## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure No.</th>
<th>Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>The global incidence of cancer</td>
<td>10</td>
</tr>
<tr>
<td>2.2</td>
<td>The global mortality due to cancer</td>
<td>10</td>
</tr>
<tr>
<td>2.3</td>
<td>Estimated age-standardised rates (World) of cervical cancer per 1,00,000</td>
<td>12</td>
</tr>
<tr>
<td>2.4</td>
<td>Incidence of cervical cancer worldwide, 2008</td>
<td>12</td>
</tr>
<tr>
<td>2.5</td>
<td>Worldwide mortality due to cervical cancer in 2008</td>
<td>13</td>
</tr>
<tr>
<td>2.6</td>
<td>Cervical cancer mortality compared to other cancers in women of all ages in India</td>
<td>14</td>
</tr>
<tr>
<td>2.7</td>
<td>Incidence of cervical cancer in India, Southern Asia and the World</td>
<td>14</td>
</tr>
<tr>
<td>2.8</td>
<td>Incidence of cervical cancer compared to other cancers in women of all ages in India</td>
<td>15</td>
</tr>
<tr>
<td>2.9</td>
<td>Age-specific incidence rates of cervical cancer in India compared to estimates in Southern Asia and the World</td>
<td>15</td>
</tr>
<tr>
<td>2.10</td>
<td>Estimated number of new cases of cervical cancer in India by age group, in 2008 and projected in 2025</td>
<td>16</td>
</tr>
<tr>
<td>2.11</td>
<td>Schematic representation of HPV 16 genome (E1-E7 early genes, L1-L2 late genes)</td>
<td>19</td>
</tr>
<tr>
<td>2.12</td>
<td>Life cycle of Human papillomavirus and cancer induction</td>
<td>21</td>
</tr>
<tr>
<td>2.13</td>
<td>Sequential phosphorylation of Rb by cyclin/CDK complex</td>
<td>23</td>
</tr>
<tr>
<td>2.14</td>
<td>DNA damage induced p53 activation</td>
<td>24</td>
</tr>
<tr>
<td>2.15</td>
<td>Participation of oncogenes and tumor suppressor genes in cellular transformation</td>
<td>32</td>
</tr>
<tr>
<td>2.16</td>
<td>Apoptosis – the programmed cell death</td>
<td>36</td>
</tr>
<tr>
<td>2.17</td>
<td>Apoptotic pathways</td>
<td>37</td>
</tr>
<tr>
<td>2.18</td>
<td>DNA Damage Response</td>
<td>39</td>
</tr>
<tr>
<td>2.19</td>
<td>DNMT- mediated methylation of cytosine</td>
<td>43</td>
</tr>
<tr>
<td>2.20</td>
<td>Hypermethylation and Cancer</td>
<td>44</td>
</tr>
<tr>
<td>2.21</td>
<td>A model for the link between DNA methylation and genome expression</td>
<td>46</td>
</tr>
</tbody>
</table>
2.22 Methyl CpG Binding Domain Proteins
2.23 Post-Translational Histone Modifications
2.24 DNA methylation induced by Histone H3-K9 methylation
2.25 Transcriptional silencing
2.26 Cyclin and cell cycle regulation
2.27 The INK4a/ARF locus and its impact on pRb and p53
2.28 p53 functional motifs
2.29 The structural organization of p53 protein
2.30 The FHIT gene at the common fragile site at chromosome band 3p14.2
2.31 Schematic diagram of DAP-kinase protein structure
2.32 Chemical structures of dietary compounds
2.33 Molecular targets of dietary agents
2.34 Chemical structures of selected DNMT1 inhibitors
2.35 Epigenetic Therapy
4.1 DNA isolated from the blood samples analyzed on 0.8% agarose gel
4.2 DNA isolated from the biopsy samples analyzed on 0.8% agarose gel
4.3 HPV infection and HPV 16 typing
4.4 A representative agarose gel showing MS-PCR product of p14\(^{ARF}\)
4.5 Methylation of p14\(^{ARF}\) in patients and controls
4.6 Bisulfite sequence of p14\(^{ARF}\)
4.7 A representative agarose gel showing RT-PCR product of p14\(^{ARF}\)
4.8 mRNA expression of methylated and unmethylated p14\(^{ARF}\)
4.9 A representative agarose gel showing MS-PCR product of p15\(^{INK4b}\)
4.10 Methylation of p15\(^{INK4b}\) in patients and controls
4.11 Bisulfite sequence of p15\(^{INK4b}\)
4.12 A representative agarose gel showing RT-PCR product of
4.13 Comparison between mRNA expression of methylated and unmethylated p15INK4b

4.14 A representative agarose gel showing MS-PCR product of p16INK4a

4.15 The percentage of methylation of p16INK4a in patients and controls

4.16 Bisulfite sequence of p16INK4a

4.17 A representative agarose gel showing RT-PCR product of p16INK4a

4.18 Comparison of mRNA expression of methylated and unmethylated p16INK4a

4.19 A) Amplification plot of p16INK4a and β actin (Unmethylated versus Methylated). B) Change in ΔCt Value of unmethylated versus methylated p16INK4a

