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- subsp. *validus* (Vahl) T. Koyama in *Occas. Pap.*, 29: 128 (1989): *Scirpus validus*.

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- burtii* I. Kukkonen in *Notes Roy. Bot. Gard. Edinburgh*, 43(3): 365 (1986)—Natal.
- molle* I. Kukkonen in *Notes Roy. Bot. Gard. Edinburgh*, 43(3): 366 (1986)—Natal.
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Grupos

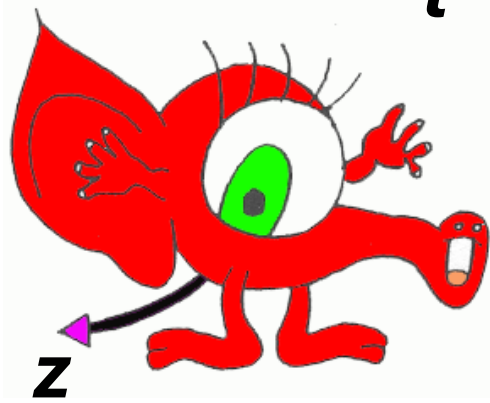
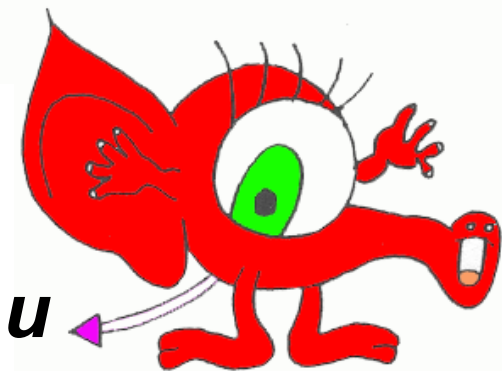
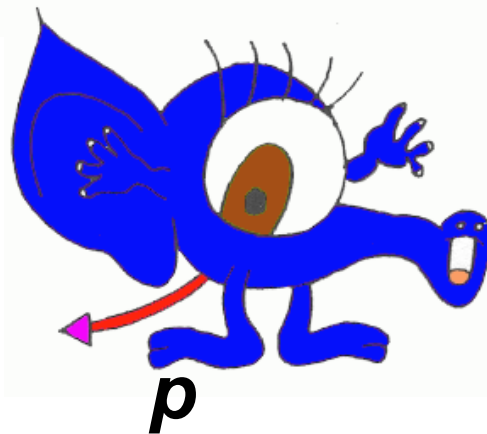
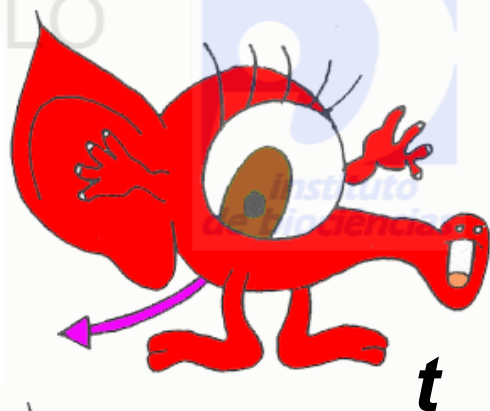
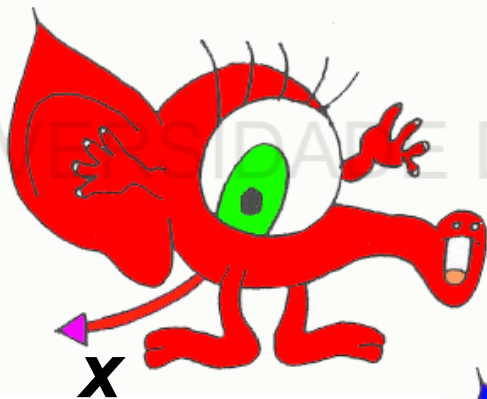
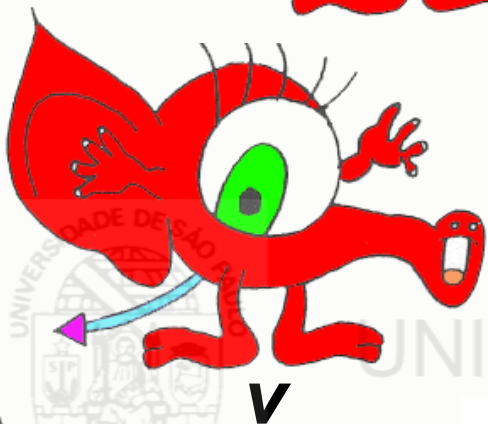
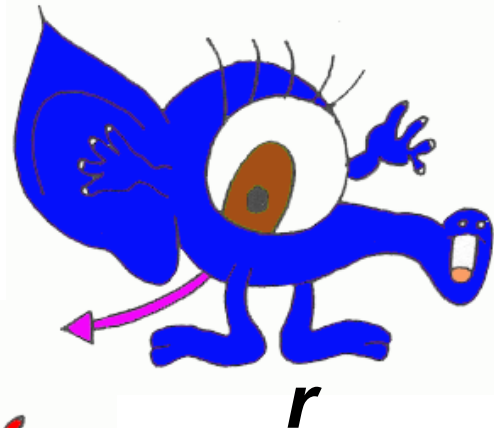
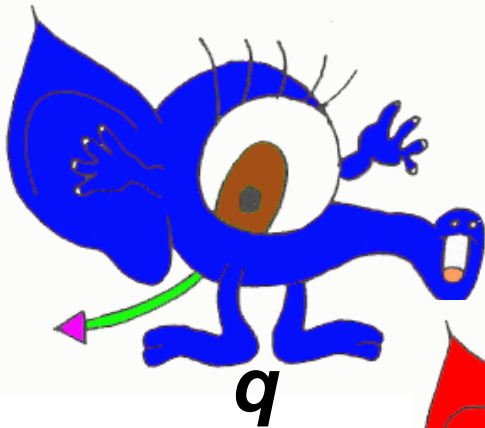
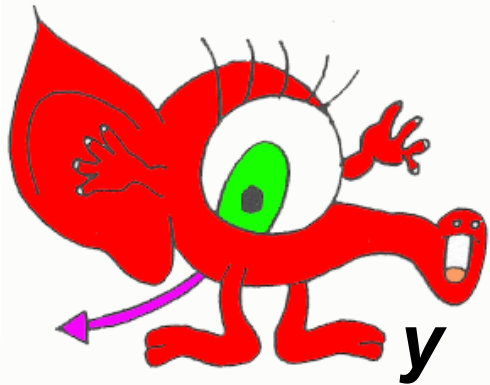
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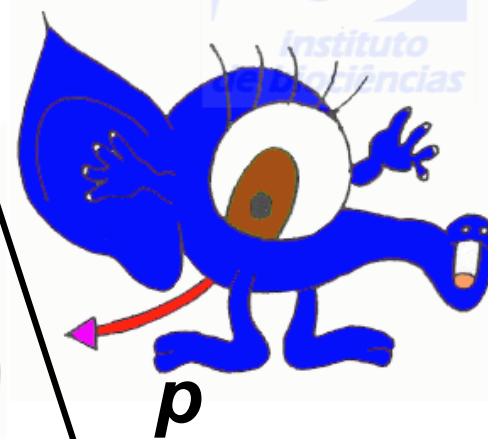
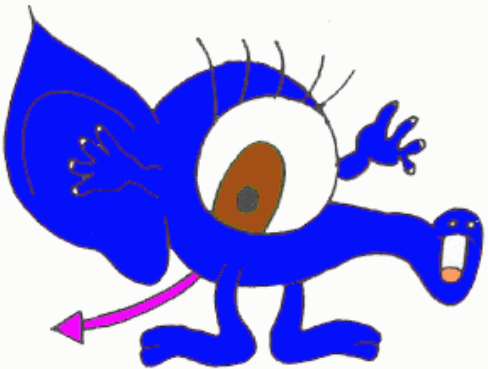
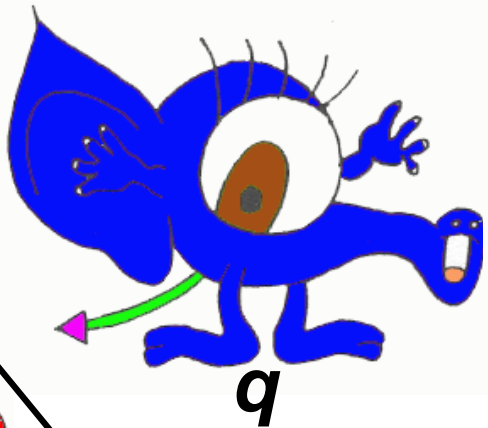
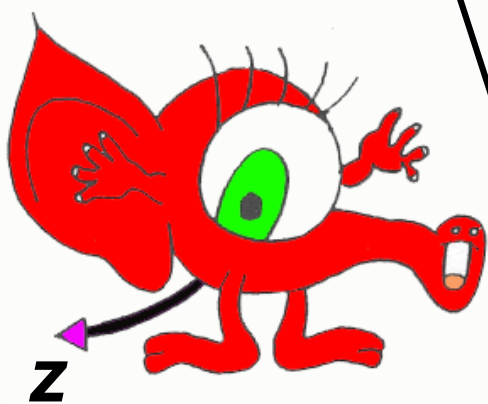
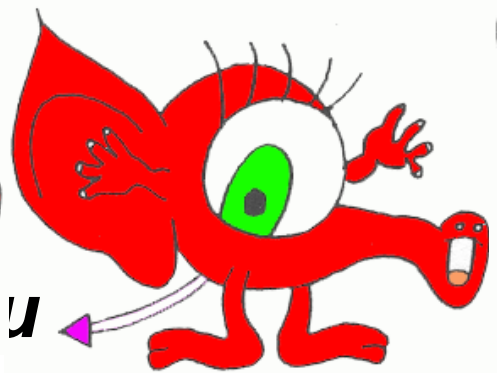
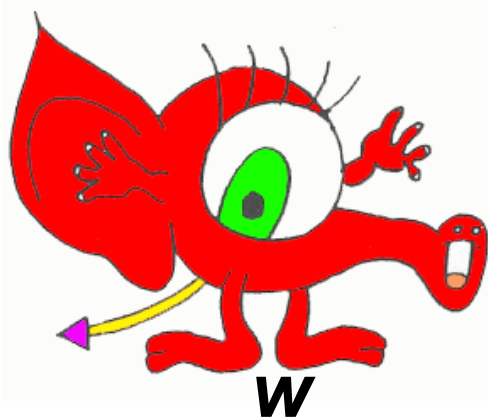
