## LIST OF FIGURES AND TABLES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1.1</td>
<td>A schematic representation of the nuclear envelope of an interphase eukaryotic nucleus</td>
<td>3</td>
</tr>
<tr>
<td>Figure 1.2</td>
<td>The similarities in lamin proteins during evolution</td>
<td>5</td>
</tr>
<tr>
<td>Figure 1.3</td>
<td>Model for intermediate filament dimer</td>
<td>6</td>
</tr>
<tr>
<td>Figure 1.4</td>
<td>Schematic representation of functional domains of lamin A</td>
<td>7</td>
</tr>
<tr>
<td>Figure 1.5</td>
<td>Position effect variegation (PEV)</td>
<td>29</td>
</tr>
</tbody>
</table>

## CHAPTER 1 INTRODUCTION

*Drosophila* Lamin C - Loss of function genetics

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 3.1</td>
<td>Genomic locus of Lamins in <em>Drosophila</em></td>
<td>69A</td>
</tr>
<tr>
<td>Figure 3.2</td>
<td>Characterization of upstream region of <em>lamC</em></td>
<td>69B</td>
</tr>
<tr>
<td>Figure 3.3</td>
<td>Construction and expression of <em>lamC</em>-LacZ fusion construct</td>
<td>69C</td>
</tr>
<tr>
<td>Figure 3.4</td>
<td>Generation of antibodies specific to <em>Drosophila</em> lamins</td>
<td>70A</td>
</tr>
<tr>
<td>Figure 3.5</td>
<td>Immunofluorescence of <em>Drosophila</em> Lamins</td>
<td>70B</td>
</tr>
<tr>
<td>Figure 3.6</td>
<td>P element insertions in <em>lamC</em> locus</td>
<td>71A</td>
</tr>
<tr>
<td>Figure 3.7</td>
<td>Generation of <em>lamC</em>-specific alleles using P element excision</td>
<td>71B</td>
</tr>
<tr>
<td>Figure 3.8</td>
<td>Characterization new excision alleles of <em>lamC</em></td>
<td>72A</td>
</tr>
<tr>
<td>Figure 3.9</td>
<td>Generation of mitotic clones using FLP-FRT method</td>
<td>73A</td>
</tr>
<tr>
<td>Figure 3.10</td>
<td>Design of inducible RNAi constructs for <em>Drosophila</em> Lamin C</td>
<td>73B</td>
</tr>
<tr>
<td>Figure 3.11</td>
<td>Construction of inducible RNAi against <em>Drosophila</em> Lamin C</td>
<td>74A</td>
</tr>
<tr>
<td>Figure 3.12</td>
<td>Adult phenotypes caused by RNAi-mediated down regulation of Lamin C expression</td>
<td>75A</td>
</tr>
<tr>
<td>Figure 3.13</td>
<td>Lamin C protein levels are reduced in specific target tissues by RNAi-mediated downregulation of <em>lamC</em></td>
<td>75B</td>
</tr>
</tbody>
</table>
## CHAPTER 4 RESULTS

Effect of Lamin C Over-Expression and Mis-expression on Developing Tissues in *Drosophila*

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 4.1</td>
<td>Construction and generation of pUAST- Lamin C transgene</td>
<td>78A</td>
</tr>
<tr>
<td>Figure 4.2</td>
<td>The ectopic expression of Lamin C in the CNS using elav-GAL4...</td>
<td>79A</td>
</tr>
<tr>
<td>Figure 4.3</td>
<td>Ectopic mis-expression of Lamin C using embryonic drivers results in larval lethality</td>
<td>80A</td>
</tr>
<tr>
<td>Figure 4.4</td>
<td>Adult phenotypes caused by the over-expression of Lamin C under various tissue-specific enhancers</td>
<td>80B</td>
</tr>
<tr>
<td>Figure 4.5</td>
<td>The mis-expression of Lamin C in the peripodial membrane causes Lamin aggregates in the nuclear membrane</td>
<td>81A</td>
</tr>
<tr>
<td>Figure 4.6</td>
<td>Over-expression of Lamin C induces apoptosis in wing imaginal discs</td>
<td>82A</td>
</tr>
<tr>
<td>Figure 4.7</td>
<td>Effects of over-expression of Lamin C in wing epithelial cells on levels of Lamin Dm0</td>
<td>82B</td>
</tr>
<tr>
<td>Figure 4.8</td>
<td>The muscle defects due to over-expression of Lamin C in early developing larva</td>
<td>83A</td>
</tr>
<tr>
<td>Figure 4.9</td>
<td>The over-expression of Lamin C in the presumptive notum of wing imaginal disc shows defects in thoracic closure</td>
<td>84A</td>
</tr>
<tr>
<td>Figure 4.9</td>
<td>The over-expression of Lamin C in the presumptive notum of wing imaginal disc shows defects in thoracic closure</td>
<td>84B</td>
</tr>
<tr>
<td>Figure 4.10</td>
<td>The over-expression of Lamin C shows loss of muscles in the thorax</td>
<td>84C</td>
</tr>
<tr>
<td>Figure 4.11</td>
<td>Construction of N-terminal-FLAG epitope-tagged <em>Drosophila</em> Lamin C</td>
<td>85A</td>
</tr>
<tr>
<td>Figure 4.12</td>
<td>Adult phenotypes shown in flies expressing FLAG LaminC</td>
<td>85A</td>
</tr>
<tr>
<td>Figure 4.13</td>
<td>The Expression and localization of epitope tagged Lamin C</td>
<td>85A</td>
</tr>
</tbody>
</table>
CHAPTER 5 RESULTS
Role of Lamin C in Chromatin Organization

Figure 5.1  Suppression of PEV by lamC mutations ................................. 89A

Figure 5.2  The pPTT LaminC::GFP protein trap makes aberrant Lamin C-GFP 90A
fusion protein forming nuclear envelope aggregates and affect
localization of HP1

Figure 5.3  Down regulation of lamC affects sub-nuclear localization of HP1..... 90B

Figure 5.4  The effect of over-expression of Lamin C on the localization of....... 91A
Lamin Dm0 and. HP1

LIST OF TABLES

Table 1.  The laminopathies: Diseases in humans due to defects in 19A'
the nuclear envelope protein Lamin A/C

Table 2  Oligonucleotides used in PCR................................................. 56A

Table 4.1 The phenotypic consequences of over-expression of Lamin C 80C
using tissue specific GAL4 drivers