

Package ‘CaPO4Sim’

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

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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://pubmed.ncbi.nlm.nih.gov/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>>.

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arrow_lighting	<i>Highlight arrows for steady state events</i>
----------------	---

Description

Use inside in the [networkCaPO4](#). Nothing is returned except that the network is updated via [vis-NetworkProxy](#).

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	<i>CaPO4Sim</i>
----------	-----------------

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>>.

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	<i>Extract the current running simulation</i>
---------------------	---

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 .
----------	---

fullScreen	<i>Create a fullScreen server logic</i>
------------	---

Description

Nothing is contained inside for now...

Usage

```
fullScreen(input, output, session)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.

fullScreenUI	<i>Create a fullScreen UI module</i>
--------------	--------------------------------------

Description

Trigger a fullScreen mode. Based on <https://stackoverflow.com/questions/42371164/how-to-run-r-shiny-app-in-full-sized-window>

Usage

```
fullScreenUI(id)
```

Arguments

id	module id.
----	------------

generate_edges	<i>CaPO4 Edges Generator</i>
----------------	------------------------------

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	<i>CaPO4 Network Generator</i>
------------------	--------------------------------

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	<i>CaPO4 Nodes Generator</i>
----------------	------------------------------

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 .

glossaryCaP04	<i>CaPO4 glossary server module</i>
---------------	-------------------------------------

Description

Create a CaPO4 glossary

Usage

```
glossaryCaP04(input, output, session)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.

glossaryCaP04Ui	<i>CaPO4 glossary UI module</i>
-----------------	---------------------------------

Description

Create a CaPO4 glossary

Usage

```
glossaryCaP04Ui(id)
```

Arguments

id	module id.
----	------------

helpCaP04	<i>Help server module</i>
-----------	---------------------------

Description

Create the help section

Usage

```
helpCaP04(input, output, session)
```

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.

helpCaP04Ui	<i>Help UI module</i>
-------------	-----------------------

Description

Create a help button

Usage

```
helpCaP04Ui(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_hyopara *Produce plots related to [hypoparathyroidism \(hyopara\)](#)*

Description

Use inside the [plotBox](#) module.

Usage

```
make_plot_hyopara(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	<i>Produce plots related to primary hyperparathyroidism (php1)</i>
----------------	--

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.

myCarousel	<i>carousel container</i>
------------	---------------------------

Description

Creates a carousel. Adapted from shinydashboardplus to also allow control of the carousel animation

Usage

```
myCarousel(
  ...,
  id,
  indicators = TRUE,
  width = 6,
  .list = NULL,
  data.interval = 5000,
  data.ride = "carousel"
)
```

Arguments

...	Slot for carouselItem
id	Carousel id. Must be unique.
indicators	Whether to display left and right indicators.
width	Carousel width. 6 by default.
.list	Should you need to pass carouselItem via lapply or similar, put these item here instead of passing them in ...

data.interval	specify data-interval in ms. 5000ms by default, set to "false" to prevent automated animation of the slides.
data.ride	specify data-ride. "carousel" by default.

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	<i>CaPO4 Network UI module</i>
----------------	--------------------------------

Description

Create a CaPO4 network

Usage

```
networkCaPO4Ui(id)
```

Arguments

id	module id.
----	------------

networkOptions	<i>CaPO4 Network Options server module</i>
----------------	--

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	<i>CaPO4 Network Options UI module</i>
------------------	--

Description

Options for the network

Usage

```
networkOptionsUi(id)
```

Arguments

id	module id
----	-----------

plotBox	<i>plot box server module</i>
---------	-------------------------------

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	<i>plot box UI module</i>
-----------	---------------------------

Description

Create modals, alerts, ...

Usage

```
plotBoxUi(id)
```

Arguments

id	module id.
----	------------

run_CaP04Sim	<i>Launch the virtual patient simulator</i>
--------------	---

Description

Unleash the virtual patient simulator

Usage

```
run_CaP04Sim(context = c("introduction", "virtual-patient"))
```

Arguments

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

Examples

```
if (interactive()) {  
  run_CaP04Sim(context = "introduction")  
  run_CaP04Sim(context = "virtual-patient")  
}
```

skinSelect	<i>Dashboard skin selector, server side</i>
------------	---

Description

Select the shinydashboard skin you want

Usage

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

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.

skinSelectUi	<i>Dashboard skin selector, ui side</i>
--------------	---

Description

Select the shinydashboard skin you want

Usage

```
skinSelectUi(id)
```

Arguments

id	module id.
----	------------

userInfo	<i>CaPO4 user info server module</i>
----------	--------------------------------------

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	<i>CaPO4 user info UI module</i>
------------	----------------------------------

Description

Create a CaPO4 user info card

Usage

```
userInfoUi(id)
```

Arguments

id	module id.
----	------------

video	<i>Create a video server logic</i>
-------	------------------------------------

Description

Nothing is contained inside for now...

Usage

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

Arguments

input	Shiny inputs
output	Shiny Outputs
session	Session object.

videoUi	<i>Create a movie UI module</i>
---------	---------------------------------

Description

Contains php1, hypopara, hypoD3

Usage

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

Arguments

id	module id.
data	Video data.

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