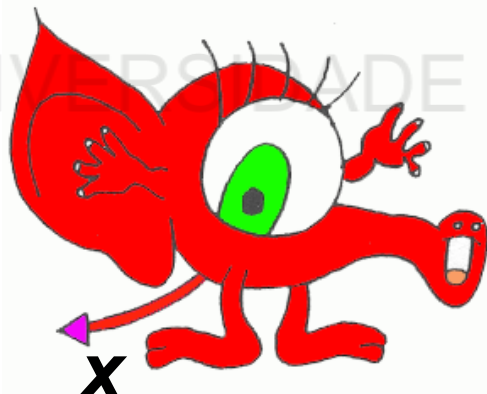
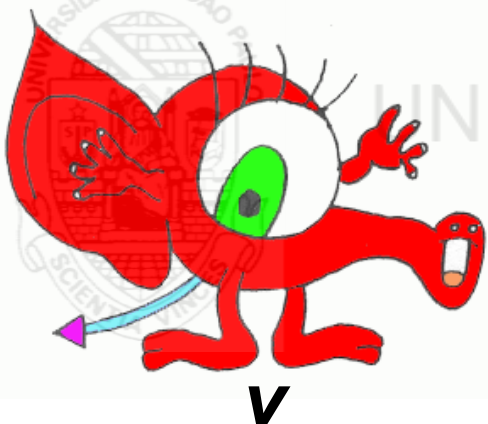
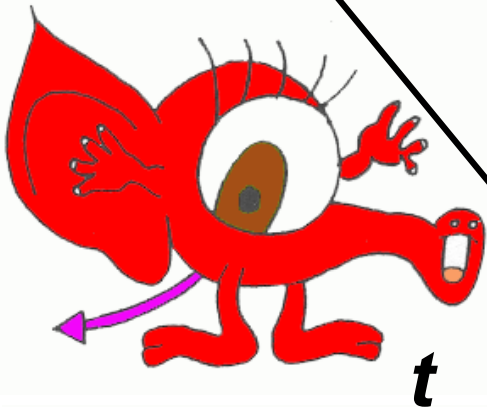
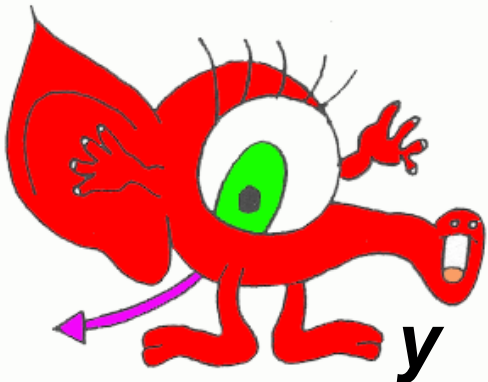
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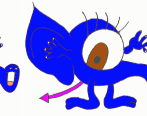
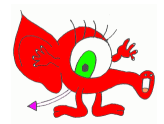
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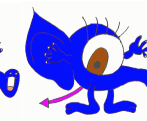
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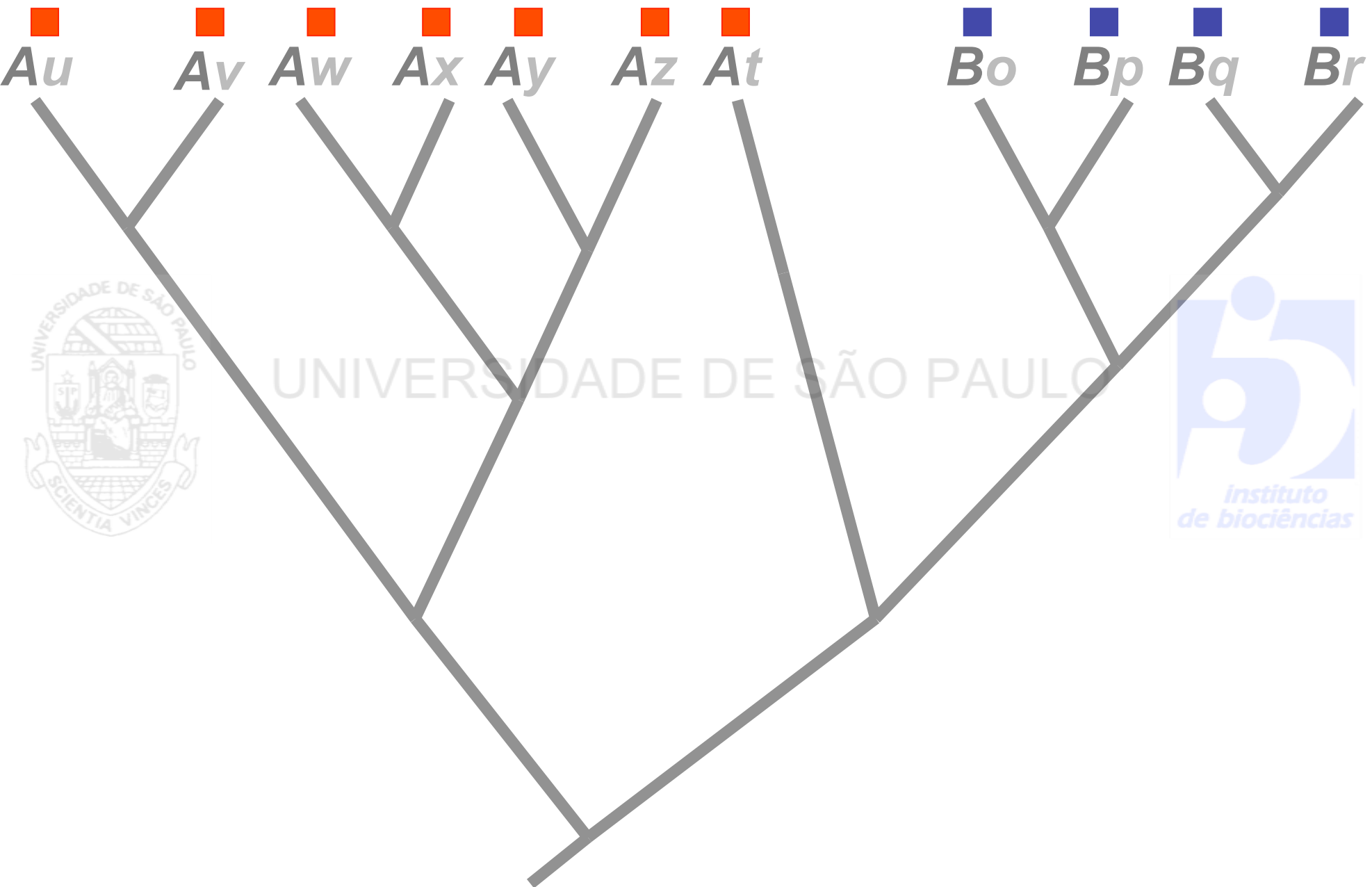
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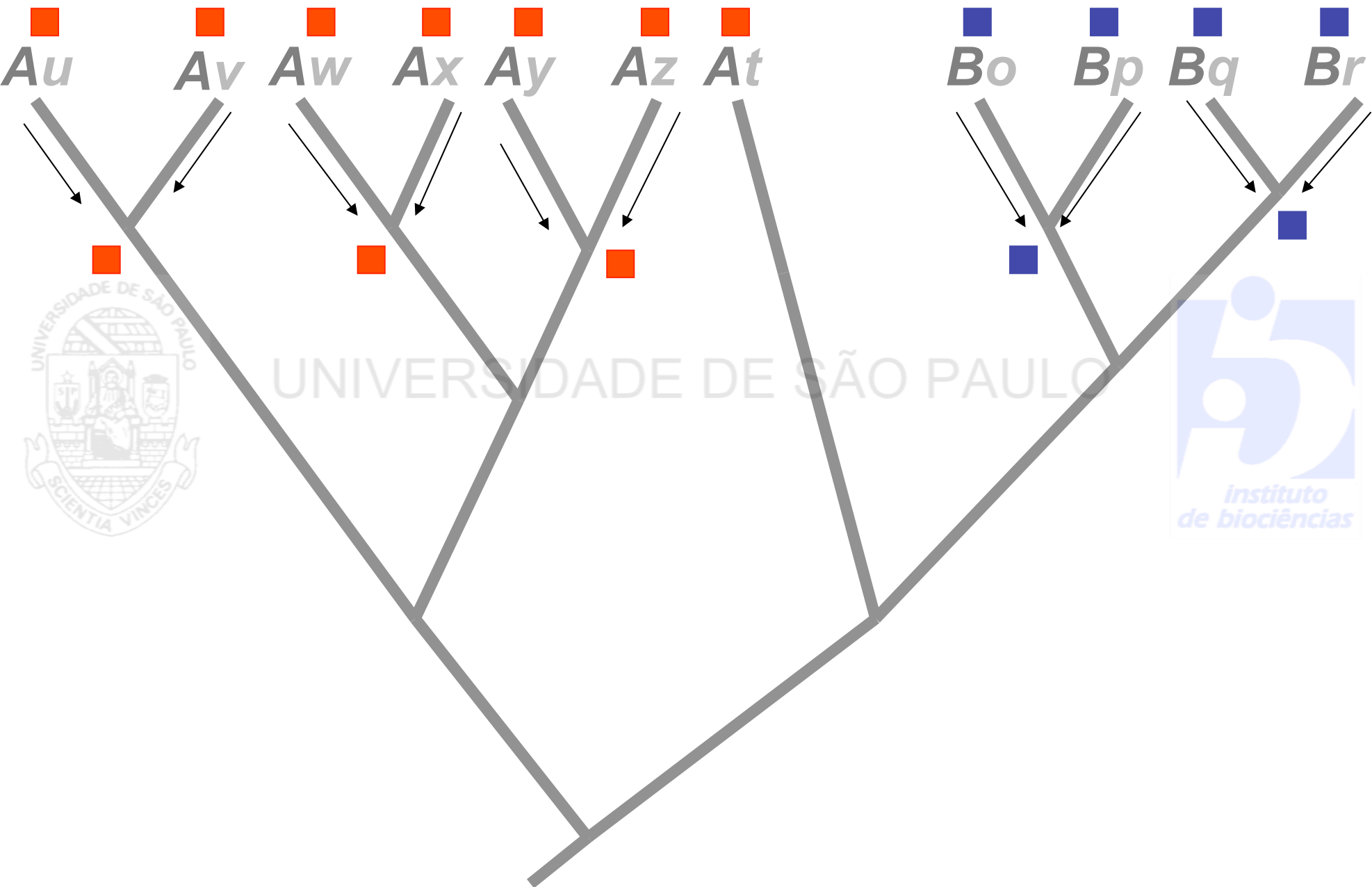
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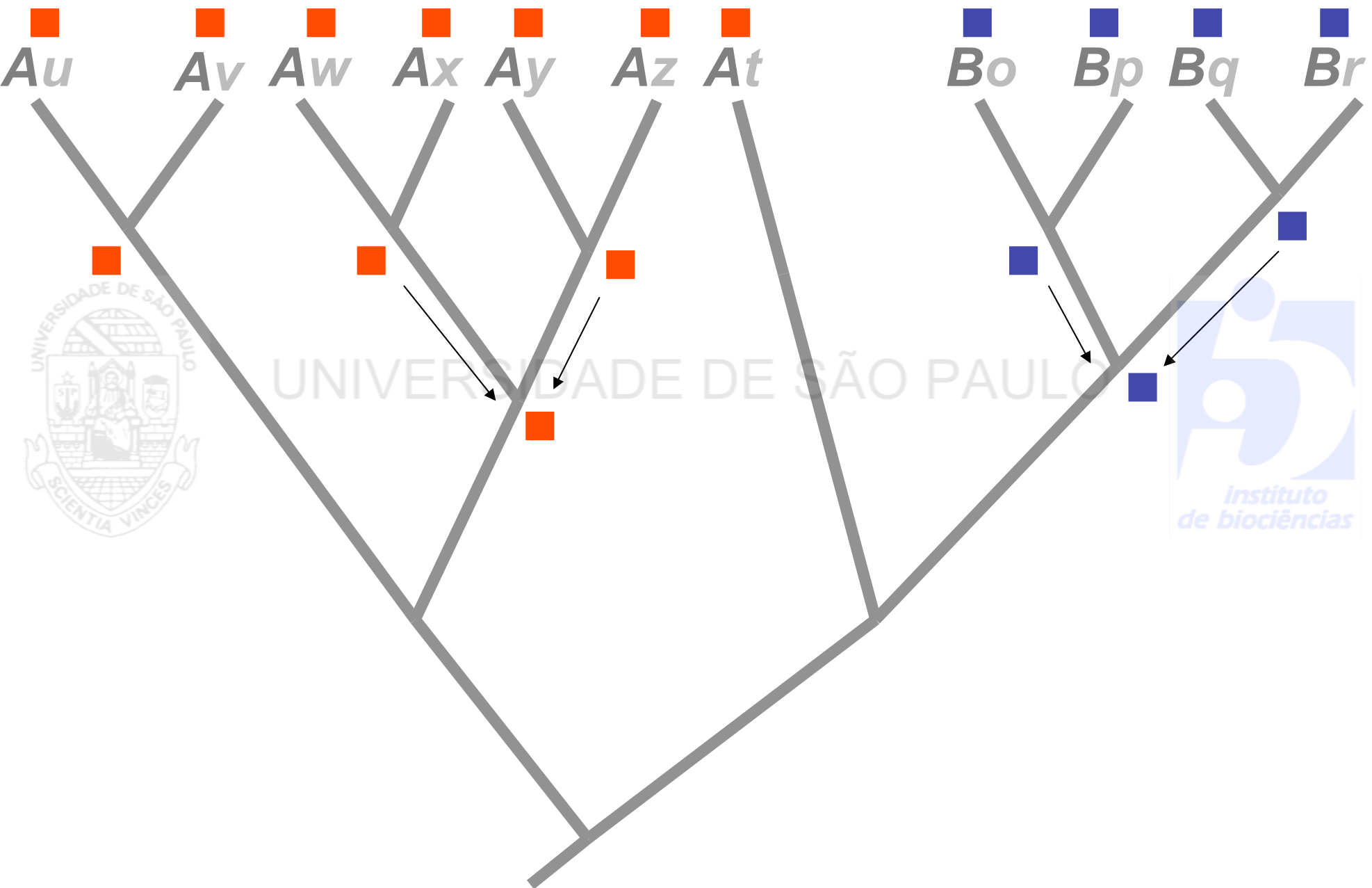
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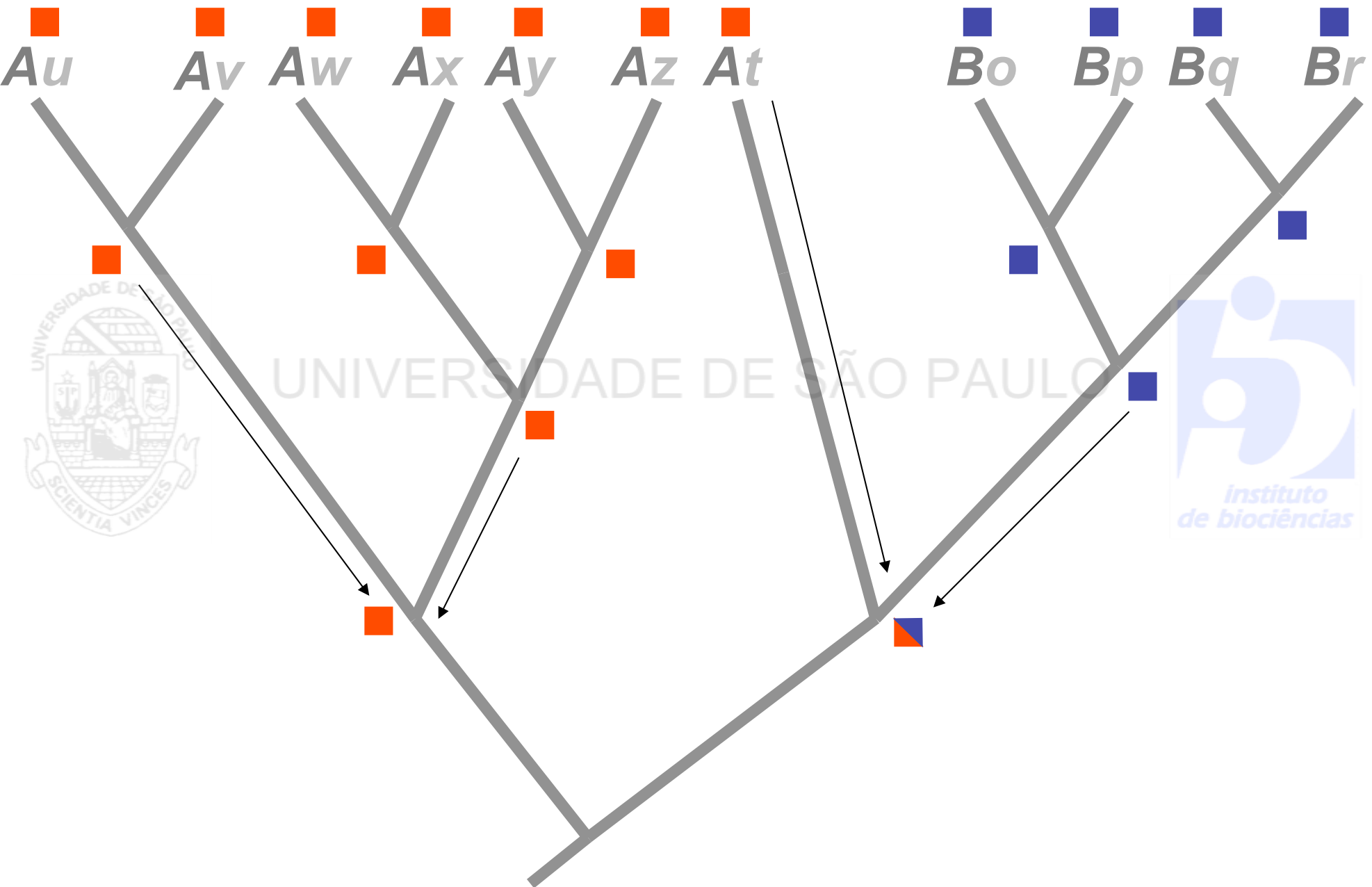
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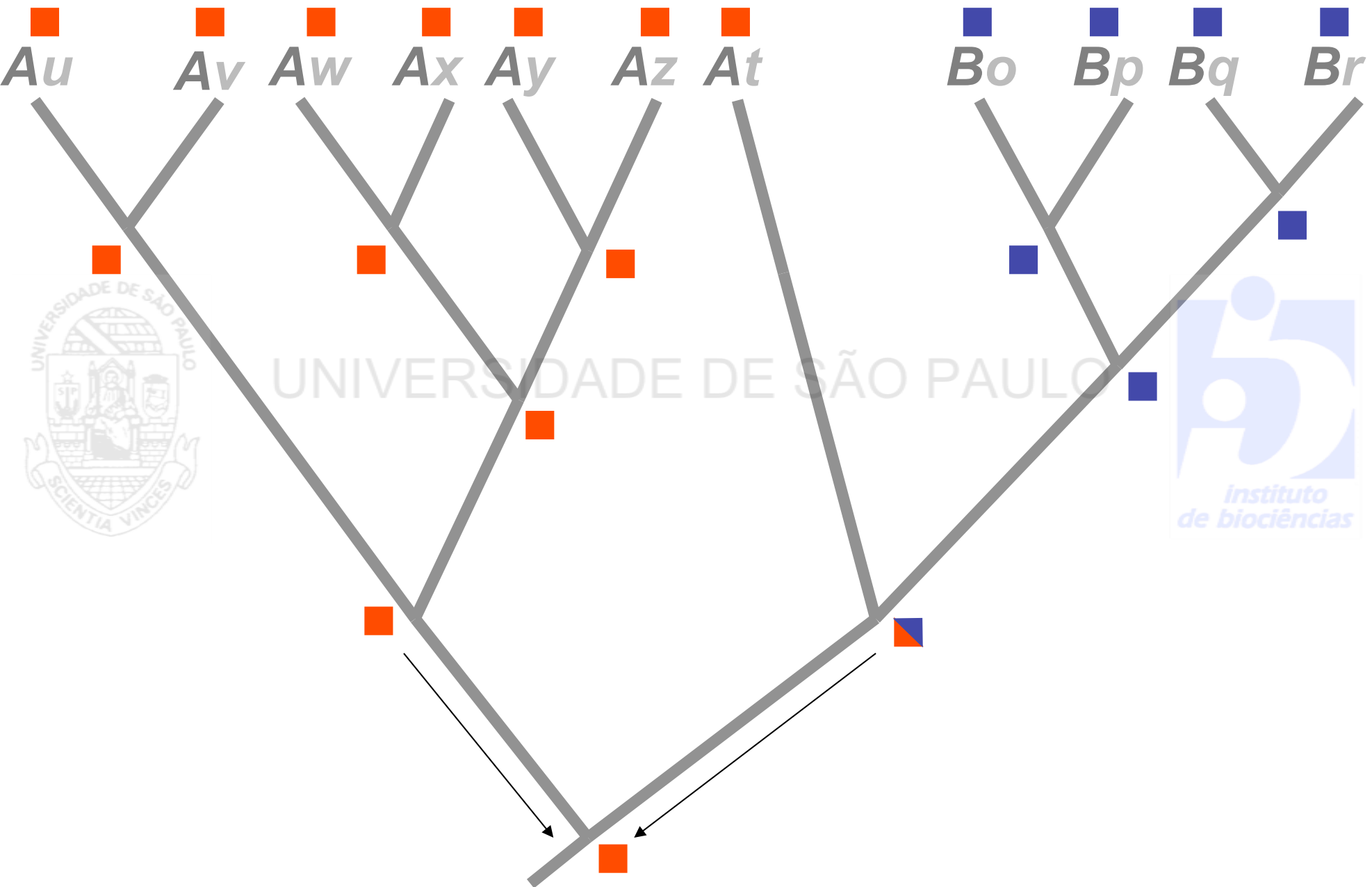
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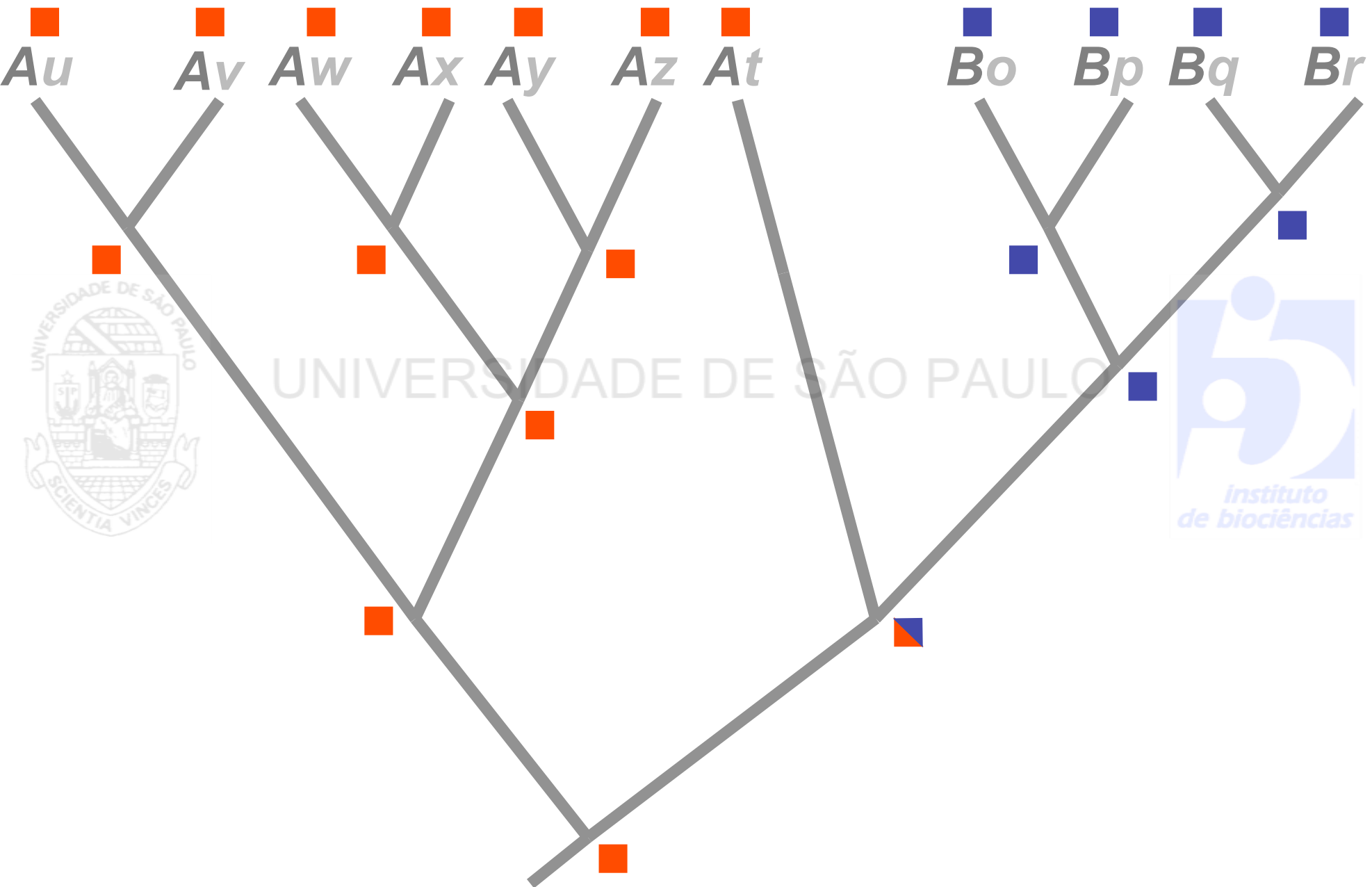
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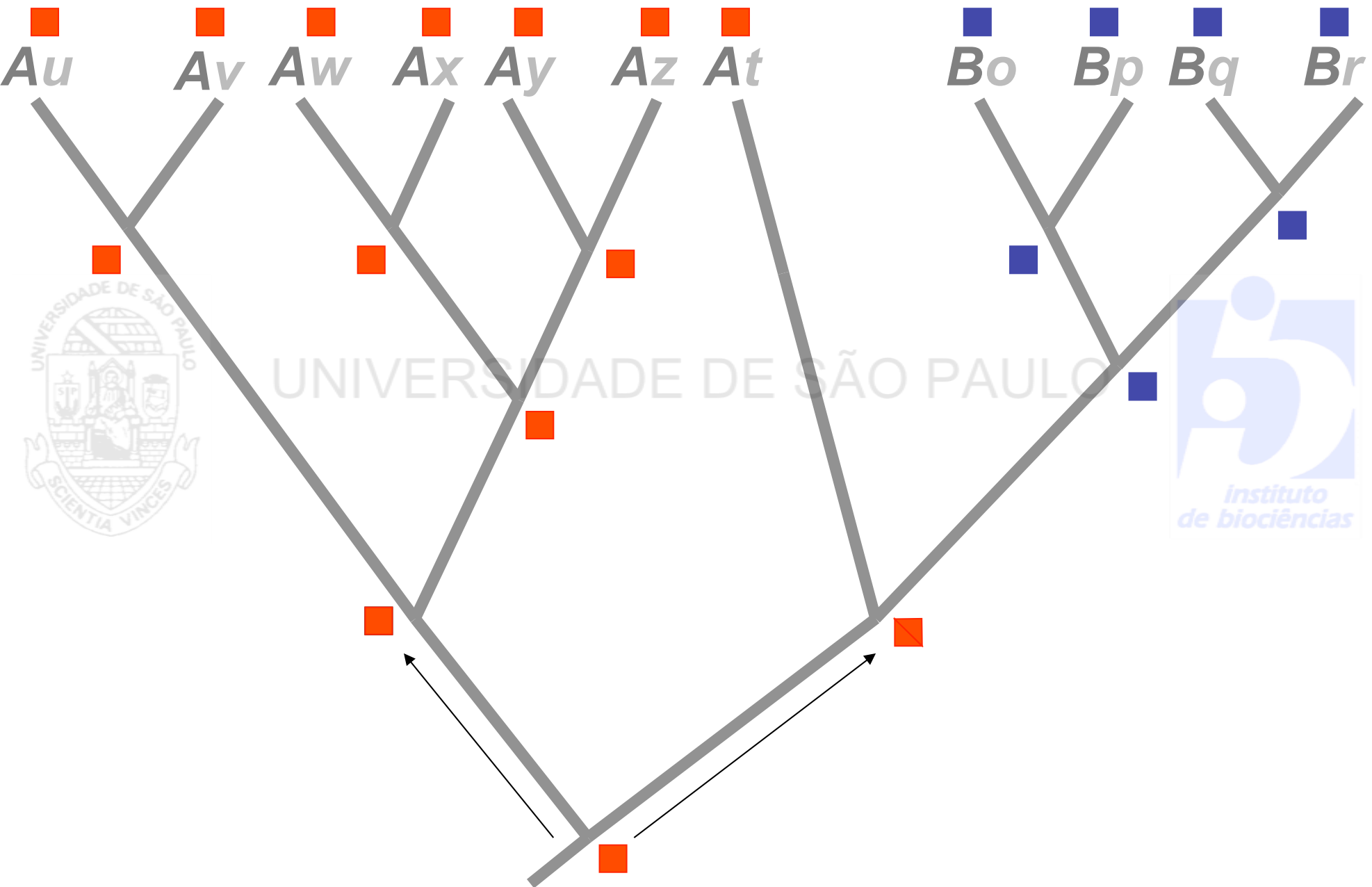




