

	60		80		114	118		250		310
hb	XEMMXLQHGSFL	IVADKDYAVTAN	NVNVFKFIIPQIMK							
sw		IVADKDYAVT	NLVQXNVNVFKFIIPQVMK							LKDDEVVQLKK
de	KGEMMDLQHGSFLQ	KIVADKDYAVTANSK	RLNLVQRNVGVFKGIIPQIVK					GYTNXAXGL		LKDDEVAQLKK
cb	KGEMMDLQHGSFLQ	KIVADKDYAVTANSK	RLNLVQRNVNVFKFIIPQIVK					KGYNWAIGL		LKDDEVAQLKK
pb	KGEMMDLQHGSFLQ	KIVANKDYSVTANSK	RLNLVQRNVNVFKFIIPQIVK					KGYNWAIGL		LKDDEVAQLKN
ca	KGEMMDLQHGSFLX	KIVAGKDYSVTAHSK	RLNLVQRNVNIFKFIIIPNVVK					KGYNWAIGL		LKPDEEEKIKK

FIGURE 24.14. Conflicting pressures in one gene. An alignment of a region of lactate dehydrogenases from various vertebrates (cb, chicken LDH-B; pb, pig LDH-B; ca, chicken LDH-A) and lens crystallins from two bird species (hb, hummingbird ϵ -crystallin; sw, swift ϵ -crystallin). Also shown is a protein from ducks (labeled de) that serves as both an LDH-B and a crystallin. Note that some residues (labeled with arrows) are conserved in the other LDHs (including many not shown) and in some crystallins but are different in the dual-function enzyme. This may represent conflicting selection pressures that could diminish the activity of the LDH while improving the function of this protein as a crystallin. The shaded residues indicate differences between ϵ -crystallin in swift or hummingbird and duck.

24.14, redrawn from Wistow G. et al., *Proc. Natl. Acad. Sci.* **87**: 6277–6280, © 1990 National Academy of Sciences, U.S.A.