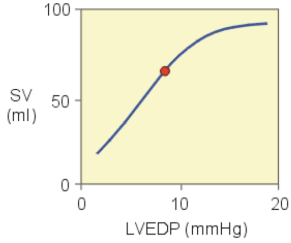
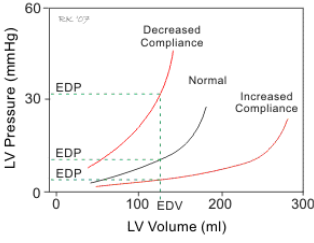
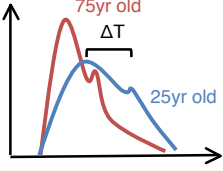


**Physiol-MAKEUP Describe the cardiovascular changes that occur with ageing.**

<p><b>1. Ageing = physiological time-dependent process, which results in decrease in cellular function and reserve</b></p> <p><b>2. Ageing is accelerated by cardiovascular disease (HTN, atherosclerosis) &amp; risk factors (T2DM, smoking, obesity)</b></p>		
	<b>Structural Changes</b>	<b>Functional Changes</b>
<b>Heart</b>	<p>↓ # Myocytes LVH &amp; ↑ cardiac mass</p>	<p>1. ↑ Collagen &amp; fibrous tissue deposition → Impair compliance &amp; early LV diastolic filling (diastolic filling may be further ↓ by tachycardia which is poorly tolerated in this age group)</p> <p>2. ↑ Preload to maintain SV &amp; CO → Overall heart functions on flatter part of Starling curve → ↓ CO reserve &amp; less responsive to positive inotropes</p> <div style="display: flex; justify-content: space-around;">   </div> <p>∴ overall ↓ inotropy and ↓ lusitropy</p>
	Downregulation of β adrenoceptors	<p>Downregulation of β adrenoceptors, ↓ affinity &amp; alteration in signal transduction</p> <p><b>Attenuated β receptor response</b> → ↓ Maximal HR &amp; ↓ peak ejection fraction → ↑ Susceptibility to cardiac failure</p> <p>↑ SNS activity → ↑ Plasma catecholamine concentration</p> <p>Prolonged contraction 2° impairment of Ca<sup>2+</sup> pumps within SR</p>
	<p>1. Calcific &amp; fibrotic degeneration of conducting pathways</p> <p>2. Fibrosis &amp; fatty infiltration of pacemaker cells</p>	<p>AF common (10% &gt;80yrs), sick sinus syndrome</p> <p>↓ Intrinsic sinus rate but overall HR preserved by ↑ sympathetic tone</p> <p><b>↓ Maximal heart rate</b> (Max HR ≈ 220 – Age)</p>
	Valves calcify, thicken, dilate	↑ incidence of MR, TR, AS
<b>Vessels</b>	<p>1. Gradual calcification</p> <p>2. Intimal thickening (exacerbated by atherosclerotic change)</p> <p>3. Breakdown of elastin</p>	<p><b>↓ Compliance</b></p> <p>Widened pulse pressure</p> <p>Loss of elastin in proximal thoracic aorta &amp; proximal branches of great vessels → Progressive central aortic dilatation</p>
	Degeneration of coronary vessels	Atherosclerotic change → <b>↓ calibre of coronary vessels</b> → ↑ coronary vascular resistance and ↓ coronary blood flow
	Baroreceptors	<b>↓ Sensitivity</b> → ↓ Reflex adaptations to hypotension → More labile BP
	Calcification of aorta	<p>↑ SBP &amp; DBP</p> <p>↑ Aortic stiffness resulting in ↑ pulse wave velocity</p> <p>Reduced time between systolic &amp; diastolic peak pressures (ΔT)</p> <div style="text-align: center;">  </div>