A radioligand is a radioactive biochemical substance (in particular, a ligand that is radiolabeled) that is used for diagnosis or for research-oriented study of the receptor systems of the body.

In a neuroimaging application the radioligand is injected into the pertinent tissue, or infused into the bloodstream. It binds to its receptor. When the radioactive isotope in the ligand decays it can be measured by positron emission tomography (PET) or single photon emission computed tomography (SPECT). In in vivo systems it is often used to quantify the binding of a test molecule to the binding site of radioligand. The higher the affinity of the molecule the more radioligand is displaced from the binding site and the increasing radioactive decay can be measured by scintillography. This assay is commonly used to calculate binding constant of molecules to receptors.

The transport of the radioligand is described by receptor kinetics.