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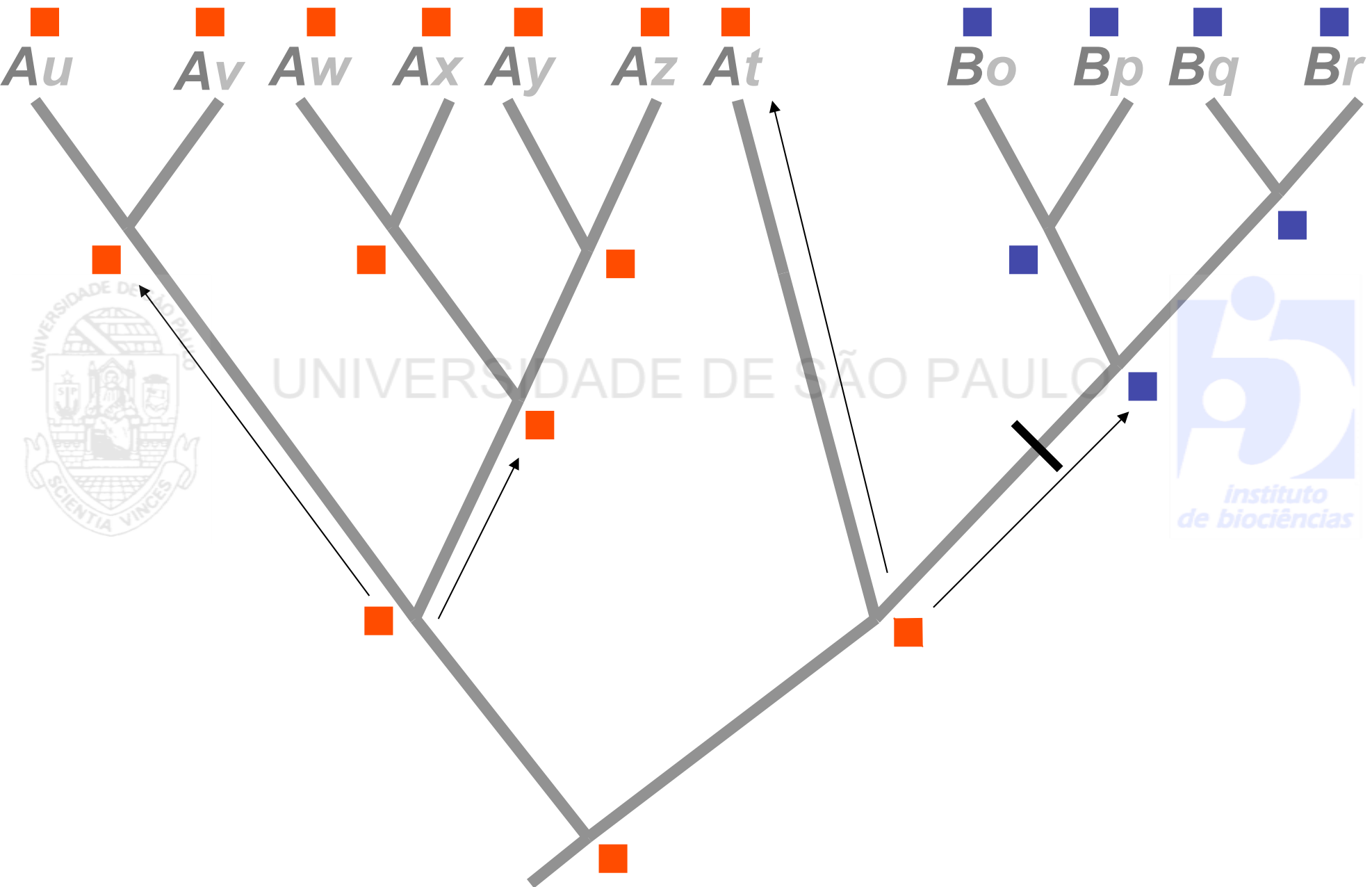






