

# Package ‘colorBlindness’

April 17, 2021

**Type** Package

**Title** Safe Color Set for Color Blindness

**Version** 0.1.9

**Description** Provide the safe color set for color blindness, the simulator of protanopia, deuteranopia. The color sets are collected from: Wong, B. (2011) <doi:10.1038/nmeth.1618>, and <<http://mkweb.bcgsc.ca/biovis2012/>>. The simulations of the appearance of the colors to color-deficient viewers were based on algorithms in Vienot, F., Brettel, H. and Mollon, J.D. (1999) <doi:10.1002/(SICI)1520-6378(199908)24:4%3C243::AID-COL5%3E3.0.CO;2-3>. The `cvdPlot()` function to generate 'ggplot' grobs of simulations were modified from <<https://github.com/clauswilke/colorblindr>>.

**Depends** R(>= 3.6)

**Imports** ggplot2, grDevices, methods, cowplot, colorspace, graphics, gridGraphics, gtable, grid

**Suggests** knitr, reshape2, stats, png, markdown, rmarkdown

**biocViews** Visualization

**License** GPL (>= 2)

**Encoding** UTF-8

**VignetteBuilder** knitr

**RoxygenNote** 7.1.1

**NeedsCompilation** no

**Author** Jianhong Ou [aut, cre] (<<https://orcid.org/0000-0002-8652-2488>>)

**Maintainer** Jianhong Ou <[jianhong.ou@duke.edu](mailto:jianhong.ou@duke.edu)>

**Repository** CRAN

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availableColors	<i>available colors</i>
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**Description**

export available colors

**Usage**

```
availableColors()
```

**Value**

a character vector contain safe colors.

**Examples**

```
availableColors()
```

---

availablePalette	<i>Available color palette</i>
------------------	--------------------------------

---

**Description**

List all the available color palettes.

**Usage**

```
availablePalette()
```

**Value**

a character vector contain available color palettes.

**Examples**

```
availablePalette()
```

---

BLACK	<i>safe colors</i>
-------	--------------------

---

**Description**

color blindness safe colors

**Usage**

```
BLACK
```

```
ORANGE
```

```
SKY_BLUE
```

```
BLUISH_GREEN
```

```
YELLOW
```

```
BLUE
```

```
VERMILLION
```

```
REDDISH_PURPLE
```

```
safeColors
```

**Format**

An object of class character of length 1.  
An object of class character of length 1.  
An object of class character of length 1.  
An object of class character of length 1.  
An object of class character of length 1.  
An object of class character of length 1.  
An object of class character of length 1.  
An object of class character of length 1.  
An object of class character of length 8.

**References**

Wong, B. (2011) <doi:10.1038/nmeth.1642> Wong, B. (2011) <doi:10.1038/nmeth.1618>

**Examples**

```
safeColors
```

---

colorNames	<i>available color variable</i>
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---

**Description**

export available color names

**Usage**

```
colorNames()
```

**Value**

a character vector contain safe colors.

**Examples**

```
colorNames()
```

---

cvdPlot	<i>Show color-deficiency simulations of a plot</i>
---------	--

---

**Description**

Plot the color-deficiency simulations for ggplot grob.

**Usage**

```
cvdPlot(  
  plot = last_plot(),  
  layout = c("origin", "deuteranope", "protanope", "desaturate")  
)
```

**Arguments**

plot	The grob to be plotted.
layout	The sub-figure types. the choices are origin, deuteranope, protanope, desaturate, and enhanced, enhanced.deuteranope, enhanced.protanope, enhanced.desaturate.

**Details**

This function is modified from <<https://github.com/clauswilke/colorblindr>>

**Value**

An object of ggplot.

**Examples**

```
cvdPlot(displayColors(safeColors))  
cvdPlot(displayColors(paletteMartin))
```

---

cvdSimulator	<i>simulate color vision deficiency</i>
--------------	---

---

**Description**

Transformation of R colors by simulating color vision deficiencies.

**Usage**

```
cvdSimulator(col, type = "deuteranope")
```

**Arguments**

`col` character. A vector of colors.  
`type` Deficiency type, "protanope" or "deutanope"

**Details**

Here use Vienot's methods but not Gustavo's methods (implemented in `colorspace::simulate_cvd`).

**Value**

colors.

**References**

Vienot, F., Brettel, H. and Mollon, J.D. (1999) <doi:10.1002/(SICI)1520-6378(199908)24:4 Sharma, G., Wu, W. and Dalal, E.N. (2005) <doi:10.1002/col.20070>

**Examples**

```
cvdSimulator(safeColors)
```

---

```
displayAvailablePalette
```

*Display available palette*

---

**Description**

Display all the available color palettes.

**Usage**

```
displayAvailablePalette(...)
```

**Arguments**

... parameters could be used by [geom\\_tile](#).

**Value**

an [ggplot](#) object

**Examples**

```
displayAvailablePalette()
```

---

displayColors	<i>display colors</i>
---------------	-----------------------

---

**Description**

Display the given colors

**Usage**

```
displayColors(col, ...)
```

```
displayAllColors(col, types = c("deutanope", "protanope", "desaturate"), ...)
```

**Arguments**

col	color set to display
...	parameters could be used by <a href="#">geom_tile</a> .
types	the type of color vision deficiency.

**Value**

an [ggplot](#) object

**Examples**

```
displayColors(safeColors)
displayColors(paletteMartin)
displayAllColors(safeColors, color="white")
displayAllColors(paletteMartin, color="white")
```

---

grobify	<i>convert plot to grob</i>
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---

**Description**

use `grid.grobExpr` or `plot_to_gtable` to convert plot to grob

**Usage**

```
grobify(plot)
```

**Arguments**

plot	plots
------	-------

**Value**

grob object.

