Package 'CaPO4Sim'

April 11, 2019

Type Package

Title A Virtual Patient Simulator in the Context of Calcium and
Phosphate Homeostasis

Version 0.1.0

Maintainer David Granjon <dgranjon@ymail.com>

Description Explore calcium (Ca) and phosphate (Pi) homeostasis with two novel 'Shiny' apps,
building upon on a previously published mathematical model written in C,
to ensure efficient computations. The underlying model is accessible
here <https://www.ncbi.nlm.nih.gov/pubmed/28747359>.
The first application explores the fundamentals of Ca-Pi homeostasis,
while the second provides interactive case studies for in-depth exploration of the topic,
thereby seeking to foster student engagement and an integrative understanding of Ca-
Pi regulation.
These applications are hosted at <https://rinterface.com/AppsPhysiol.html>.

Imports shiny, htmltools, shinyjs, shinyWidgets, shinydashboard,
shinydashboardPlus, shinyjqui, plotly, rintrojs,
shinycssloaders, visNetwork, purrr, DT, magrittr, utils

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

NeedsCompilation no

Author David Granjon [aut, cre, cph],
Diane de Zélicourt [cph],
Vartan Kurtcuoglu [cph],
Olivier Bonny [cph],
François Verrey [cph],
University of Lausanne [fnd],
University of Zurich [fnd],
Kidney NCCR.CH [fnd],
The Interface Group [cph] (Hosting Group),
RinteRface [cph] (R/HTML Templates)

Repository CRAN

R **topics documented:**

arrow_lighting   *Highlight arrows for steady state events*

Description

Use inside in the networkCaPO4. Nothing is returned except that the network is updated via visNetworkProxy.

Usage

```
arrow_lighting(edges, simulation, counter, session)
```

Arguments

edges	A dataframe of edges provided by generate_edges.
simulation	Which disease is currently selected. See extract_running_sim.
counter	To determine which notification to display. We expect a counter returned by the networkCaPO4 module.
session	Session object.

CaPO4Sim   *CaPO4Sim*

Description

CaPO4Sim

diseaseCheckBox   *Create a checkbox for diseaseSelectUi*

Description

Create a prettyCheckbox.

Usage

```
diseaseCheckBox(inputId, label)
```

Arguments

inputId	Checkbox Input id.
label	Checkbox label.

---

diseaseSelect *Create a disease selector server logic*

Description

Only returns inputs associated with php1, hypopara, hypoD3

Usage

```
diseaseSelect(input, output, session)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.

---

diseaseSelectUi *Create a disease selector UI module*

Description

Contains php1, hypopara, hypoD3

Usage

```
diseaseSelectUi(id)
```

Arguments

id	module id.

---

extract_running_sim *Extract the current running simulation*

Description

Simulations are currently php1, hypoD3 and hypopara. Takes diseases as input given by the [diseaseSelect](#) module.

Usage

```
extract_running_sim(diseases)
```

Arguments

diseases	Shiny input disease selector. See [diseaseSelect](#).

generate_edges *CaPO4 Edges Generator*

Description

Generate edges for the CaPO4 network

Usage

```
generate_edges(components, organs, regulations, diseases,
  organs_edges_size, hormones_edges_size)
```

Arguments

components   Shiny input CaPO4 component selector. See [networkOptions](#).

organs   Shiny input to toggle organs display. See [networkOptions](#).

regulations   Shiny input to toggle hormone display. See [networkOptions](#).

diseases   Shiny input disease selector. See [diseaseSelect](#).

organs_edges_size
                Shiny input for organs edges size. See [networkOptions](#).

hormones_edges_size
                Shiny input for hormones edges size. See [networkOptions](#).

generate_network *CaPO4 Network Generator*

Description

Create a CaPO4 network taking nodes and edges as inputs

Usage

```
generate_network(nodes, edges, usephysics = FALSE, isMobile)
```

Arguments

nodes   A dataframe of nodes provided by [generate_nodes](#).

edges   A dataframe of edges provided by [generate_edges](#).

usephysics   Whether to use physic. FALSE by default. A visNetwork API parameter.

isMobile   Shiny input checking if the app is running on a cellphone/tablet.

---

generate_nodes   *CaPO4 Nodes Generator*

Description

Generate nodes for the CaPO4 network

Usage