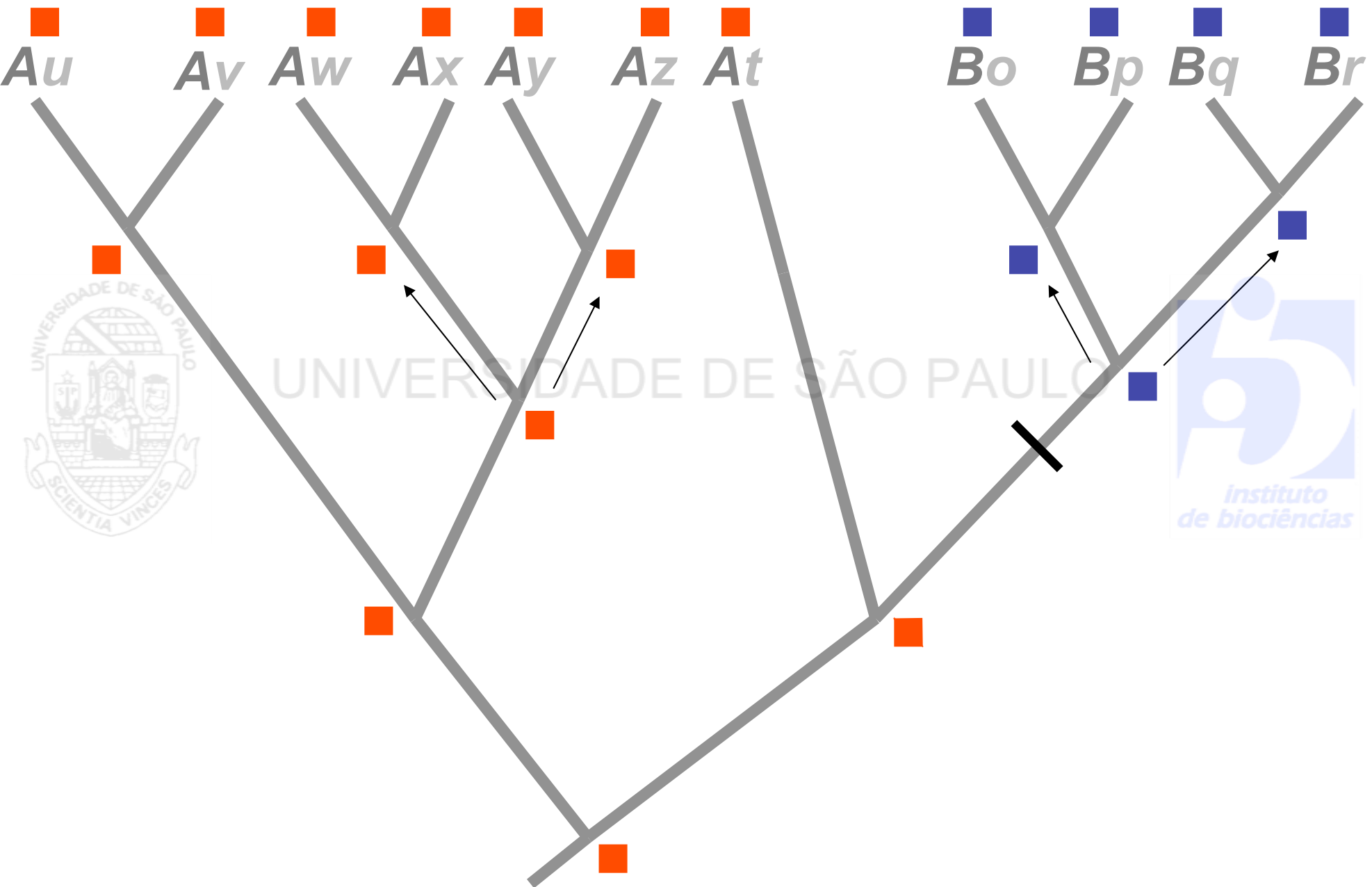
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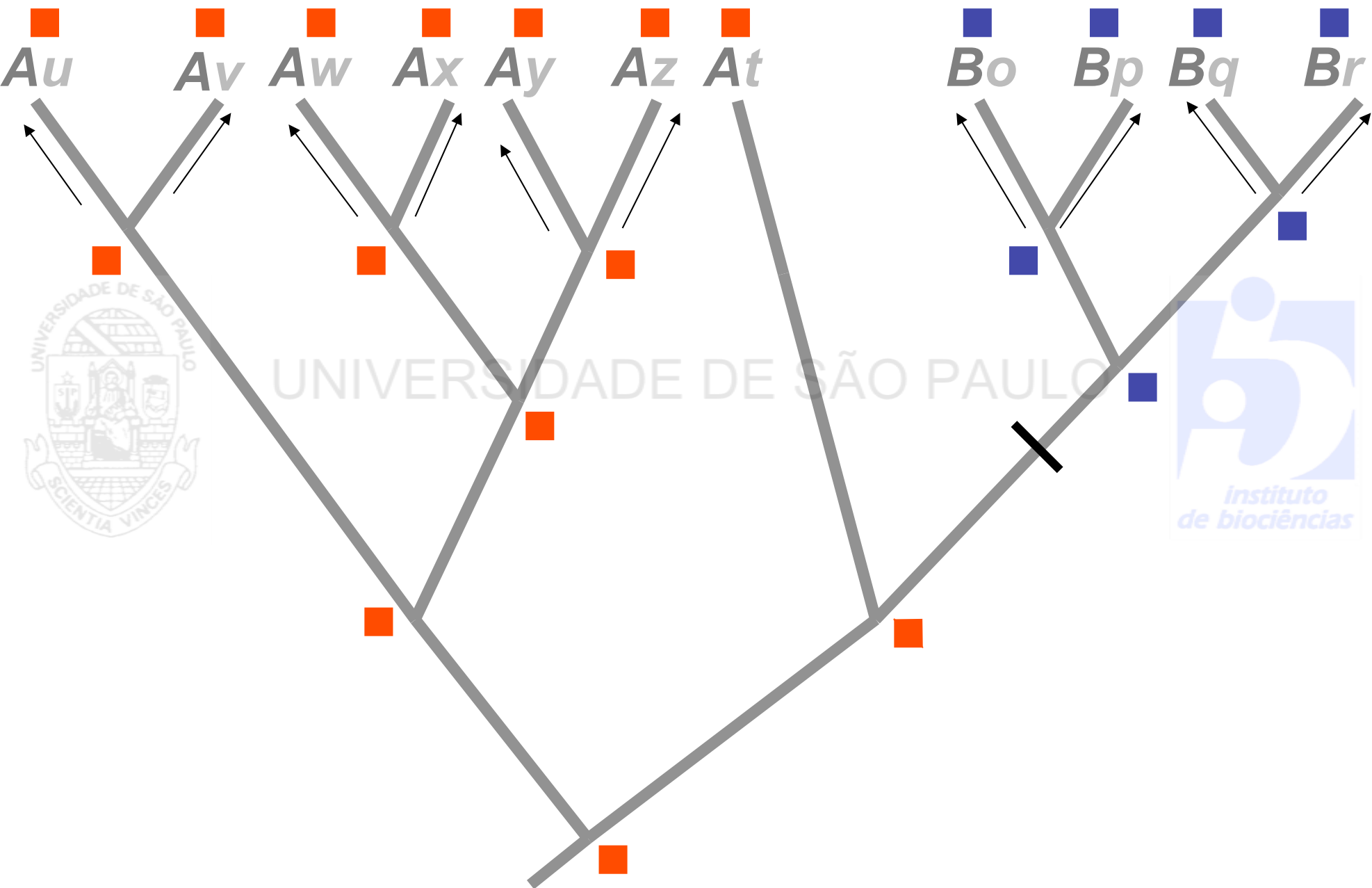
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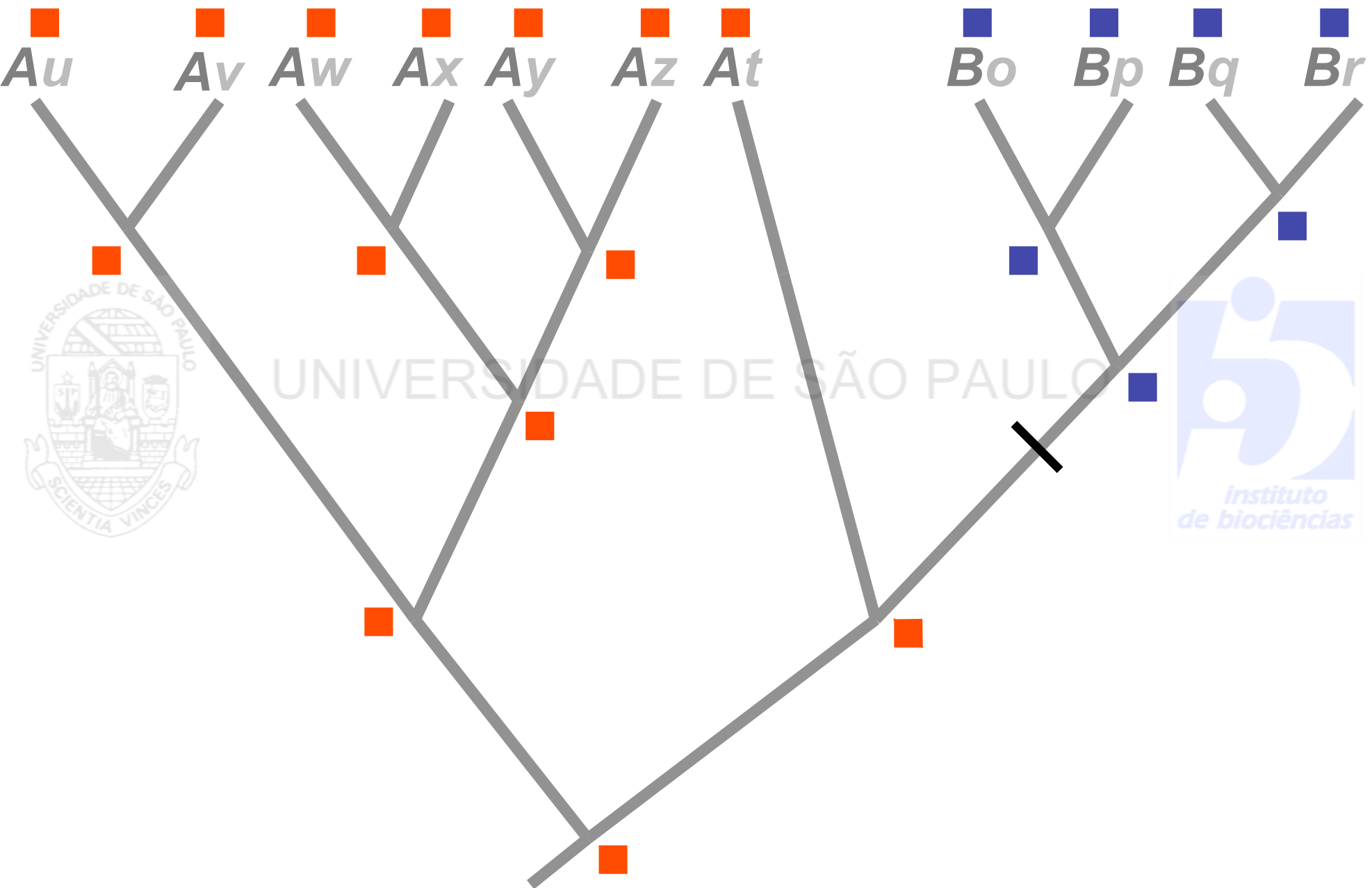
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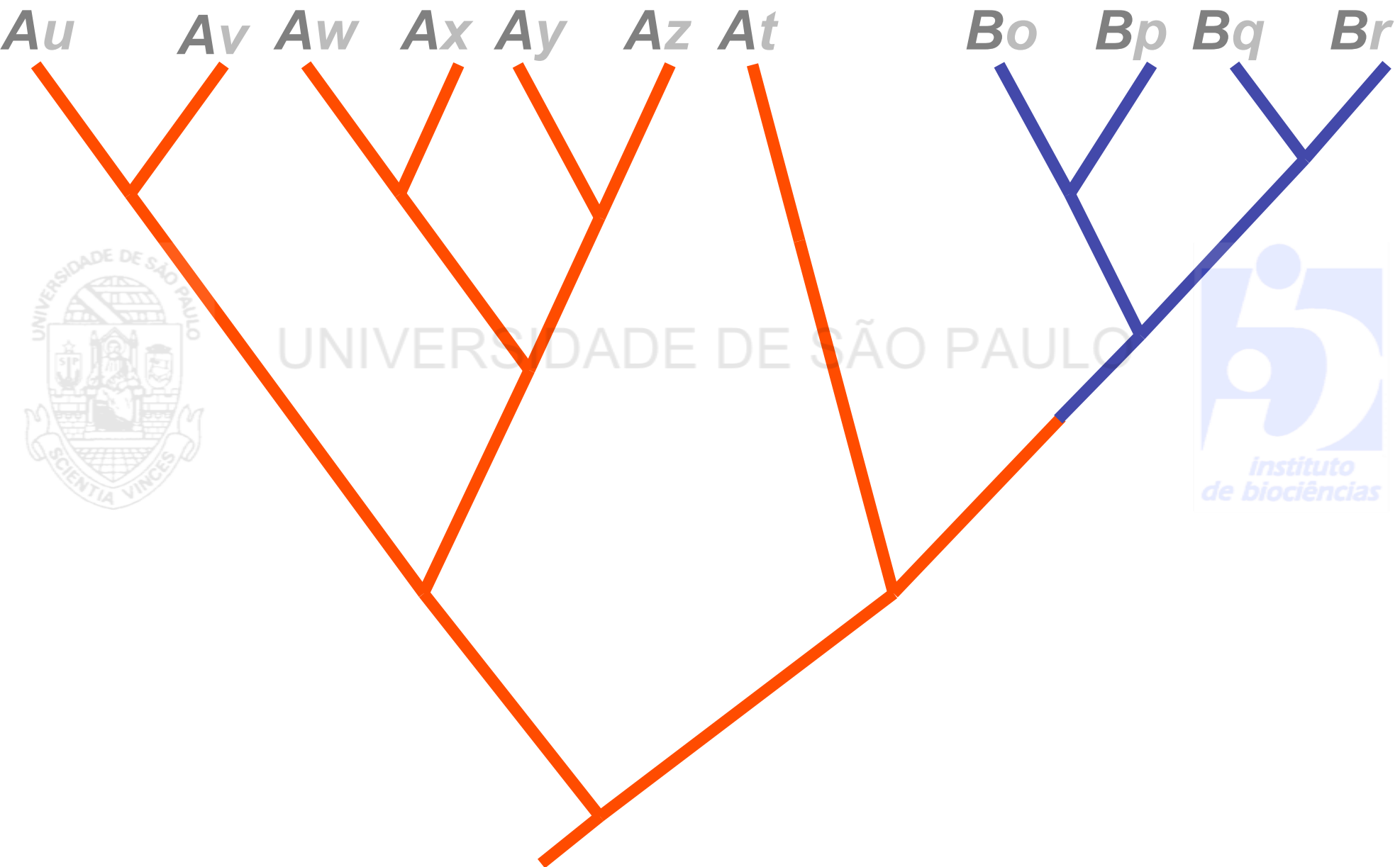




