

Claims

Claim 1

A unimolecular FRET probe, comprising:

5 an acceptor consisting of a fluorescent protein having the property of undergoing enzymatic degradation by an acidic protease under an acidic condition; and

a donor having an amino acid sequence having a sequence identity of 95% or more with respect to an amino
10 acid sequence represented by SEQ ID NO: 1,

wherein the amino acid sequence of the donor has one or more selected from the group consisting of S58, S60, A82, S184, E199, C210 and A217, when the amino acids are counted from the second position of SEQ ID NO: 1.

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Claim 2

The unimolecular FRET probe as set forth in claim 1, wherein the fluorescent protein is a yellow fluorescent protein derived from *Aequorea victoria*.

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Claim 3

The unimolecular FRET probe as set forth in claim 1 or 2, wherein the fluorescent protein is selected from the group consisting of YFP, EYFP, Ypet, Topaz, Citrine, mCitrine,
25 mEYFP, Venus, mVenus, and TagYFP.

Claim 4

The unimolecular FRET probe as set forth in any one of claims 1 through 3, further comprising a mitochondrial
30 localization sequence.

Claim 5

A polynucleotide encoding a unimolecular FRET probe
recited in any one of claims 1 through 4.

Claim 6

5 A kit comprising a polynucleotide recited in claim 5.

Claim 7

A method for quantifying an activity of autophagy,
comprising detecting a fluorescent signal from a cell
10 containing a unimolecular FRET probe recited in any one of
claims 1 through 4.

Claim 8

The method as set forth in claim 7, wherein the cell has
15 been fixed.