```
generate_nodes(components, organs, regulations, background, diseases,
  organs_nodes_size, hormones_nodes_size)
```

Arguments

components	Shiny input CaPO4 component selector. See networkOptions.
organs	Shiny input to toggle organs display. See networkOptions.
regulations	Shiny input to toggle hormone display. See networkOptions.
background	Shiny input background selector. See networkOptions.
diseases	Shiny input disease selector. See diseaseSelect.
organs_nodes_size	
	Shiny input for organs node size. See networkOptions.
hormones_nodes_size	
	Shiny input for hormones node size. See networkOptions..

---

generate_notification *Notifications Generator for CaPO4 animations*

Description

Generate sequential notification as a function of the selected diseases. All notifications are in the notifications.R file in the inst/entry_level app folder. Used in the infos module.

Usage

```
generate_notification(simulation, counter, allowed)
```

Arguments

simulation	Which disease is currently selected. See extract_running_sim.
counter	To determine which notification to display. We expect a counter returned by the networkCaPO4 module.
allowed	Whether to allow simulations. Expect logical value. See infos module.

generate_userFields   *Generate user fields*

Description

Use inside in the userInfo. Function that helps in generating 4 users fields, image, stat1, stat2 and stat3, so as to reinject them in the header userMenu

Usage

```
generate_userFields(diseases, sliderDisease)
```

Arguments

`diseases`	Shiny input disease selector. See diseaseSelect.
`sliderDisease`	Shiny slider input related to the current disease severity. See plotBox.

glossaryCaPO4   *CaPO4 glossary server module*

Description

Create a CaPO4 glossary

Usage

```
glossaryCaPO4(input, output, session)
```

Arguments

`input`	Shiny inputs
`output`	Shiny Outputs
`session`	Session object.

---

glossaryCaPO4Ui   *CaPO4 glossary UI module*

Description

Create a CaPO4 glossary

Usage

```
glossaryCaPO4Ui(id)
```

Arguments

id   module id.

---

helpCaPO4   *Help server module*

Description

Create the help section

Usage

```
helpCaPO4(input, output, session)
```

Arguments

input   Shiny inputs
output   Shiny Outputs
session   Session object.

---

helpCaPO4Ui   *Help UI module*

Description

Create a help button

Usage

```
helpCaPO4Ui(id)
```

Arguments

id   module id.

---

infos *Info server module*

Description

Create modals, alerts, ...

Usage

```
infos(input, output, session, diseases, animation_counter, regulations)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.
diseases	Shiny input disease selector. See diseaseSelect.
animation_counter	
	Give the current temporal state of the animation. See networkCaPO4.
regulations	Shiny input to toggle hormone display. See networkOptions.

---

infosUi *Info UI module*

Description

Create modals, alerts, ...

Usage

```
infosUi(id)
```

Arguments

id	module id.

---

infoSwitch   *Create a switch input for [infosUi](#)*

Description

Create a [prettySwitch](#).

Usage

```
infoSwitch(inputId, label)
```

Arguments

inputId	Checkbox Input id.
label	Checkbox label.

---

make_plot_hypoD3   *Produce plots related to vitamin D3 deficiency (hypoD3)*

Description

Use inside the [plotBox](#) module.

Usage

```
make_plot_hypoD3(sliderVal, isMobile)
```

Arguments

sliderVal	Shiny slider input related to the current disease severity. See [plotBox](#).
isMobile	Shiny input useful to scale elements based on the device screen size.

---

make_plot_hypopara   *Produce plots related to hypoparathyroidism (hypopara)*

Description

Use inside the [plotBox](#) module.

Usage

```
make_plot_hypopara(sliderVal, isMobile)
```

Arguments

sliderVal	Shiny slider input related to the current disease severity. See [plotBox](#).
isMobile	Shiny input useful to scale elements based on the device screen size.

