A GTP sensor is a protein or molecule that can detect the presence or level of GTP (guanosine triphosphate), a small molecule that plays a key role in many cellular processes, including protein synthesis, signal transduction, and cell division.

GTP sensors can be used to study the dynamics of GTP signaling pathways in living cells, and to monitor changes in GTP levels in response to various stimuli or perturbations. They are typically designed to bind specifically to GTP or its hydrolysis product GDP (guanosine diphosphate) and to produce a measurable signal, such as fluorescence or enzymatic activity, when GTP is present.

One example of a GTP sensor is Raf kinase's Ras binding domain (RBD), which binds specifically to GTP-bound forms of the small GTPase Ras. Another example is the GTPase activity sensor (GAS), which uses a fluorescent protein attached to a GTPase domain to monitor GTP hydrolysis in real time.

GTP sensors have been used in a variety of applications, such as studying the kinetics of GTPase activity, identifying GTPase regulators and effectors, and screening for compounds that modulate GTP signaling pathways. They have also been used to study various diseases that involve aberrant GTP signalings, such as cancer and immune disorders.

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