Prevention and Treatment of Allergies: Ayurvedic and Allopathic Perspectives

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CANADA

Ayurveda and Allopathy

Ancient
Complementary alternate medicine
Whole picture
Pañchamahābhūta

Modern
Details
Ayurveda

- Caring for all humanity
- ‘Herb’ preparations
- Traditional principles
- Personalized
- New potencies of disease prevention and remedies
Allopathy

• New discoveries and insights
• New initiatives
• Chemical pharmacology
• Detailed sub-atomic structures
• Active ingredients

Similarities between Ayurveda and Allopathy

• Safe and effective use
• Balancing and regulating internal body systems
  • Vāta/pitta/kapha (ayurveda)
  • Chemical pathways / feedback systems (allopathy)
• Physical therapy
Ayurveda and allopathy are beginning to embrace each other

Health is achieved through balance and regulation of the internal systems

Ayurveda as the ‘Last Resort’

- Terminal patients turn to ayurveda only as the ‘last resort’ to prolong life
- Drug-drug, drug-herb and herb-herb interactions
Challenges facing Ayurveda

- Educational
- Cultural
- Social
- Environmental
- Legal

There is a Need for Integration of Ayurveda and Allopathy
Food Allergies

- Adverse immune reactions to food
- 20% of population in economically developed countries
- Affect 8% of children and 4% of adults in North America
- More than 180 foods are reported to cause allergies
- Can be life-threatening
- Economic loss to the food industry
- Loss to the Canadian economy and World economy

Hen Egg Ovalbumin

http://www.beta.rcsb.org
RECOMBINANT OVALBUMIN (rOVA)

RECOMBINANT OVALBUMIN MUTANTS (rOVAm)

Amino Acids of OVA for Site-Directed Mutagenesis

<table>
<thead>
<tr>
<th></th>
<th>MGSIGAASME FCDFVFKELK VHANENIFY CPIAIMSALA MVYLGA KDST</th>
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<tr>
<td>51</td>
<td>RTQINKVVF DKLPF GDSI EAQCGT SVNV HSSLRD ILNQ ITKPDV YSF</td>
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<tr>
<td>351</td>
<td>DAASVSEEFR ADHPFLFCIK HIATNAV LFF GRCVSP</td>
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# Site-Directed rOVAm for Desensitization

<table>
<thead>
<tr>
<th>Mutant Serial Number</th>
<th>Construct</th>
<th>Mutations</th>
<th>Mutated Amino Acid Number</th>
<th>OVA IgE Epitope Number</th>
<th>Organism with the Construct</th>
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<tbody>
<tr>
<td>Mutant-1</td>
<td>pGAPZ-α/ova</td>
<td>Single</td>
<td>R59G</td>
<td>1</td>
<td><em>P. pastoris</em></td>
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<td>Mutant-2</td>
<td>pGAPZ-α/ova</td>
<td>Double</td>
<td>S104G / D305G</td>
<td>3 / 6</td>
<td><em>P. pastoris</em></td>
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<tr>
<td>Mutant-3</td>
<td>pGAPZ-α/ova</td>
<td>Double</td>
<td>V58D / K280E</td>
<td>1 / 5</td>
<td><em>P. pastoris</em></td>
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<td>pGAPZ-α/ova</td>
<td>Single</td>
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<tr>
<td>Mutant-5</td>
<td>pGAPZ-α/ova</td>
<td>Double</td>
<td>S104G / D305G</td>
<td>3 / 6</td>
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<tr>
<td>Mutant-6</td>
<td>pGAPZ-α/ova</td>
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<td>1 / 5</td>
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<tr>
<td>Mutant-7</td>
<td>pET-22b(+)/ova</td>
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<tr>
<td>Mutant-8</td>
<td>pET-22b(+)/ova</td>
<td>Triple</td>
<td>R59G / K280E / F307S</td>
<td>1 / 5 / 6</td>
<td><em>E. coli</em></td>
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Induction of Allergic Sensitization

Allergy


V58D / K280E Pp and R59G / K280E / F307S Ec – H

Total IgE ↓, Specific IgE ↓

Total IgG ↑, Specific IgG ↑, Specific IgG1 ↓, Specific IgG2a ↑

Histamine ↓
Th1 / Th2 Polarization


Th17 Cells and Treg Cells

**Teff Cells, Treg Cells and Transcription Factors**


| Th1 | IL-12 ↑, IFN-γ ↑ |
| Th2 | IL-4 ↓, TNF-α ↓ |
| Treg | IL-10 ↑, TGF-β ↑ |
Th1: IL-12↑, IFN-γ↑, IL-2↑, IL-18↓, T-bet↑, FoxP3↑

Th17: IL-6↓, IL-23↓

Th2: IL-4↓, IL-5↓, IL-13↓, GATA-3↓

Treg: IL-10↑, TGF-β↑

Total IgA↑, Specific IgA↑
V58D / K280E Pp and R59G / K280E / F307S Ec – H

PPL: CD4^+CD25^+ ↑, CD4^+γδ^+ ↑

IEL: CD4^+CD25^+ ↑, CD4^+γδ^+ ↑, CD8^+CD25^+ ↑, CD8^+γδ^+ ↑

LPL: CD4^+CD25^+ ↑, CD4^+γδ^+ ↑, CD4^+FoxP3^+ ↑

Th1 / Th2 balance → Th1 pathway

Teff / Treg balance → Treg pathway
Summary

- There is a need to integrate ayurveda and allopathy
- Recombinant molecules are effective in reducing the dosa imbalance
- By integrating ayurveda and allopathy through recombinant technology, the benefits of healthy and hygienic living for society will be more fully realized

Thank You
Recombinant DNA Technology