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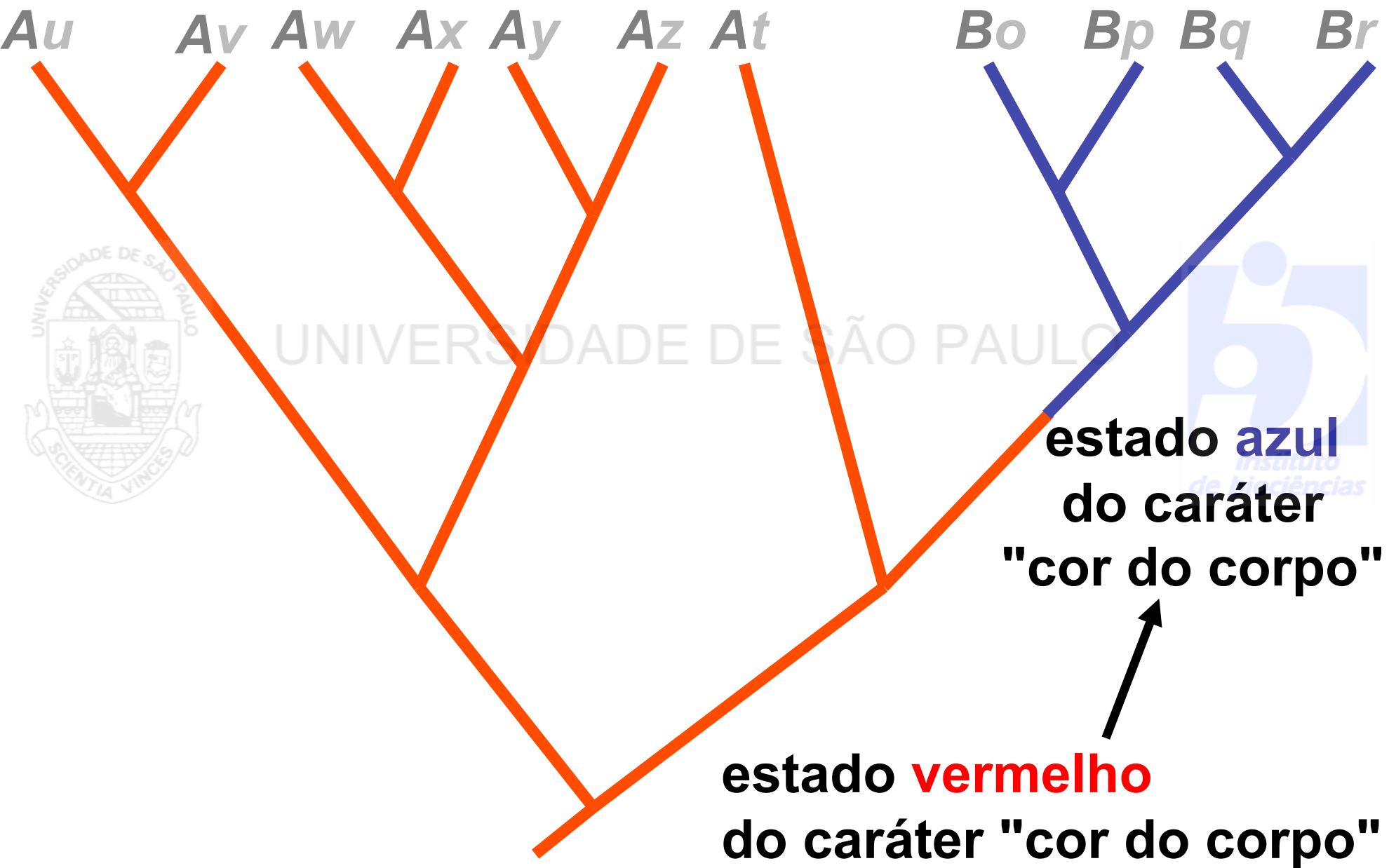






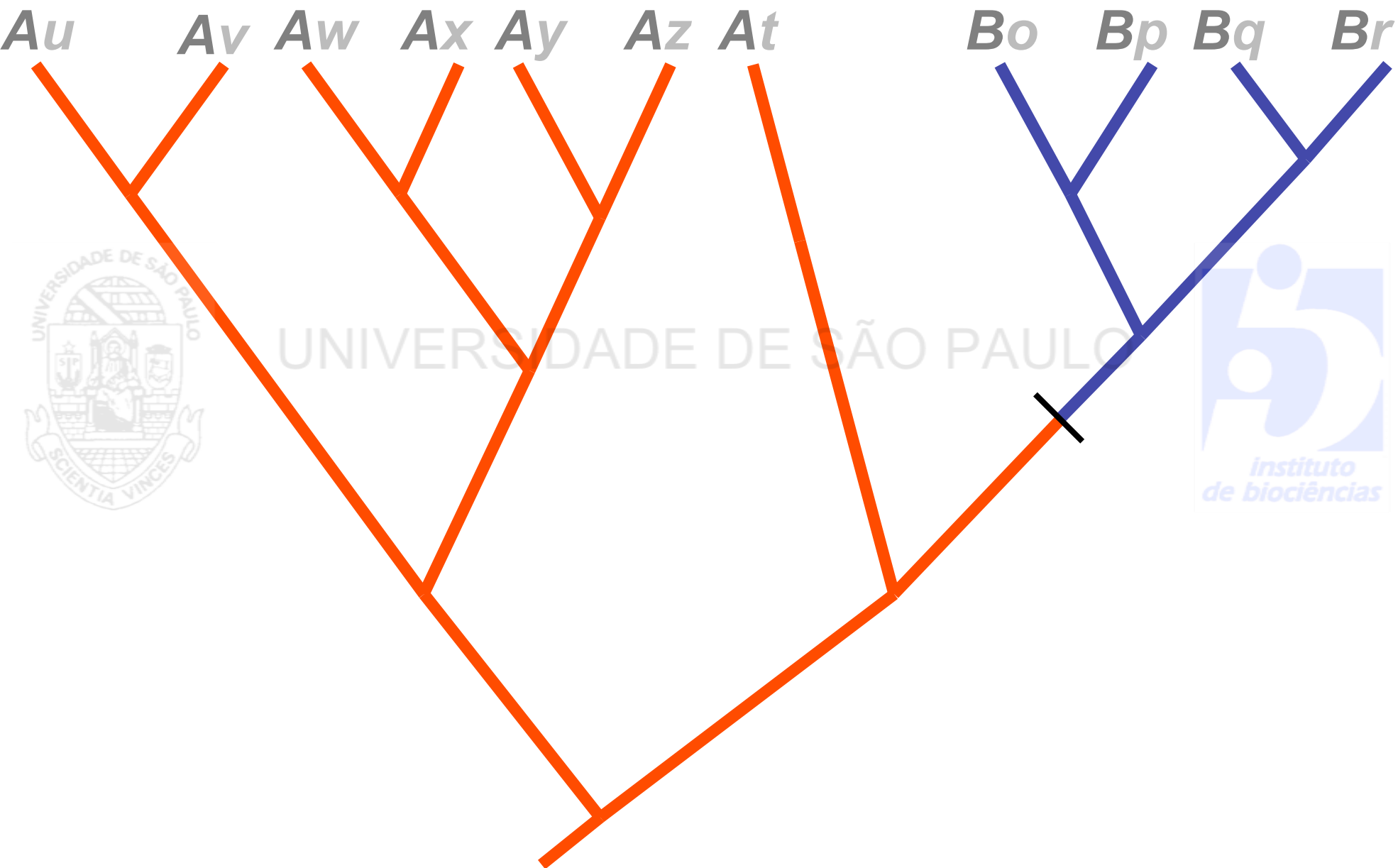
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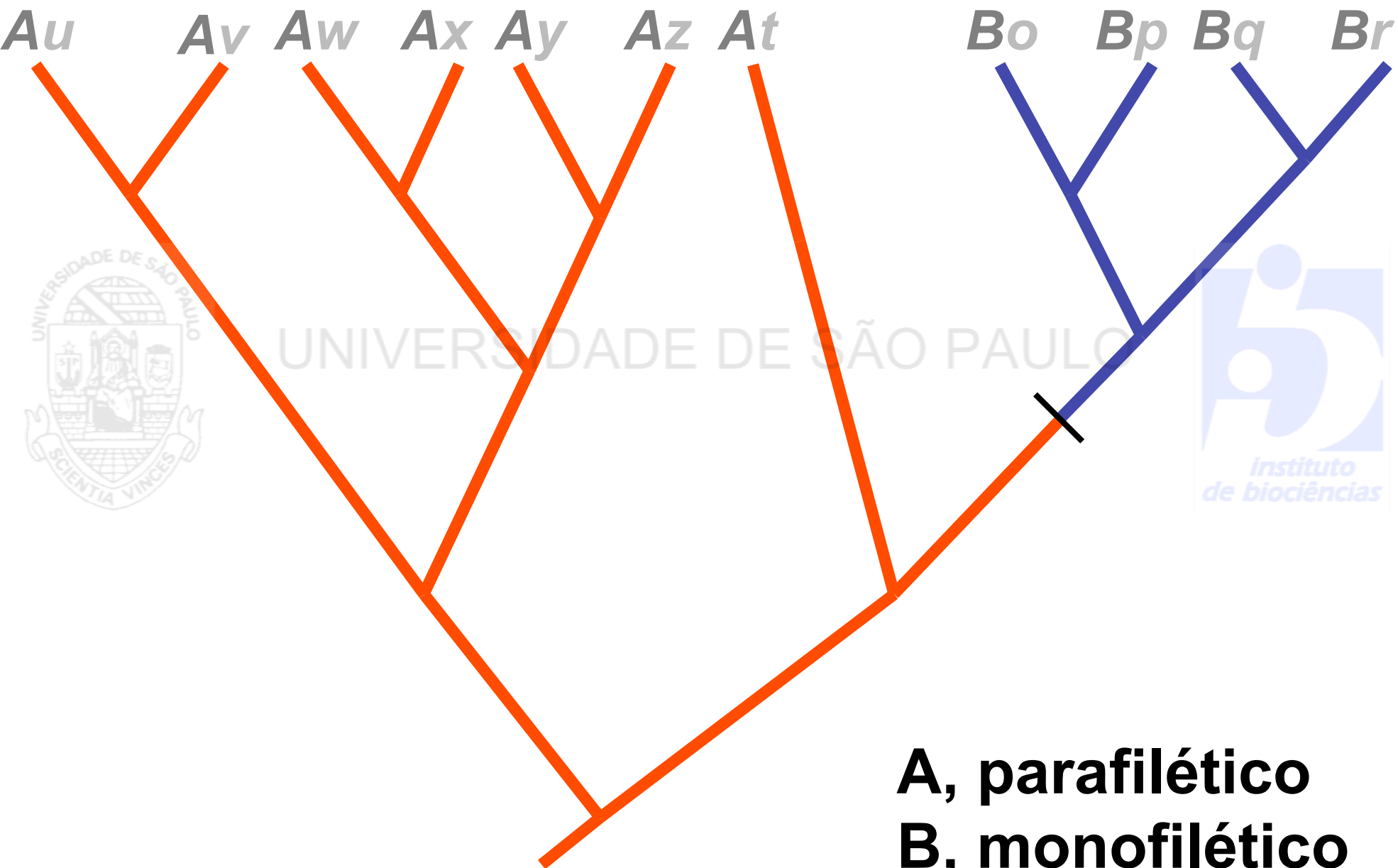
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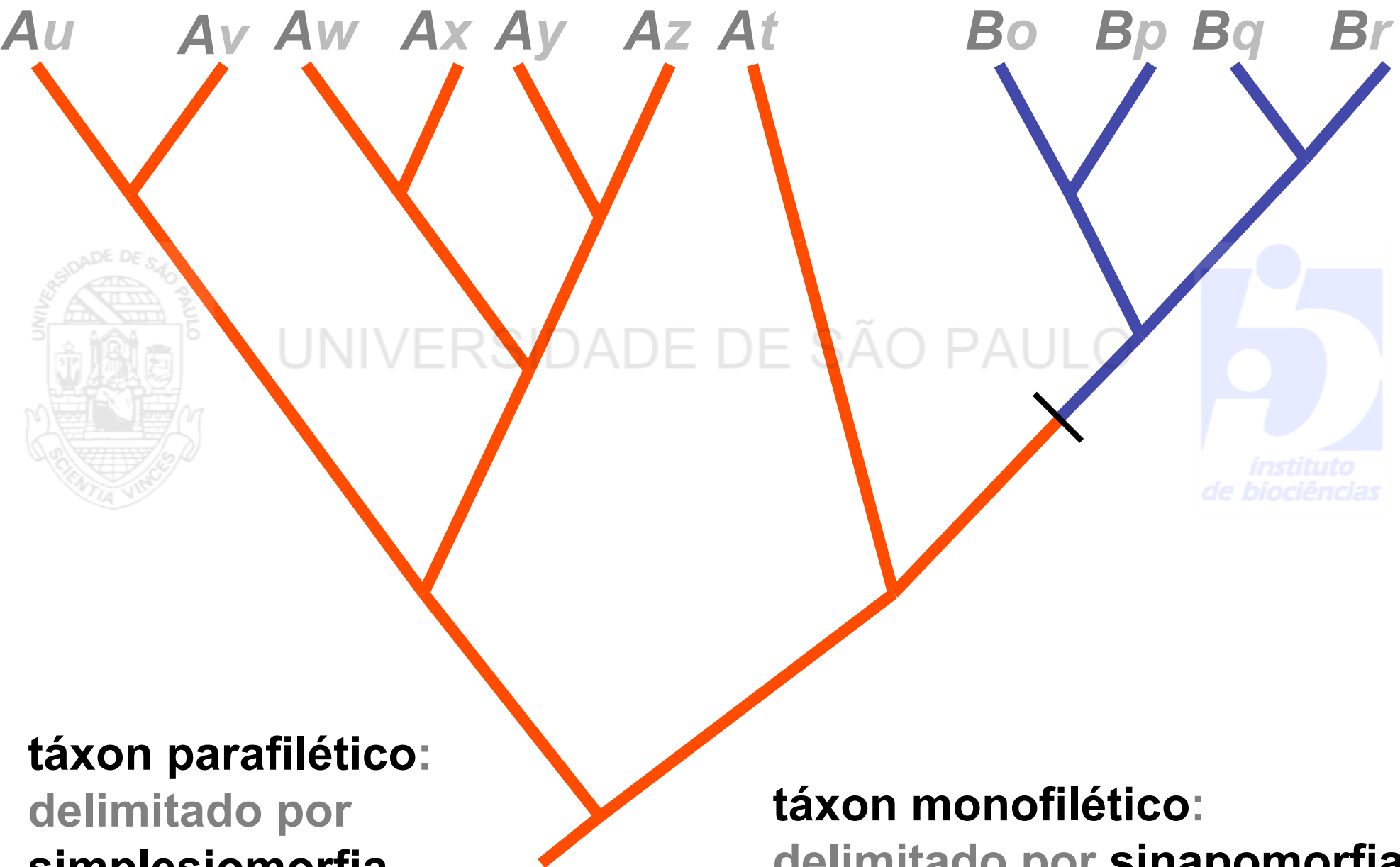




