Reductive amination is the synthetic protocol in which an aldehyde or a ketone is converted to an amine via an imine.

\[
\text{aldehyde/ketone} \quad \rightarrow \quad \text{imine} \quad \rightarrow \quad \text{amine}
\]

In the first stage of the procedure, the aldehyde or the ketone is treated with ammonia or a primary amine in the presence of an acid catalyst. An addition-elimination reaction results in an imine. In the second stage, the imine is reduced to the corresponding amine.

eg. 1:

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\begin{align*}
\text{C}_6\text{H}_5\text{CHO} & \xrightarrow{\text{NH}_3, \text{catalytic acid}} \text{C}_6\text{H}_5\text{CHNH}_2 \\
\text{C}_6\text{H}_5\text{CHNH}_2 & \xrightarrow{\text{H}_2, \text{catalyst N}_2} \text{C}_6\text{H}_5\text{CH}_2\text{NH}_2
\end{align*}
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eg. 2:

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\begin{align*}
\text{C}_6\text{H}_5\text{CO} & \xrightarrow{\text{catalytic acid}} \text{C}_6\text{H}_5\text{CH}_2\text{NH}_2 \\
\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2 & \xrightarrow{\text{catalyst N}_2, \text{H}_2} \text{C}_6\text{H}_5\text{NCH}_2\text{CH}_2\text{NH}_2
\end{align*}
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Contributors

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