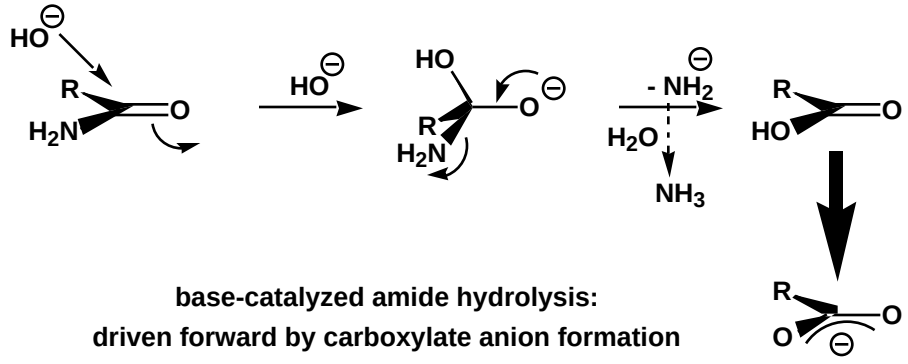
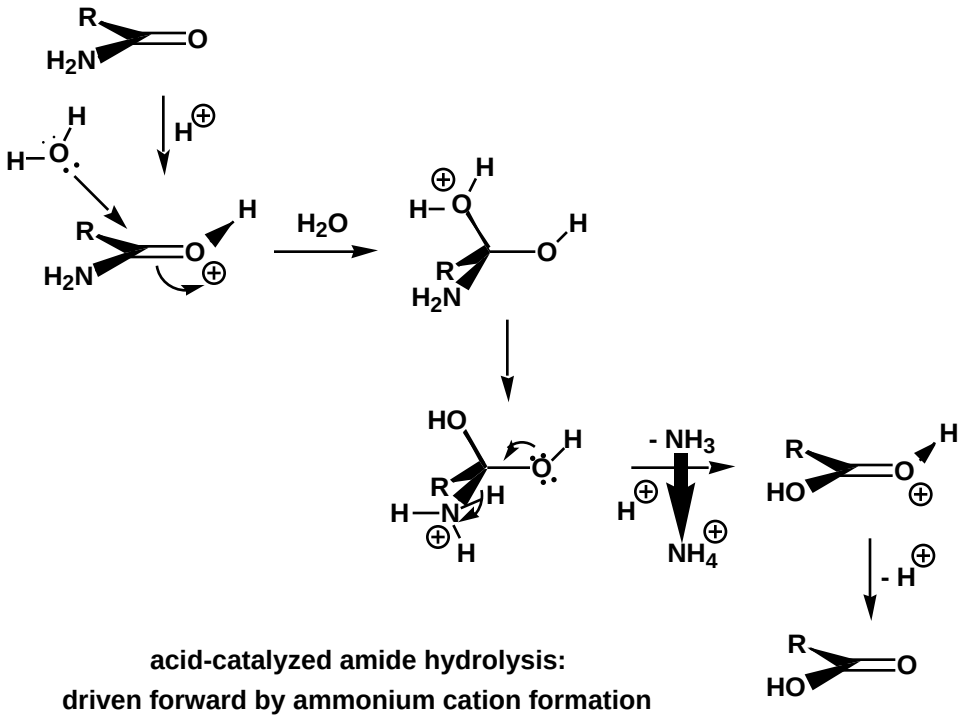
Text Related to Segments 19.05 & 19.06 ©2002 Claude E. Wintner

Routes for the formation of amides have been outlined in Segment 19.01. Amide hydrolysis runs a course parallel to hydrolysis of esters. As with esters, in base the carbonyl group ultimately appears in the form of the carboxylate anion, but it is ammonia or an amine, rather than an alcohol, that is extruded. Once again, the formally forbidden displacement of a stronger base (now the amide anion) by a weaker one in fact is avoided as a result of simultaneous protonation of the incipient anion by water in the aqueous base solution:



base-catalyzed amide hydrolysis:
driven forward by carboxylate anion formation



acid-catalyzed amide hydrolysis:
driven forward by ammonium cation formation

Also in the acid case amide hydrolysis is analogous to ester hydrolysis, except that acid-catalyzed amide hydrolysis is driven forward irreversibly by the formation of ammonium or alkylammonium cation in the aqueous acid, preempting the release of what otherwise would be the (basic) free ammonia or amine. Transamidation reactions (involving exchange of one amine for another as the partner of the acyl group in an amide) occur by analogous mechanisms.