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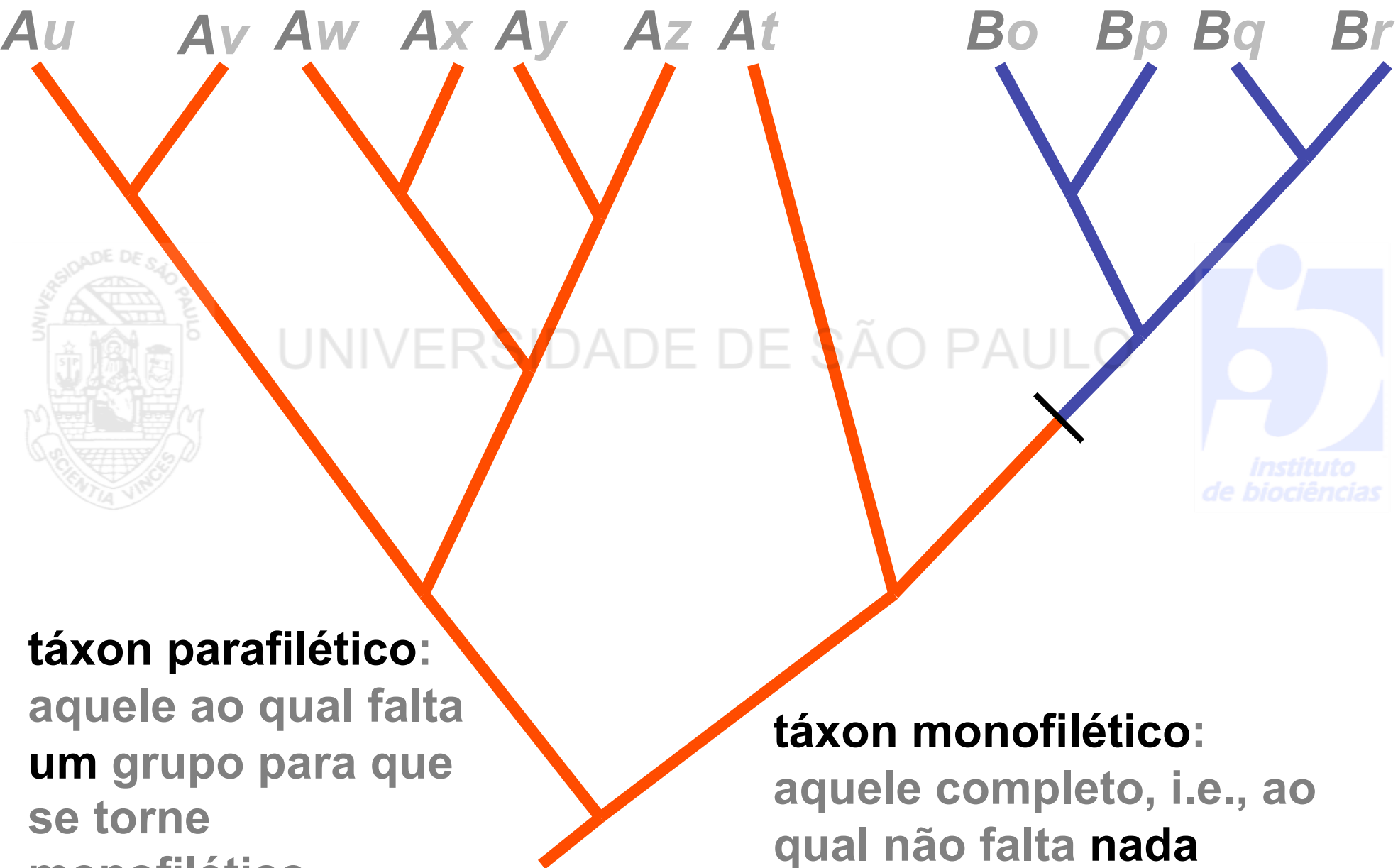


A, parafilético
B, monofilético



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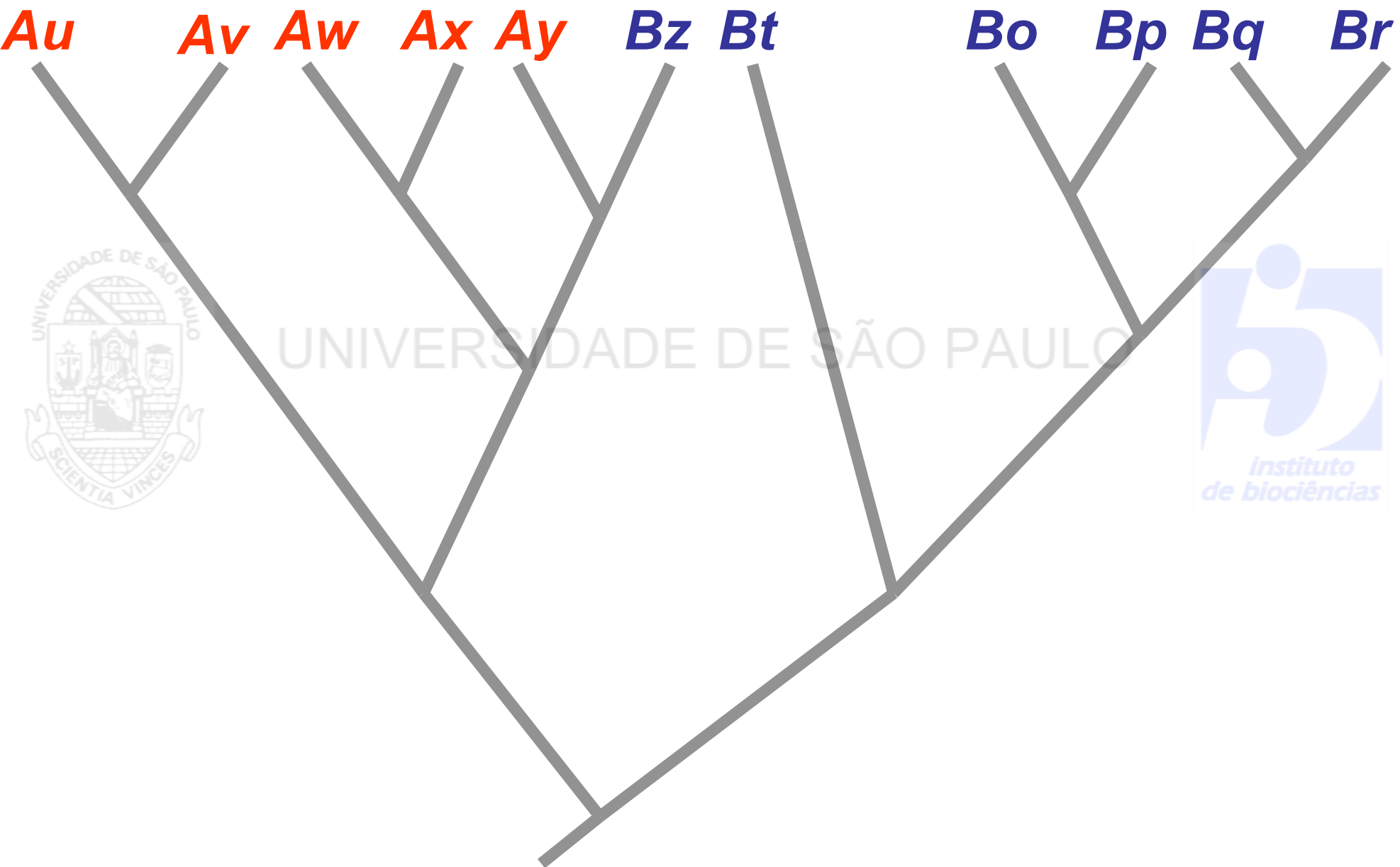