---

paletteMartin

*Palette for color blindness*

---

**Description**

The palette could be used for heatmap or pie graph

**Usage**

paletteMartin

Green2Magenta16Steps

Blue2DarkRed12Steps

Blue2DarkRed18Steps

Blue2OrangeRed14Steps

Blue2DarkOrange12Steps

Blue2DarkOrange18Steps

Blue2Green14Steps

Brown2Blue10Steps

Brown2Blue12Steps

Blue2Gray8Steps

Blue2Orange8Steps

Blue2Orange10Steps

Blue2Orange12Steps

ModifiedSpectralScheme11Steps

LightBlue2DarkBlue7Steps

LightBlue2DarkBlue10Steps



PairedColor12Steps

SteppedSequential5Steps

### Format

- An object of class character of length 15.
- An object of class character of length 16.
- An object of class character of length 12.
- An object of class character of length 18.
- An object of class character of length 14.
- An object of class character of length 12.
- An object of class character of length 18.
- An object of class character of length 14.
- An object of class character of length 10.
- An object of class character of length 12.
- An object of class character of length 8.
- An object of class character of length 8.
- An object of class character of length 10.
- An object of class character of length 12.
- An object of class character of length 11.
- An object of class character of length 7.
- An object of class character of length 10.
- An object of class character of length 12.
- An object of class character of length 25.

### Details

The names of the palette is approximal color name.

Green2Magenta16Steps: Useful for generic diverging data.

Blue2DarkRed12/18Steps: Useful for temperature-like data, with a subjective interpretation (blue=cold, red=hot) Blue2OrangeRed14Steps: Useful as an alternative to the red/blue temperature scale.

Blue2DarkOrange12/18Steps: Useful for data without a specific subjective color association.

Blue2Green14Steps: Useful for data with a winter (blue) vs. summer (green) association.

Brown2Blue10/12Steps: Useful for data with a dry (brown) vs. wet (blue) association.

Blue2Gray8Steps: Useful in particular for diverging data like cloudiness anomalies.

Blue2Orange8/10/12Steps: Useful for data like sea-level pressure, with an subjective association (blue=low, wet, orange=high, dry)

ModifiedSpectralScheme11Steps: An alternative to the spectral scheme (no green)

LightBlue2DarkBlue7/10Steps: Useful for precipitation-like data.

PairedColor12Steps: Attempt at a categorical color scale with colors that may be distinguishable to all viewers

SteppedSequential5Steps: Useful for portraying levels-within-categories

### Source

<<http://mkweb.bcgsc.ca/biovis2012/>>

### References

Light A, Bartlein PJ (2004). "The End of the Rainbow? Color Schemes for Improved Data Graphics." EOS Transactions of the American Geophysical Union, 85(40), 385.

### Examples

```
paletteMartin
Green2Magenta16Steps
Blue2DarkRed12Steps
Blue2DarkRed18Steps
Blue2OrangeRed14Steps
Blue2DarkOrange12Steps
Blue2DarkOrange18Steps
Blue2Green14Steps
Brown2Blue10Steps
Brown2Blue12Steps
Blue2Gray8Steps
Blue2Orange8Steps
Blue2Orange10Steps
Blue2Orange12Steps
ModifiedSpectralScheme11Steps
LightBlue2DarkBlue7Steps
LightBlue2DarkBlue10Steps
PairedColor12Steps
SteppedSequential5Steps
```

---

`replacePlotColor`      *replace the colors for plots*

---

### Description

replace the colors of plots to meet the requirement of publication. Replacing red with magenta or green with turquoise. Replacing all the colored symbols in the legend.

### Usage

```
replacePlotColor(plot)
```

### Arguments

`plot`                      The grob to be plotted.

**Value**

an object of gtable.

**Examples**

```
replacePlotColor(displayColors(c("Red", "Green", "blue")))
```

---

 setPDFopt

*Auxiliary function to set width of pdf for journals*


---

**Description**

Set the pdf width and height for journals.

Pre-sets of width for figures.

**Usage**

```
setPDFopt(
  width = c("1col", "1.5col", "0.5col", "2col"),
  presets = PRESETS$science
)
```

PRESETS

**Arguments**

width            columns.

presets          The pre-setting of width,height,family,font for pdf. Available choices: 0.5col, 1col, 1.5col, 2col.

**Format**

An object of class list of length 4.

**Details**

The family will be Helvetica. The font will be 8. The width and height will be same.

science: 0.5col=1.78 inches (4.52 cm.); 1col=3.54 inches (9 cm.); 1.5col=5 inches (12.7 cm.); 2col=7.25 inches (18.4 cm.). nature: 0.5col=2.28 inches (5.8 cm.); 1col=3.39 inches (8.6 cm.); 1.5col=4.76 inches (12.1 cm.); 2col=7 inches (17.8 cm.). cell: 0.5col=1.78 inches (4.52 cm.); 1col=3.35 inches (8.5 cm.); 1.5col=4.49 inches (11.4 cm.); 2col=6.85 inches (17.4 cm.). CA: A Cancer Journal for Clinicians 0.5col=1.62 inches (4.1 cm.); 1col=3.25 inches (8.25 cm.); 1.5col=3.87 inches (9.8 cm.); 2col=6.75 inches (17.1 cm.).

**Value**

A named list of all the defaults. If any arguments are supplied the return values are the old values and the result has the visibility flag turned off.

**References**

<[http://www.sciencemag.org/sites/default/files/Figure\\_prep\\_guide.pdf](http://www.sciencemag.org/sites/default/files/Figure_prep_guide.pdf)>

<<https://images.nature.com/full/nature-assets/aj/artworkguidelines.pdf>>

**Examples**

```
op <- setPDFopt("1col")
```

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