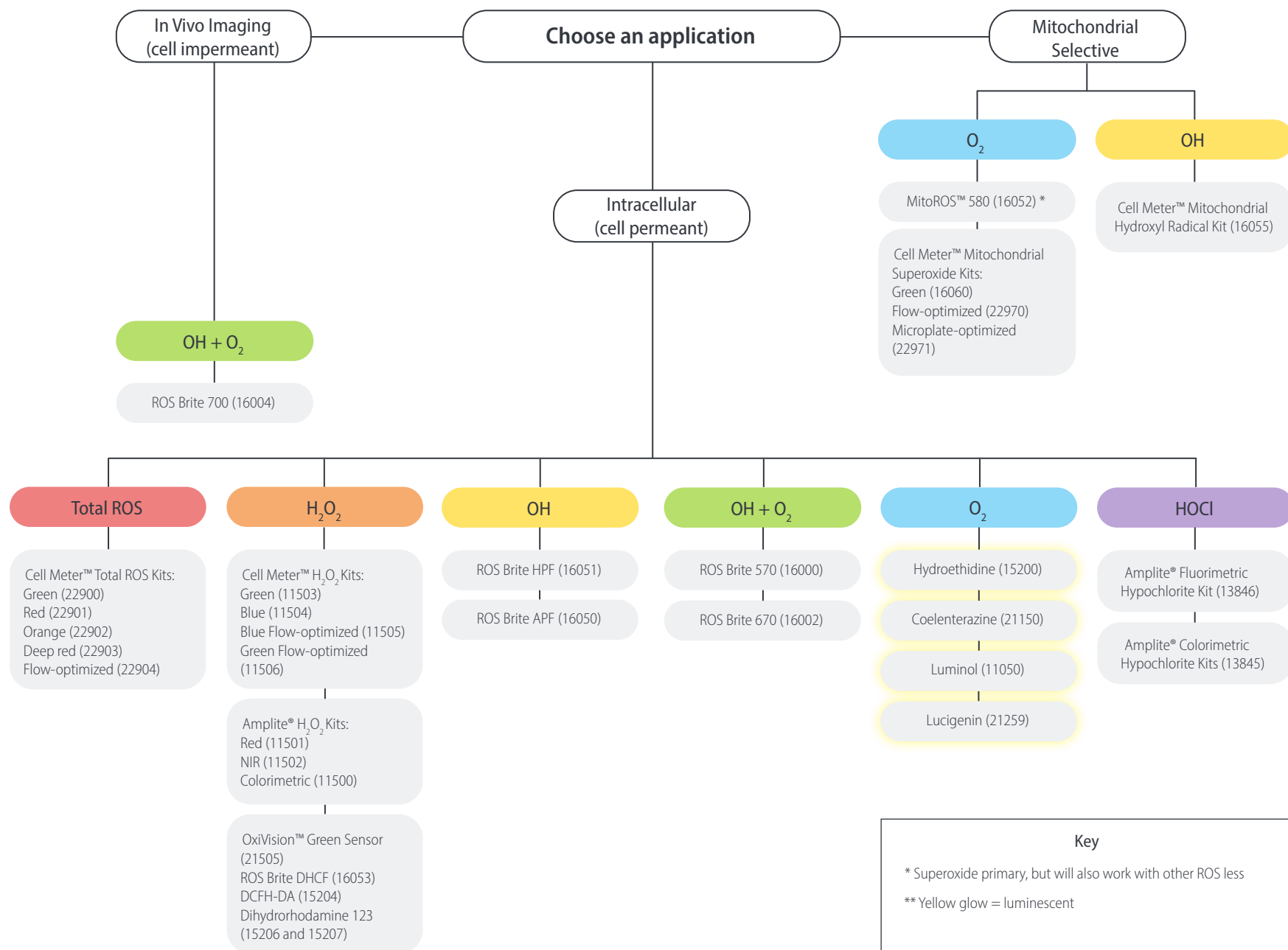


REACTIVE OXYGEN SPECIES SELECTION GUIDE



Key

* Superoxide primary, but will also work with other ROS less

** Yellow glow = luminescent

Reactive Oxygen Species

Target	Application	Tools	Cat. No.	Principle
<p>Hydrogen peroxide (H₂O₂)</p> <p>a product of many enzymatic ROS scavenging pathways. The most well studied is superoxide dismutase activity, which catalyzes the reduction of superoxide anion to hydrogen peroxide.</p>	live cell	DCFH-DA	15204	Probe enters cell wherein esterases cleave off diacetate group. Then DCFH is oxidized by hydrogen peroxide to DCF and emits green fluorescence upon excitation.[4]
		Dihydrorhodamine 123	15206, 15207	Probe passively permeates cell membrane. Oxidation by hydrogen peroxide yields rhodamine 123, which fluoresces blue upon excitation.
		OxiVision™ Blue	11504, 11505	Probe permeates cell and is oxidized by intracellular hydrogen peroxide. Generates fluorescence upon excitation.
		OxiVision™ Green	11503, 11506	
	cell extract; solutions	Amplite® Fluorimetric Hydrogen Peroxide Assay Kit (Red)	11501	Hydrogen peroxide dependent oxidation of ADHP (synonyms: 10-acetyl-3,7-dihydroxyphenoxazine, Amplex® Red) by horseradish peroxidase (HRP) converts ADHP to resorufin. Resorufin can be detected using colorimetric or fluorimetric methods.
		Amplite® Colorimetric Hydrogen Peroxide Assay Kit	11500	
		Amplex™ Red Hydrogen Peroxide/Peroxidase Assay Kit	Not available	
Amplite® Fluorimetric Hydrogen Peroxide Assay Kit (Infrared)	11502	Hydrogen peroxide dependent oxidation of Amplite IR by horseradish peroxidase (HRP) generates activated probe. Excitation emits a near-infrared fluorescent signal		
<p>Superoxide anion (O₂⁻)</p> <p>a by-product of aerobic metabolism, such as mitochondrial respiration (particularly Complex I and Complex III).</p>	live cell; cell extract; solutions	Lucigenin	21259	Lucigenin is activated by conversion to lucigenin cation radical. Lucigenin cation radical reacts with superoxide anion to produce dioxetane intermediate, which decomposes to N-methylacridone. High energy electrons in N-methylacridone fall to lower energy state, resulting in luminescence.[5]