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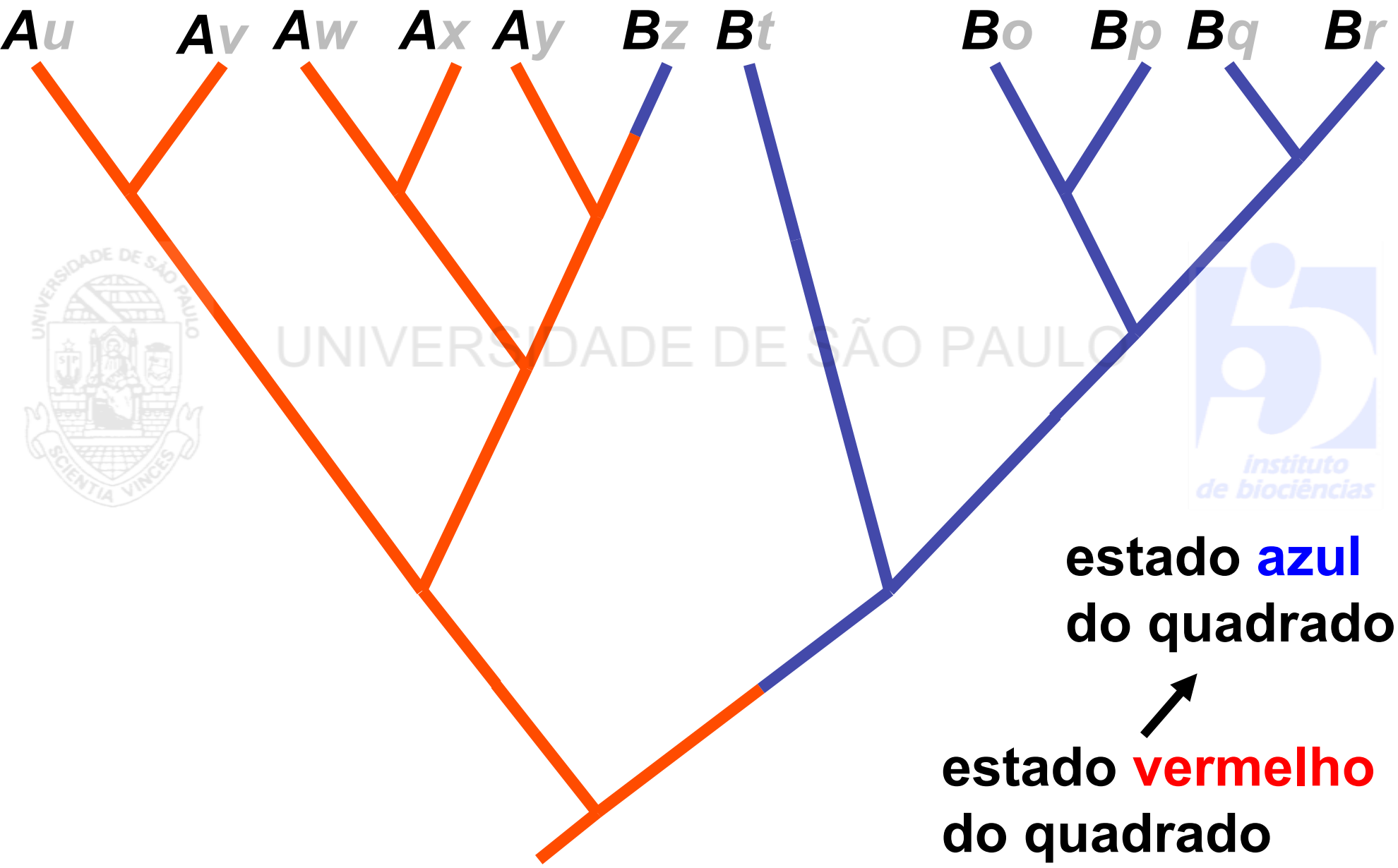
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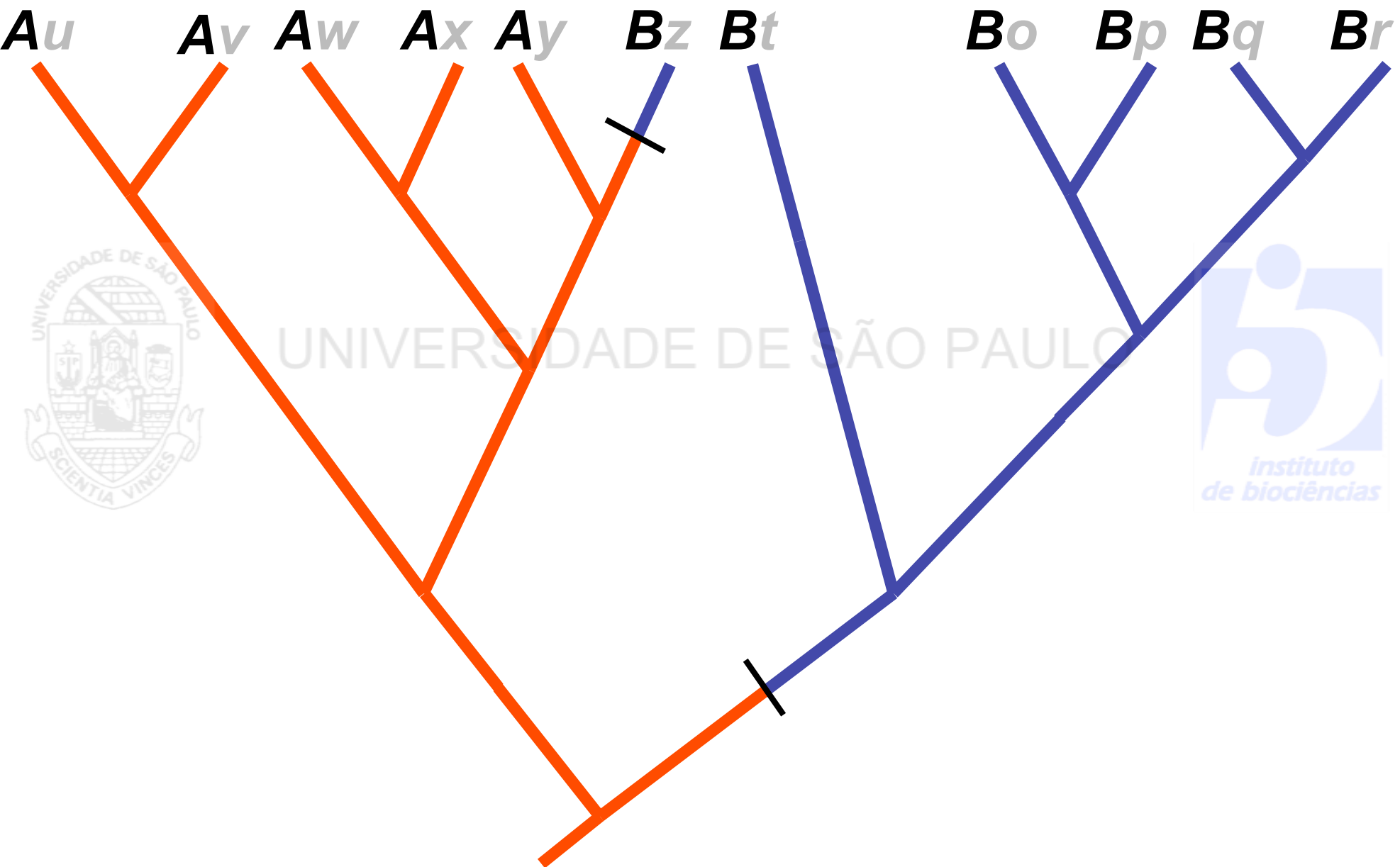
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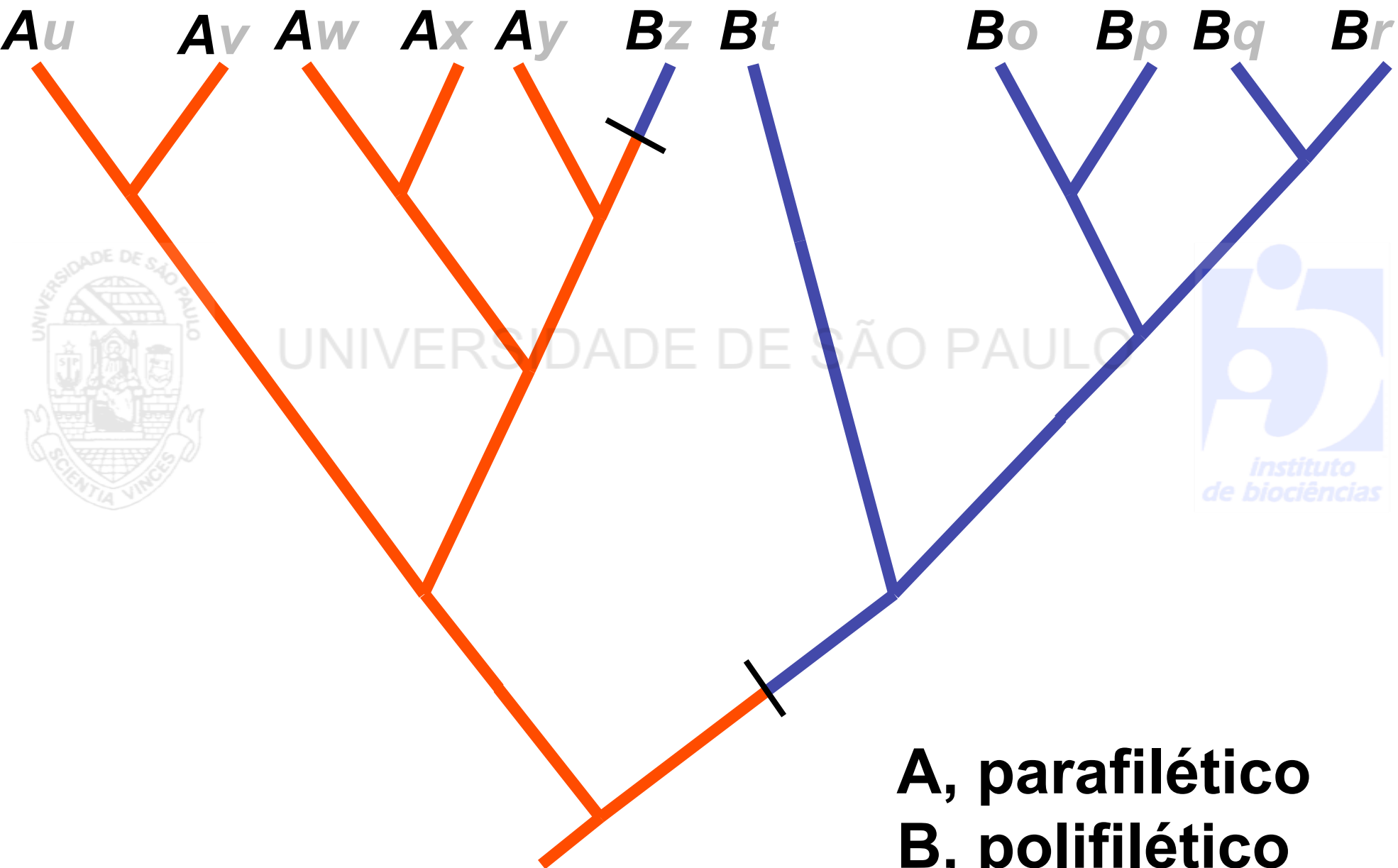




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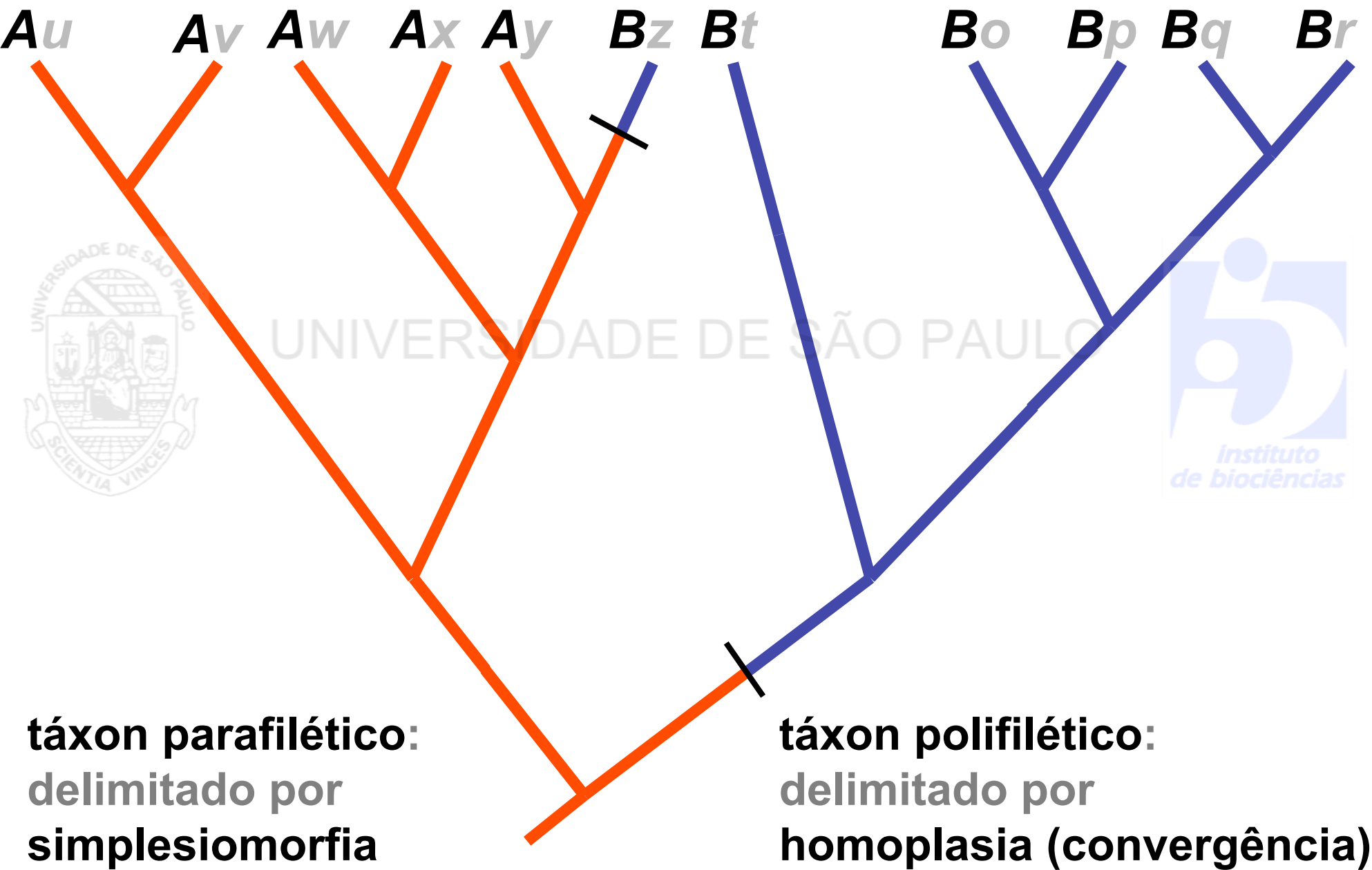