---

make_plot_php1 *Produce plots related to primary hyperparathyroidism (php1)*

Description

Use inside the [plotBox](#) module.

Usage

```
make_plot_php1(sliderVal, isMobile)
```

Arguments

sliderVal	Shiny slider input related to the current disease severity. See [plotBox.](#)
isMobile	Shiny input useful to scale elements based on the device screen size.

---

networkCaPO4 *CaPO4 Network server module*

Description

Create a CaPO4 network

Usage

```
networkCaPO4(input, output, session, isMobile, components, organs,
  regulations, background, diseases, organs_nodes_size,
  hormones_nodes_size, organs_edges_size, hormones_edges_size, help)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.
isMobile	Shiny input checking if the app is running on a cellphone/tablet.
components	Shiny input CaPO4 component selector. See [networkOptions.](#)
organs	Shiny input to toggle organs display. See [networkOptions.](#)
regulations	Shiny input to toggle hormone display. See [networkOptions.](#)
background	Shiny input background selector. See [networkOptions.](#)
diseases	Shiny input disease selector. See [diseaseSelect.](#)
organs_nodes_size	
	Shiny input for organs node size. See [networkOptions.](#)

hormones_nodes_size

> Shiny input for hormones node size. See [networkOptions](#).

organs_edges_size

> Shiny input for organs edges size. See [networkOptions](#).

hormones_edges_size

> Shiny input for hormones edges size. See [networkOptions](#).

help   Help input.

---

networkCaPO4Ui   *CaPO4 Network UI module*

Description

Create a CaPO4 network

Usage

```
networkCaPO4Ui(id)
```

Arguments

id   module id.

---

networkOptions   *CaPO4 Network Options server module*

Description

Create a CaPO4 network options

Usage

```
networkOptions(input, output, session, mobile)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.
mobile	Whether we are on cellphone/tablets or not. Slot for input$ismobile().

---

networkOptionsUi *CaPO4 Network Options UI module*

Description

Options for the network

Usage

```
networkOptionsUi(id)
```

Arguments

id   module id

---

plotBox *plot box server module*

Description

Create modals, alerts, ...

Usage

```
plotBox(input, output, session, diseases, help, isMobile)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.
diseases	Shiny input disease selector. See diseaseSelect.
help	Help input.
isMobile	Shiny input useful to scale elements based on the device screen size.

---

plotBoxUi   *plot box UI module*

Description

Create modals, alerts, ...

Usage

```
plotBoxUi(id)
```

Arguments

id   module id.

---

run_CaPO4Sim   *Launch the virtual patient simulator*

Description

Unleash the virtual patient simulator

Usage

```
run_CaPO4Sim(context = c("introduction", "virtual-patient"))
```

Arguments

context   Choose between c("introduction", "virtual-patient").

Examples

```
if (interactive()) {
 run_CaPO4Sim(context = "introduction")
 run_CaPO4Sim(context = "virtual-patient")
}
```

skinSelect   *Dashboard skin selector, server side*

Description

Select the shinydashboard skin you want

Usage

```
skinSelect(input, output, session)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.

skinSelectUi   *Dashboard skin selector, ui side*

Description

Select the shinydashboard skin you want

Usage

```
skinSelectUi(id)
```

Arguments

id	module id.

---

userInfo   *CaPO4 user info server module*

Description

Create a CaPO4 user info card

Usage

```
userInfo(input, output, session, diseases, sliderDisease, help)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.
diseases	Shiny input disease selector. See diseaseSelect.
sliderDisease	Shiny input disease severity selector. See plotBox.
help	Help input.

---

userInfoUi   *CaPO4 user info UI module*

Description

Create a CaPO4 user info card

Usage

```
userInfoUi(id)
```

Arguments

id	module id.

---

video *Create a video server logic*

Description

Nothing is contained inside for now...

Usage

```
video(input, output, session)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.

---

videoUi *Create a movie UI module*

Description

Contains php1, hypopara, hypoD3

Usage

```
videoUi(id, data)
```

Arguments

id	module id.
data	Video data.

Index