		Coelenterazine	21150	Oxidation by superoxide anion results in an excited electron state. Upon decay to ground state electron configuration, photons are released as luminescence.[8]
		Luminol	11050	Superoxide-dependent enzyme catalyzed oxidation of luminol results in luminescence. [6]
		Hydroethidine	15200	Probe passively permeates intact cells and localizes in the mitochondria. Probe is activated through oxidation by superoxide. The activated probe intercalates with DNA and, upon excitation, fluoresces. DNA binding is necessary for strong fluorescence signal. For hydroethidine, activated probe is ethidium (ie. same active species as DNA stain ethidium bromide).[3,7,12]
		MitoSox™ Red	Not available	
		MitoROS™ 580	16052, 22970, 22971	
		MitoROS™ 520	16060	Probe readily passes through intact cell membranes whereupon it localizes in mitochondria. It is then oxidized by superoxide. Upon excitation, it releases a green fluorescence.
<p>Hydroxyl radical (-OH)</p> <p>can be generated when superoxide anions react with transition metals. Extremely reactive. Can react with hydrogen on DNA backbone, resulting in strand breakage.</p>	live cell; cell extract; solutions	MitoROS™ OH580	16055	Probe is able to freely enter live cells wherein it becomes oxidized specifically by free hydroxyl radicals. Upon excitation, oxidized probe fluoresces red.
<p>Total ROS</p> <p>includes hydrogen peroxide, superoxide anion, hydroxyl radical, singlet oxygen, nitric oxide, butyl peroxide and hypochlorous acid</p>	live cell; cell extract; solutions	ROS™ Brite 570	16000, 22902	Probe passively permeates intact cell membranes. Once inside the cell, probe is oxidized by intracellular ROS. Probe can also be oxidized by ROS in solution for cell extract assays. Upon excitation, probe emits a fluorescent signal.
		ROS™ Brite 670	16002, 22901	
		ROS™ Brite 700	16004, 22903	
		Amplite® ROS Green	22900	