

# 1. SynCircos

SynCircos draws the interactive Circos plot by using selected species and chromosomes.

## (1) Selecting reference species and assembly version

The screenshot shows the SynCircos web interface. At the top, there is a navigation bar with 'SYNTENY PORTAL', 'SynCircos', 'SynBrowser', 'SynSearcher', 'SynBuilder', and 'Documentation'. Below the navigation bar, the main heading reads 'SynCircos draws the interactive Circos plot by using selected species and chromosomes.' with a 'HELP' link. The interface is divided into two main sections: 'Reference' and 'Target'. The 'Reference' section has a dropdown menu for 'Species name' with 'Human' selected. Below it, there are three rows for 'Target 0', 'Target 0', and 'Target 0', each with a dropdown for 'Species name' and a text input for 'Assembly'. The 'Reference' section also includes a 'Resolution (bp)' dropdown set to '150,000', a 'Name type' dropdown set to 'Species name', and 'Submit' and 'Reset' buttons. At the bottom, there is an 'Image format' dropdown set to 'SVG', and 'Download' and 'Show job status' buttons.

- Selecting a reference species.

This screenshot shows the SynCircos interface with the 'Reference' dropdown menu open. The 'Species name' dropdown is set to 'Human'. The 'Assembly' dropdown for 'Reference' is open, showing options: 'hg38 (GRCh38)', 'hg19 (GRCh37)', 'hg18 (NCBI36)', and 'hg17 (NCBI35)'. The 'hg19 (GRCh37)' option is selected. The 'Target' section remains the same as in the previous screenshot.

- Selecting the assembly version of the selected reference species.

## (2) Selecting a target species and assembly version

This screenshot shows the SynCircos interface with the 'Target 0' dropdown menu open. The 'Reference' section is set to 'Human' and 'hg19 (GRCh37)'. The 'Target 0' dropdown menu is open, showing options: 'Human', 'Cat', 'Chicken', 'Chimpanzee', 'Cow', 'Dog', 'Gorilla', 'Horse', 'Lizard', 'Marmoset', 'Medaka', 'Mouse', 'Opossum', 'Orangutan', 'Pig', and 'Rabbit'. The 'Cow' option is selected. The 'Assembly' dropdown for 'Target 0' is set to 'bosTau7'.

- Selecting a target species.

This screenshot shows the SynCircos interface with the 'Target 0' dropdown menu open. The 'Reference' section is set to 'Human' and 'hg19 (GRCh37)'. The 'Target 0' dropdown menu is open, showing options: 'Human', 'Cat', 'Chicken', 'Chimpanzee', 'Cow', 'Dog', 'Gorilla', 'Horse', 'Lizard', 'Marmoset', 'Medaka', 'Mouse', 'Opossum', 'Orangutan', 'Pig', and 'Rabbit'. The 'Cow' option is selected. The 'Assembly' dropdown for 'Target 0' is open, showing options: 'hg19 (GRCh37)', 'mm10', and 'bosTau7'. The 'bosTau7' option is selected.

- Selecting the assembly version of the selected target species.

### (3) Adding target species

SynCircos draws the interactive Circos plot by using selected species and chromosomes. [HELP](#)

	Species name	Assembly	Chromosomes >>	
Reference	Human	hg19 (GRCh37)	Chromosomes >>	1,3,5,6,8,12,15,19
Target O1	Mouse	mm10	Chromosomes >>	1,3,7,17,18
Target O2	Cow	bosTau7	Chromosomes >>	3,9,10,14,17,22
Target O3	Cat	felCat5	Chromosomes >>	A1,A2,A3,B1,B2,B3,B4,C1,C2,D1,D2,D3,D4,F1,F2
Target O4	Cat	felCat5	Chromosomes >>	A1,A2,A3,B1,B2,B3,B4,C1,C2,D1,D2,D3,D4,F1,F2

Resolution (bp) 150,000 Name type Species name

Image format SVG

- Users can add target species by clicking on the ‘Add a target’ button.

