**Understanding the Genetic and Molecular Mechanisms of Complex Syndromes of Diabetes Mellitus**

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**BACKGROUND**

The two most commonly known types of Diabetes Mellitus (DM) are DM type 1 and DM type 2, characterized by insulin deficiency or insulin resistance respectively. DM can also be associated with rare multisystemic syndromes such as Alstrom, Bardet-Biedl, Wolfram and pigmentary hypertrichosis insulin dependent diabetes (PHID) syndromes.

**OBJECTIVES**

To understand the genetic and molecular basis of rare and novel syndromes of DM in a large cohort of patients.

**METHODS**

1. Polymerase Chain Reaction
2. Target Gene Sequencing
3. Homozygosity Mapping (HJM)
4. Western Blotting (WB)

**PHENOTYPE**

<table>
<thead>
<tr>
<th>Patient</th>
<th>Phenotype</th>
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<tbody>
<tr>
<td>1, 2, 3</td>
<td>- Diabetes Mellitus (DM), Diabetes Insipidus (DI) - Deafness (D) &amp; Optic Atrophy (OA)</td>
</tr>
<tr>
<td>4, 5</td>
<td>- DM, DI, OA &amp; no D</td>
</tr>
<tr>
<td>6</td>
<td>- DM, OA, D, no DI &amp; Microcephaly</td>
</tr>
<tr>
<td>7, 8</td>
<td>- DM, Hyperpigmentation, Hypertrichosis &amp; Growth Failure</td>
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**RESULTS**

A. Wolfram Syndrome Type 1 in 5 Turkish Patients

B. Wolfram Syndrome Type 2 in a Turkish Patient

C. PHID Syndrome in 2 Turkish Patients

**Conclusions**

This study so far has identified novel causes of Wolfram type 1 and PHID syndrome, highlighting a potentially new mechanism for the latter. Also, Western Blotting techniques revealed disrupted protein expression in the three diseases under study. Further work is ongoing to understand the molecular and genetic mechanisms of these and other rare DM syndromes in 17 patients.

**References**


