Probiotics for Chronic Kidney Disease: The “RENADYL” story

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INTRODUCTION

Chronic Kidney Disease (CKD) is a growing health problem worldwide. CKD patients have high levels of inflammation, and their blood uremic toxins passively diffuse into the bowel. A novel probiotic supplement formulation was developed, after a decade of R&D, for the removal of blood uremic toxins. Having a blend of three strains of probiotic bacteria; RENADYL™ is targeted to help and restore/maintain kidney function in CKD patients.

OBJECTIVES

1. Gut dysbiosis and inflammation is related to various diseases including Chronic Kidney Disease
2. Chronic Kidney Disease is accompanied by altered gut microbiome
3. Some specific probiotic strains can remove uremic toxins, reduce inflammation and restore the gut microflora balance

METHODS

Earlier attempts to genetically engineer a microbe with various genes - urease, creatininase and uricase were technically difficult and unsuccessful. Secondly, the possible challenges from USFDA for use in highly immunocompromised CKD patients led us to drop this route, and opt for naturally occurring safe microbes possessing some uremic toxin catabolizing properties. Screening of 165 probiotics strains, selecting a dozen and enhancing their growth in uremic milieu led to strains which could metabolize uremic toxins. In vitro and simulated gut studies led to the formulation of the probiotic dietary supplement ‘RENADYL™’ having a blend of three strains of probiotic bacteria; S. thermophilus(KB19), L. acidophilus(KB27) and B. longum(KB31). RENADYL™ has a pharmaceutical like validation with various animal trials and also human trials in CKD/Dialysis patients.

CLINICAL TRIAL 1-RESULTS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>No of Patients showing positive response</th>
<th>% of Patients showing positive response</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Urea Nitrogen (BUN)</td>
<td>29</td>
<td>63</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Creatinine (Crn)</td>
<td>20</td>
<td>43</td>
<td>Not statistically significant</td>
</tr>
<tr>
<td>Uric Acid</td>
<td>15</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Quality of Life</td>
<td>8</td>
<td>86</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

CLINICAL TRIAL 2-RESULTS

CLINICAL TRIAL 3-RESULTS

SUMMARY/CONCLUSIONS

Levels of urea, uric acid, creatinine, CRP, and the lesser known toxic metabolite (IG) arising from protein putrefaction due to gut dysbiosis in CKD, can be reduced using some specific probiotic strains with improved QOL. Use of genetically engineered probiotics will be daunting in terms of development costs and US FDA governmental regulations.

REFERENCES

1. CKD impairs barrier function and alters microbial flora of the intestine: a major link to inflammation and uremic toxicity
2. Nosratola D Vaziri.
7. Nephrol Dial Transplant, 2014, 0: 0-0
12. In vitro and in vivo Assessment of Intraintestinal Bacteriotherapy in Chronic Kidney Disease. Natarajan Ranganathan; Beena G. Patel; Pari Ranganathan; Joseph Marczyz; Rahul Dheer; Bohdan Pechenych; Stephen R. Dunn; Willy Verstraete; Karel Decroos; Raj Mehta; Eli A. Friedman.
13. ASAIO Journal 2006, 70-79
16. Pilot Study of Probiotic Dietary Supplementation for Promoting Healthy Kidney Function in Patients with Chronic Kidney Disease. N. Ranganathan, P. Ranganathan, E.A. Friedman, Joseph A. Friedman, Joseph, Dheer, Rahul; Chordia, Tushar; Dunn, Stephen R.; Friedman, Eli A.
18. In vitro and in vivo Assessment of Intraintestinal Bacteriotherapy in Chronic Kidney Disease. Natarajan Ranganathan; Beena G. Patel; Pari Ranganathan; Joseph Marczyz; Rahul Dheer; Bohdan Pechenych; Stephen R. Dunn; Willy Verstraete; Karel Decroos; Raj Mehta; Eli A. Friedman.
19. ASAIO Journal 2006, 70-79
22. Pilot Study of Probiotic Dietary Supplementation for Promoting Healthy Kidney Function in Patients with Chronic Kidney Disease. N. Ranganathan, P. Ranganathan, E.A. Friedman, Joseph A. Friedman, Joseph, Dheer, Rahul; Chordia, Tushar; Dunn, Stephen R.; Friedman, Eli A.
24. In vitro and in vivo Assessment of Intraintestinal Bacteriotherapy in Chronic Kidney Disease. Natarajan Ranganathan; Beena G. Patel; Pari Ranganathan; Joseph Marczyz; Rahul Dheer; Bohdan Pechenych; Stephen R. Dunn; Willy Verstraete; Karel Decroos; Raj Mehta; Eli A. Friedman.
25. ASAIO Journal 2006, 70-79
28. Pilot Study of Probiotic Dietary Supplementation for Promoting Healthy Kidney Function in Patients with Chronic Kidney Disease. N. Ranganathan, P. Ranganathan, E.A. Friedman, Joseph A. Friedman, Joseph, Dheer, Rahul; Chordia, Tushar; Dunn, Stephen R.; Friedman, Eli A.
30. In vitro and in vivo Assessment of Intraintestinal Bacteriotherapy in Chronic Kidney Disease. Natarajan Ranganathan; Beena G. Patel; Pari Ranganathan; Joseph Marczyz; Rahul Dheer; Bohdan Pechenych; Stephen R. Dunn; Willy Verstraete; Karel Decroos; Raj Mehta; Eli A. Friedman.
31. ASAIO Journal 2006, 70-79
34. Pilot Study of Probiotic Dietary Supplementation for Promoting Healthy Kidney Function in Patients with Chronic Kidney Disease. N. Ranganathan, P. Ranganathan, E.A. Friedman, Joseph A. Friedman, Joseph, Dheer, Rahul; Chordia, Tushar; Dunn, Stephen R.; Friedman, Eli A.