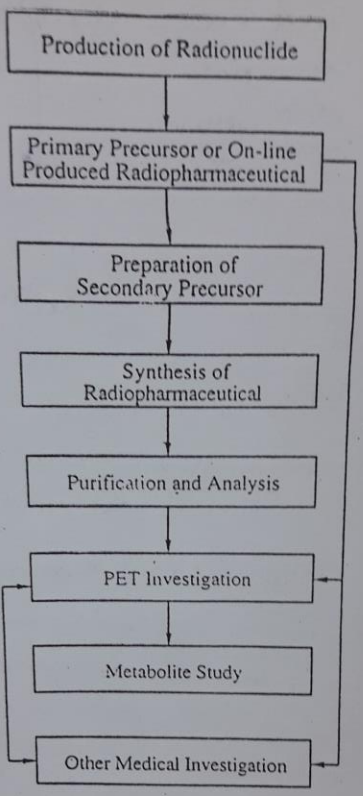

Figure 7.3 Various steps involved before and during medical investigations using positron-emitting radionuclides.

An example of a multi-step synthesis that can be performed with ^{11}C is the seven-step synthesis of optically enriched L-[3-^{11}C]phenylalanine ([^{11}C]**7.34**) from [^{11}C]carbon dioxide via [^{11}C]benzaldehyde (**7.32**) (Scheme 7.9). The labelled benzaldehyde was prepared by a selective oxidation of [^{11}C]benzylalcohol (**7.31**). The three steps from [^{11}C]CO_2 to (**7.32**) were accomplished within 5 minutes. [^{11}C]Benzaldehyde was condensed with a 2-phenyl-5-oxazolone to give the [α-^{11}C]-4-benzylidene-2-phenyl-5-oxazolone which was opened by sodium hydroxide in ethanol to give the amide protected α-aminocinnamic acid (**7.33**). Asymmetric catalytical hydrogenation was performed using a chiral Wilkinson catalyst to obtain the L-form of the amino acid ([^{11}C]**7.34**) in 80% e.e. The total synthesis