion on the acupoints which can provide new paradigm for the functions of physiology and tell that the electric active points on the surface of the physiological body as "pace maker" and acupoints models then they can

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Basic Concept Developing of Acupuncture

**Stimulation**

**Figure 3.** Hypothesis of the process of traditional acupuncture

- Ear acupuncture
- Scalp acupuncture
- Nose acupuncture
- Palm and leg acupuncture

The principle point of topography on the acupuncture map is still in the form of "trial and error" Chinese results in which histology form of acupoints and the differences of non-acupoints have not been definitely recognized.

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**Figure 4.** Basic concept developing of Acupuncture
determine the causal relationship of "characteristics window towards related organs" on certain organs.

**Modern Science Model of Acupuncture**

Target Organ Model as the target of signal transduction, has similar electric coherence to body surface receptor.

Meridian Model is as electricity actives cell with same electric coherence from same signal transduction.

**Acupuncture Points and Target Organ Correlation**

Signal transduction from acupuncture points through meridian is going to target organ. Change of functional condition will give signal by meridian to acupuncture points.

**Bioelectricity Phenomenon**

Bioenergi is called "CHI" Stimuli in biological process caused by biological and non biological stimuli (Modern scientific Approach - Airlangga University Research Institute 1993).

In Endocrinology, it can be proved that there is an increase of testosterone level of male rabbit and estrogen level of female rabbit after they encounter electric stimulation of the specific acupoints on their backs.

![Diagram of Bioelectricity Phenomenon](image)

**Figure 5.** The changes of increasing sugar blood level after given stimuli of acupoints on rabbits no. 49 and 51 and at the same time the level of sugar blood decreases. (Adikara, Koosnadi, 1997)
Figure 6.

Insulin effect of Acupoint voltage profile

Figure 7. A. Normal chart of electrical voltage at Pi Shu and Ming Men points and sugar blood level 60 mg/dl.
B. One hour after giving streptozotocine, sugar blood level 109 mg/dl. Chart begins to look rough.
C. Two hours after giving streptozotocine, sugar blood level 241 mg/dl the chart begins to look fluctuative.
D. Twenty one hours after giving insuline IV, sugar blood level decreases to 53 mg/dl and the chart returns to smooth although it is not as normal as chart A.
(Suhriningsih, Tirtakusmanah, 1994)

Research of stimulus after stimuli of acupoints on rabbits no 49 and 51 shows real decreasing of sugar blood level on the same experimental animals.
Electrical Profile of Diabetic Mellitus

Normal volunteer, BSN = 90 mg\%  
Diabetic Mellitus Patient, BSN, = 300 mg\%

Figure 8. Electric profile of Diabetic Mellitus Patient

Acupuncture and β Cell Pancreas Correlation (Sagiran, Saputra, 2001)

1. Research model

Figure 9.
### Ratio β Sel in Islet of Langerhans

<table>
<thead>
<tr>
<th>Subject</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
<th>Group IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.413 ± 0.10</td>
<td>0.398 ± 0.08</td>
<td>0.223 ± 0.96</td>
<td>0.333 ± 0.78</td>
</tr>
<tr>
<td>2</td>
<td>0.646 ± 0.14</td>
<td>0.349 ± 0.02</td>
<td>0.242 ± 0.54</td>
<td>0.280 ± 0.70</td>
</tr>
<tr>
<td>3</td>
<td>0.649 ± 0.10</td>
<td>0.418 ± 0.04</td>
<td>0.322 ± 0.81</td>
<td>0.225 ± 0.43</td>
</tr>
</tbody>
</table>

### Electrical Voltage Profile Backshu Points Pancreas

<table>
<thead>
<tr>
<th>Subject</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
<th>Group IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18,933 ± 6.00</td>
<td>27,833 ± 4.55</td>
<td>27,733 ± 10.96</td>
<td>29,067 ± 10.78</td>
</tr>
<tr>
<td>2</td>
<td>14,300 ± 5.08</td>
<td>28,900 ± 4.93</td>
<td>27,767 ± 2.54</td>
<td>31,100 ± 7.70</td>
</tr>
<tr>
<td>3</td>
<td>18,930 ± 2.10</td>
<td>44,500 ± 11.68</td>
<td>31,100 ± 4.81</td>
<td>16,433 ± 2.43</td>
</tr>
</tbody>
</table>

Statistic analysis for influence of pancreatic destruction to electrical voltage profile acupuncture points by Liniar Regression

<table>
<thead>
<tr>
<th>Group analysis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0.003</td>
</tr>
<tr>
<td>II</td>
<td>1.847</td>
</tr>
<tr>
<td>III</td>
<td>8.442*</td>
</tr>
<tr>
<td>IV</td>
<td>0.587</td>
</tr>
<tr>
<td></td>
<td>0.947</td>
</tr>
</tbody>
</table>

Note: * significant (P < 0.05)

I = control
II = 1st intervention (alosan dose 70 mg/kg BB)
III = 2nd intervention (alosan dose 140 mg/kg BB)
IV = 3rd intervention (alosan dose 210 mg/kg BB)
Control Group I

Group II
1st intervention (aloksan dose 70 mg/kg BB)

Group III
2nd intervention (aloksan dose 140 mg/kg BB)
It is known that bio physics and bio molecular approach functionally explain more about specification of acupoint than anatomical structure approach that has been done for about tens years, but up to now there is no proof showing the anatomical difference with the area outside the acupoint.

Specification of acupoint showed by using electric profile measurement can measure or appraise, in the way of profile, the change towards the stimulus, however, it can not be absolutely appraised; this is in line with the phenomenon of energy fluctuating dependent upon the production of “bioenergetic” and environment.

Therefore the existence of environmental disturbance on acupoint is by giving chemical substances Streptozotosin and Aloxan injection to destruct insulin receptor and β cell pancreas, and the decrease of insulin extremely influence the electric profile of acupoint. It can be analyzed because the transportation disturbance of ionic cell transmembrane on acupoint may influence the polarization of membrane and the production of energy in cells.

The effect of specific stimulus on acupoints which does not go through nerve compilation may come from humoral transmitter which has not been explained clearly. However, the morphofunctional reaction of organ or the tissues which can secrete neurochemical in acupuncture can be proved by several ways either on experimental animals or volunteers.

CONCLUSION

Relationship between biophysical, morphology and physiological study of acupuncture points in diabetic animal and diabetic patient to base acupuncture model as alternative treatment to diabetes mellitus.

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