4.20 A representative agarose gel showing MS-PCR product of p21CIP1

4.21 The percentage of methylation of p21CIP1 in patients and controls

4.22 Bisulfite sequence of p21CIP1

4.23 A representative agarose gel showing RT-PCR product of p21CIP1

4.24 Comparison between mRNA expression of methylated and unmethylated of p21CIP1

4.25 A representative agarose gel showing MS-PCR product of p27KIP1

4.26 The percentage of methylation of p27KIP1 in patients and controls

4.27 Bisulfite sequence of p27KIP1

4.28 A representative agarose gel showing RT-PCR product of p27KIP1

4.29 Comparison between mRNA expression of methylated and unmethylated p27KIP1

4.30 A representative agarose gel showing MS-PCR product of p57KIP2

4.31 The percentage of methylation of p57KIP2 in patients and controls
controls

4.32 Bisulfite sequence of $p57^{kip2}$

4.33 A representative agarose gel showing RT-PCR product of $p57^{kip2}$

4.34 Comparison between mRNA expression of methylated and unmethylated $p57^{kip2}$

4.35 A representative agarose gel showing MS-PCR product of $p53$

4.36 The percentage of methylation of $p53$ in patients and controls

4.37 A representative agarose gel showing MS-PCR product of $p73$

4.38 The percentage of methylation of $p73$ in patients and controls

4.39 Bisulfite sequence of $p73$

4.40 A representative agarose gel showing RT-PCR product of $p73$

4.41 Comparison of mRNA expression of methylated and unmethylated $p73$

4.42 A) Amplification plot of $p73$ and $\beta$ actin (Unmethylated versus Methylated). B) Change in Ct Value of unmethylated versus methylated $p73$.

4.43 A representative agarose gel showing MS-PCR product of

4.44 The percentage of methylation of in patients and controls

4.45 Bisulfite sequence of

4.46 A representative agarose gel showing RT-PCR product of $RAR\ 2$

4.47 Comparison of mRNA expression of methylated and unmethylated $RAR\ 2$

4.48 A) Amplification plot of $RAR/2$ and $\beta$-actin (Unmethylated versus Methylated). B) Change in Ct Value of unmethylated versus methylated $RAR/2$.

4.49 A representative agarose gel showing MS-PCR product of $FHIT$

4.50 The percentage of methylation of $FHIT$ in patients and controls

4.51 Bisulfite sequence of $FHIT$

4.52 A representative agarose gel showing RT-PCR product of $FHIT$
4.53 Comparison of mRNA expression of methylated and unmethylated FHIT

4.54 A) Amplification plot of FHIT and β-actin (Unmethylated versus Methylated). B) Change in ΔCt Value of unmethylated versus methylated FHIT.

4.55 A representative agarose gel showing MS-PCR product of RB1

4.56 The percentage of methylation of RB1 in patients and controls

4.57 Bisulfite sequence of RB1

4.58 A representative agarose gel showing RT-PCR product of RB1

4.59 Comparison of mRNA expression of methylated and unmethylated RB1

4.60 A representative agarose gel showing MS-PCR product of STAT1

4.61 The percentage of methylation of STAT1 in patients and controls

4.62 A representative agarose gel showing RT-PCR product of STAT1

4.63 Comparison of mRNA expression of unmethylated and methylated STAT1

4.64 A representative agarose gel showing MS-PCR product of DAPK

4.65 The percentage of methylation of DAPK in patients and controls

4.66 Bisulfite sequence of DAPK

4.67 A representative agarose gel showing RT-PCR product of DAPK

4.68 Comparison of mRNA expression of methylated and unmethylated DAPK

4.69 A) Amplification plot of DAPK and β-actin (Unmethylated versus Methylated). B) Change in ΔCt Value of unmethylated versus methylated DAPK

4.70 MSP of gene in biopsy and serum samples

4.71 MSP of p16 gene in biopsy and serum samples

4.72 MTT Assay to estimate cell viability after the treatment of SiHa cells
4.73 MTT Assay to estimate cell viability after the treatment of HeLa cells

4.74 Morphological changes in SiHa cells after 24 h of treatment with the test compounds and plant extracts

4.75 Morphological changes in HeLa cells after 24 h of treatment with test compounds and plant extracts

4.76 Induction of apoptosis in SiHa cells

4.77 Induction of apoptosis in HeLa cells

4.78 MSP of RARβ2 gene after 48 h of treatment with the test compounds in SiHa cells

4.79 MSP of RARβ2 gene after 48 h of treatment with the plant extracts in SiHa cells

4.80 Reversal of promoter hypermethylation of RARβ2 gene in SiHa cell line after treatment with curcumin and genistein

4.81 MSP of RARβ2 gene after 72 h of treatment with plant extracts, EGCG and resveratrol in SiHa cells

4.82 Reversal of promoter hypermethylation of RARβ2 gene as shown by MSB (Methylation Specific Band) in SiHa cells after 6 days of treatment

4.83 MSP of RARβ2 gene after 48 h of treatment with the test compounds and plant extracts in HeLa cells

4.84 Reversal of promoter hypermethylation of RARβ2 gene in HeLa cells after 72 h of treatment

4.85 Reversal of promoter hypermethylation of RARβ2 gene in HeLa cells after 72 h of treatment

4.86 MSP of RARβ2 gene after 6 days of treatment with the test compounds in HeLa cells

4.87 (A) Alterations in the level of mRNA expression of RARβ2 gene after treatment with the test compounds in SiHa cells. 
(B) mRNA expression of β-actin (internal control)

4.88 (A) Alteration in the level of mRNA expression after 6 days of treatment with the test compounds in SiHa cells 
(B) mRNA expression of β-actin gene (internal control)

4.89 (A) Alterations in the level of mRNA expression of RARβ2 gene after 6 days of treatment with the test compounds in HeLa cell line 
(B) mRNA expression of β-actin gene (internal control)