Lasers in Medicine
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• Extra training
• Expensive and bulky equipment
• Eye safety
• Fire safety
• The laser plume
Benefits

• Sterilizes the area
• Cauterization
• Seal nerve endings
• Has a relatively uniform area of thermal damage
So if a magnifying glass can do this...
## Tissue Changes with Temperature Increases

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Visual change</th>
<th>Biological change</th>
</tr>
</thead>
<tbody>
<tr>
<td>37-60°C</td>
<td>No visual change</td>
<td>Warming, welding</td>
</tr>
<tr>
<td>60-65°C</td>
<td>Blanching</td>
<td>Coagulation</td>
</tr>
<tr>
<td>65-90°C</td>
<td>White/grey</td>
<td>Protein denaturization</td>
</tr>
<tr>
<td>90-100°C</td>
<td>Puckering</td>
<td>Drying</td>
</tr>
<tr>
<td>100°C</td>
<td>Smoke plume</td>
<td>Vaporization, carbonization</td>
</tr>
</tbody>
</table>
Thermal zones after laser impact
\[ t_d = \frac{1}{\kappa \mu a^2} \]
Photodynamic Therapy

• A photosensitizing agent is injected into the patient

• Within 1 to 2 days, most remaining dye will be concentrated in the cancer cells

• Finally, light is shown on the target area(s), activating the photosensitizer