### (4) Removing target species

SynCircos draws the interactive Circos plot by using selected species and chromosomes. [HELP](#)

	Species name	Assembly	Chromosomes >>	
Reference	Human	hg19 (GRCh37)	Chromosomes >>	1,3,5,6,8,12,15,19
Target O1	Mouse	mm10	Chromosomes >>	1,3,7,17,18
Target O2	Cow	bosTau7	Chromosomes >>	3,9,10,14,17,22
Target O3	Cat	felCat5	Chromosomes >>	A1,A2,A3,B1,B2,B3,B4,C1,C2,D1,D2,D3,D4,F1,F2

Resolution (bp) 150,000 Name type Species name

Image format SVG

- Users can delete target species by clicking on the ‘Delete a target’ button or the ‘-’ symbol in front of the label ‘Target XX’.
- When Users press ‘Delete a target’ button, the last target is removed.

### (5) Selecting specific chromosomes

SynCircos draws the interactive Circos plot by using selected species and chromosomes. [HELP](#)

	Species name	Assembly	Chromosomes >>	
Reference	Human	hg19 (GRCh37)	Chromosomes >>	1,4,5,8

chr1  
chr2  
chr3  
chr4  
chr5  
chr6  
chr7  
chr8  
chr9

Target O1	Mouse	mm10	Chromosomes >>	1,3,7,17,18
Target O2	Cow	bosTau7	Chromosomes >>	3,9,10,14,17,22

Resolution (bp) 150,000 Name type Species name

Image format SVG

- The specific chromosomes of a reference and target species can be selected.
- The chromosome selection menu is opened when user click on the ‘Chromosomes >>’ button.
- It is possible to select multiple chromosomes at once by clicks with the ‘Ctrl’ or ‘Shift’ key.
- All chromosomes can be selected or unselected by using the ‘Select all’ and ‘Unselect all’ buttons respectively.

## (6) Selecting a resolution

Synteny Portal: SynCircos, SynBrowser, SynSearcher, SynBuilder, Documentation

SynCircos draws the interactive Circos plot by using selected species and chromosomes. [HELP](#)

	Species name	Assembly	Chromosomes >>	
Reference	Human	hg19 (GRCh37)	1,3,5,6,8,12,15,19	
Target O1	Mouse	mm10	1,3,7,17,18	
Target O2	Cow	bosTau7	3,9,10,14,17,22	

Buttons: Add a target, Delete a target

Resolution (bp): 150,000 (selected), 300,000, 400,000, 500,000

Name type: Species name (selected)

Buttons: Submit, Reset

Image format: SVG

Buttons: Download, Show job status

- Selecting a resolution of synteny blocks.

## (7) Selecting a name type

Synteny Portal: SynCircos, SynBrowser, SynSearcher, SynBuilder, Documentation

SynCircos draws the interactive Circos plot by using selected species and chromosomes. [HELP](#)

	Species name	Assembly	Chromosomes >>	
Reference	Human	hg19 (GRCh37)	1,3,5,6,8,12,15,19	
Target O1	Mouse	mm10	1,3,7,17,18	
Target O2	Cow	bosTau7	3,9,10,14,17,22	

Buttons: Add a target, Delete a target

Resolution (bp): 150,000

Name type: Species name (selected), Assembly ID, None

Buttons: Submit, Reset

Image format: SVG

Buttons: Download, Show job status

- Selecting the name type of a reference and target species which will be used in the output Circos plot.
- ‘Species name’ is a human-friendly species name, such as human, mouse, and cow.
- ‘Assembly ID’ is a genome assembly identifier, such as hg19, mm10, and bosTau7, used in the UCSC genome browser.
- When users select ‘None’, a name is not shown in the output Circos plot.

## (8) Clicking the ‘Submit’ button for drawing the Circos plot

Synteny Portal: SynCircos, SynBrowser, SynSearcher, SynBuilder, Documentation

SynCircos draws the interactive Circos plot by using selected species and chromosomes. [HELP](#)

	Species name	Assembly	Chromosomes >>	
Reference	Human	hg19 (GRCh37)	1,3,5,6,8,12,15,19	
Target O1	Mouse	mm10	1,3,7,17,18	
Target O2	Cow	bosTau7	3,9,10,14,17,22	

Buttons: Add a target, Delete a target

Resolution (bp): 150,000

Name type: Species name (selected)

Buttons: Submit, Reset

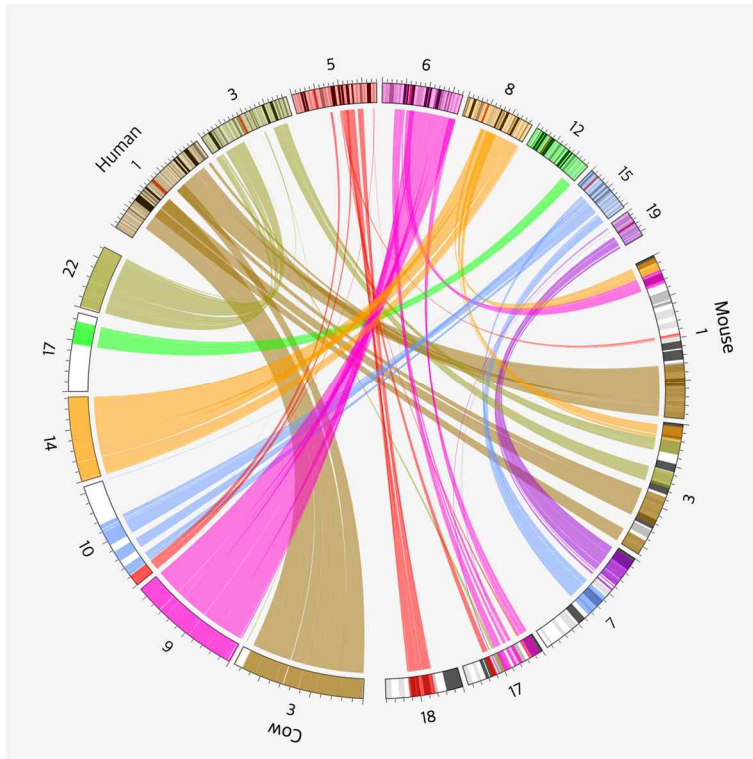
Image format: SVG

Buttons: Download, Show job status

- The Circos plot is drawn in the current page when the total number of selected chromosomes is less than 20. → (9-1)
- Otherwise, the Circos plot is drawn in a separated result page. → (9-2)

(9-1) An example of SynCircos

The following Circos plot is created by using the Circos software package.



- The specific syntenic relationship shown as a ribbon can be highlighted by a mouse over the specific reference chromosome number, track or ribbon.

(9-2) An example of SynCircos in a separated result page

**SYNTENY PORTAL**      **Job Status - SynCircos**

Job ID	Description	Status	Circos
1	Resolution: 150000 bp, Name type: Species name Reference: Human (hg19) - 1,3,5,6,8,12,15,19 Target 1: Mouse (mm10) - 1,3,7,17,18 Target 2: Cow (bosTau7) - 3,9,10,14,17,22,23,24	Complete	<a href="#">View</a> <a href="#">Download</a> ▾

\*\* This page will be automatically refreshed in every second. \*\*

[Reload](#)

- When the total number of selected chromosomes is larger than 20, the drawing job is submitted to our job scheduler.
- The description and status of submitted jobs are shown in a table as shown above.
- When the job status is changed to 'Complete', click 'View' button for visualizing the resulting Circos plot.
- The output Circos plot can be downloaded by using the 'Download' select box as PNG, JPEG, SVG, or PDF format.

(10) Selecting an image format for downloading the output Circos plot.

The screenshot shows the SynCircos web interface. At the top, there is a navigation bar with links for SYNTENY PORTAL, SynCircos, SynBrowser, SynSearcher, SynBuilder, and Documentation. Below this, a header states "SynCircos draws the interactive Circos plot by using selected species and chromosomes." with a HELP link. The main form includes fields for Reference (Human), Target 01 (Mouse), and Target 02 (Cow), each with an Assembly dropdown and a Chromosomes selection field. Below these are "Add a target" and "Delete a target" buttons. Further down, there are fields for Resolution (150,000 bp), Name type (Species name), and Image format (SVG, selected). There are also "Download" and "Show job status" buttons, along with "Submit" and "Reset" buttons.

- User can also download the Circos plot drawn in the default page as an image file in four different image formats (PNG, JPEG, SVG, and PDF).