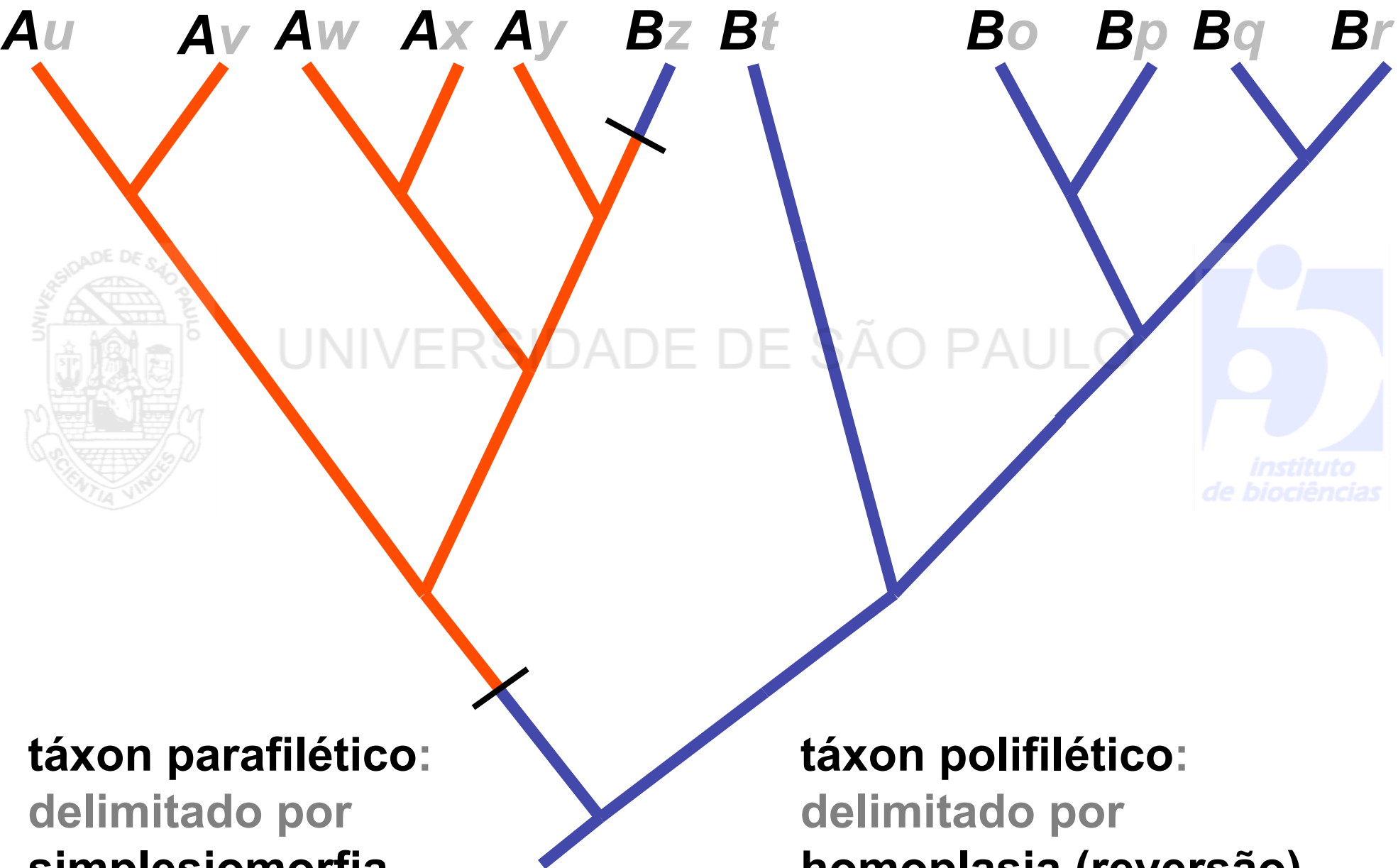
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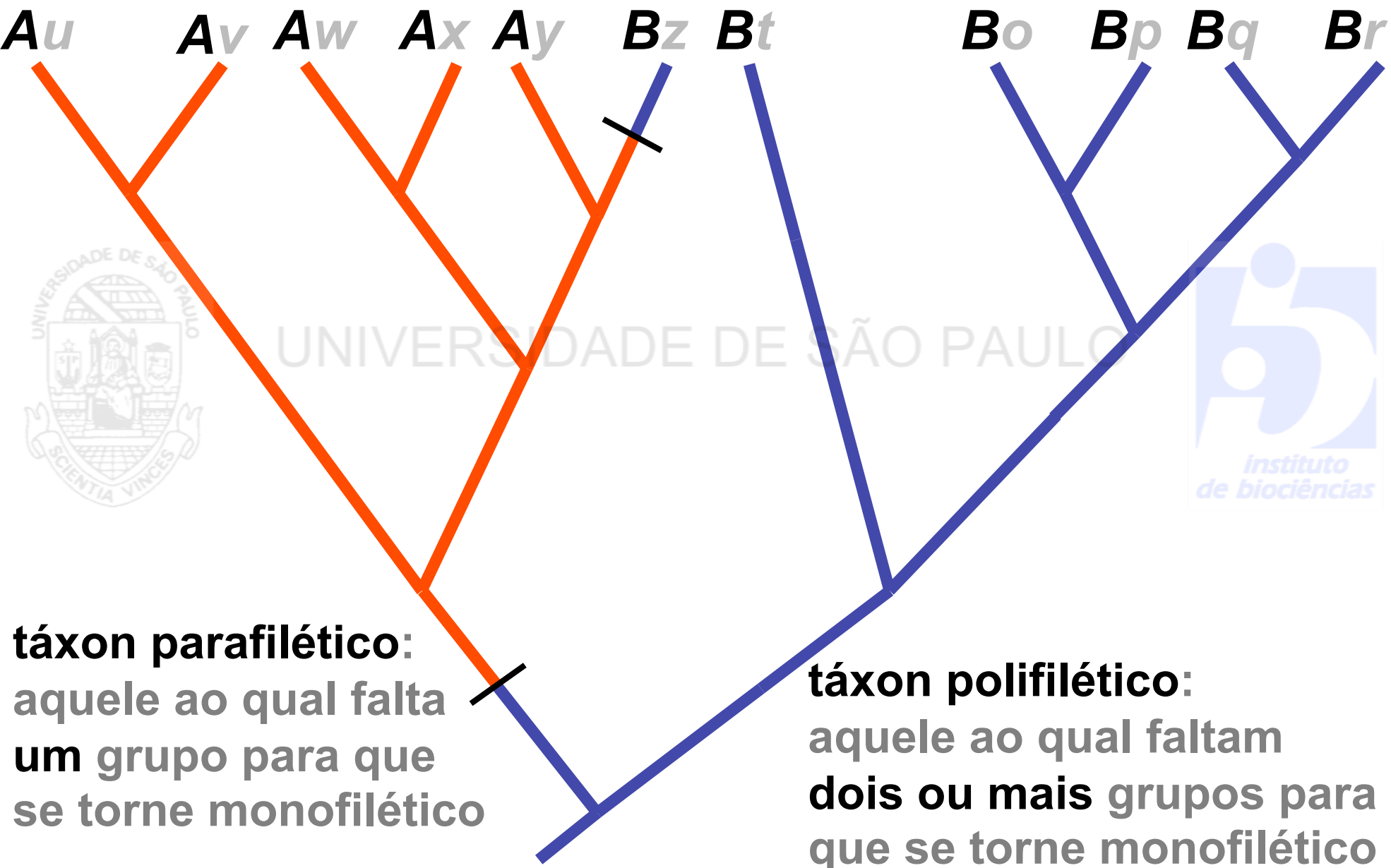
táxon parafilético:
delimitado por
simplesiomorfia

táxon polifilético:
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homoplasia (reversão)



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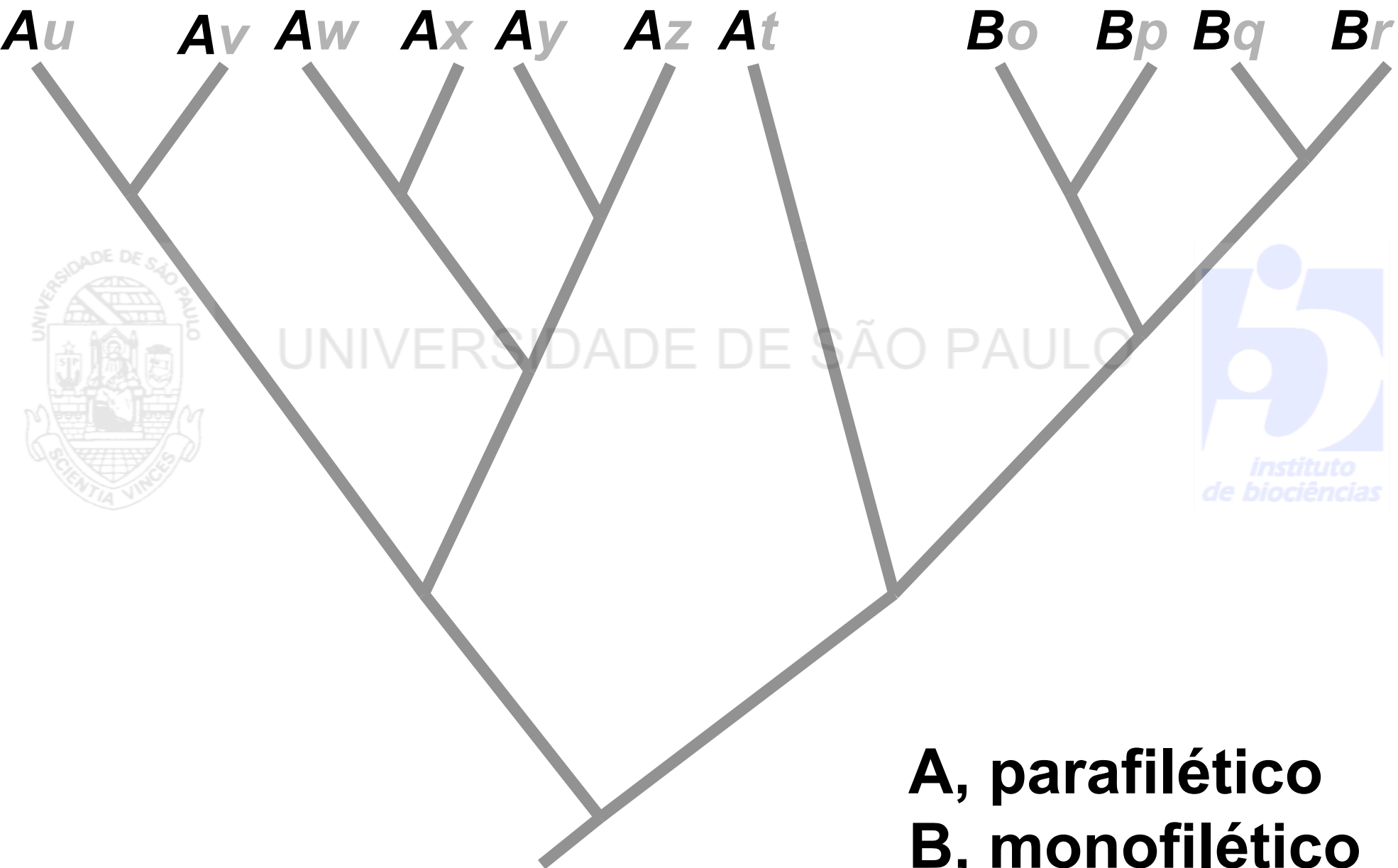
táxon parafilético:
aquele ao qual falta
um grupo para que
se torne monofilético

táxon polifilético:
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que se torne monofilético



Soluções?

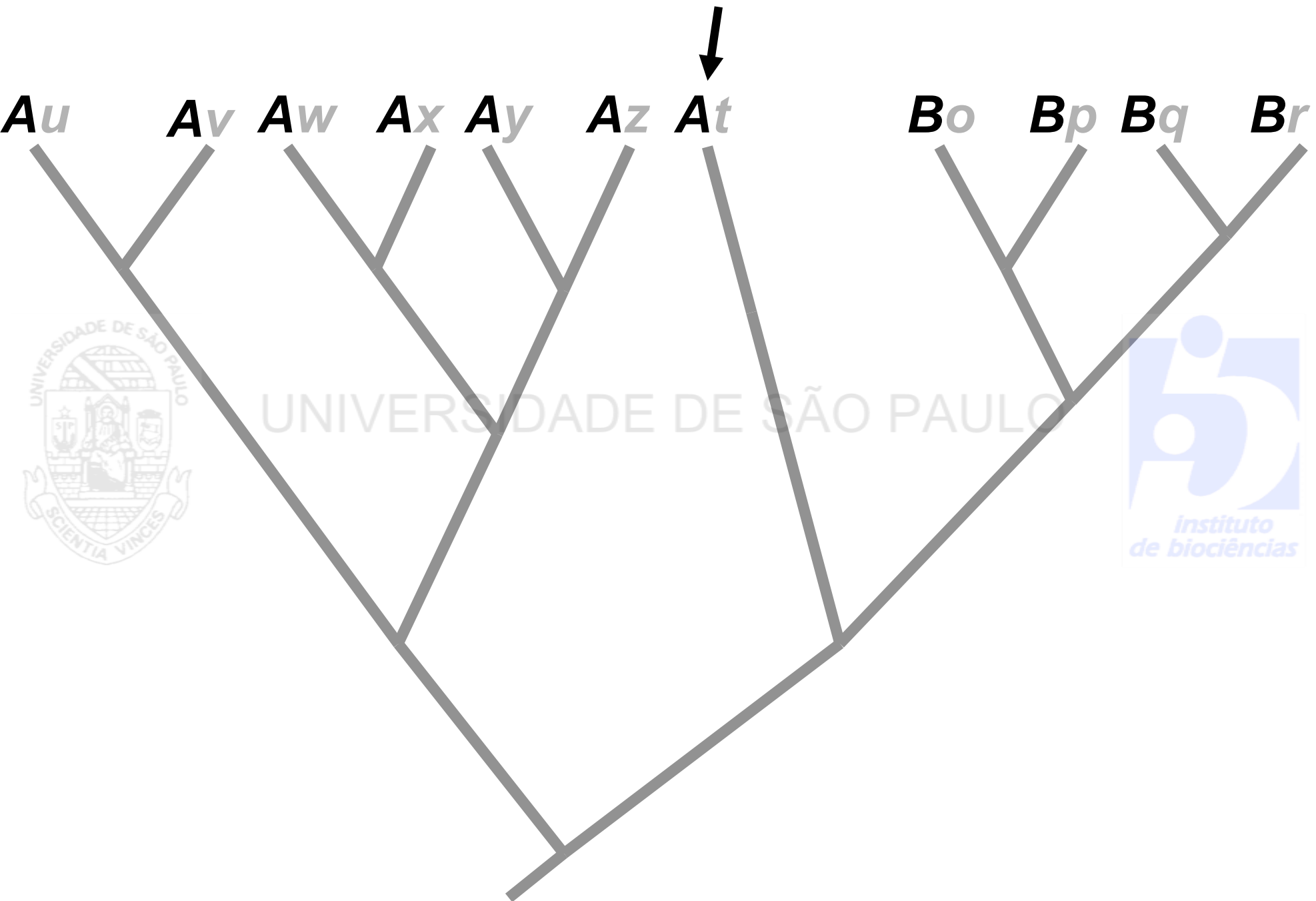




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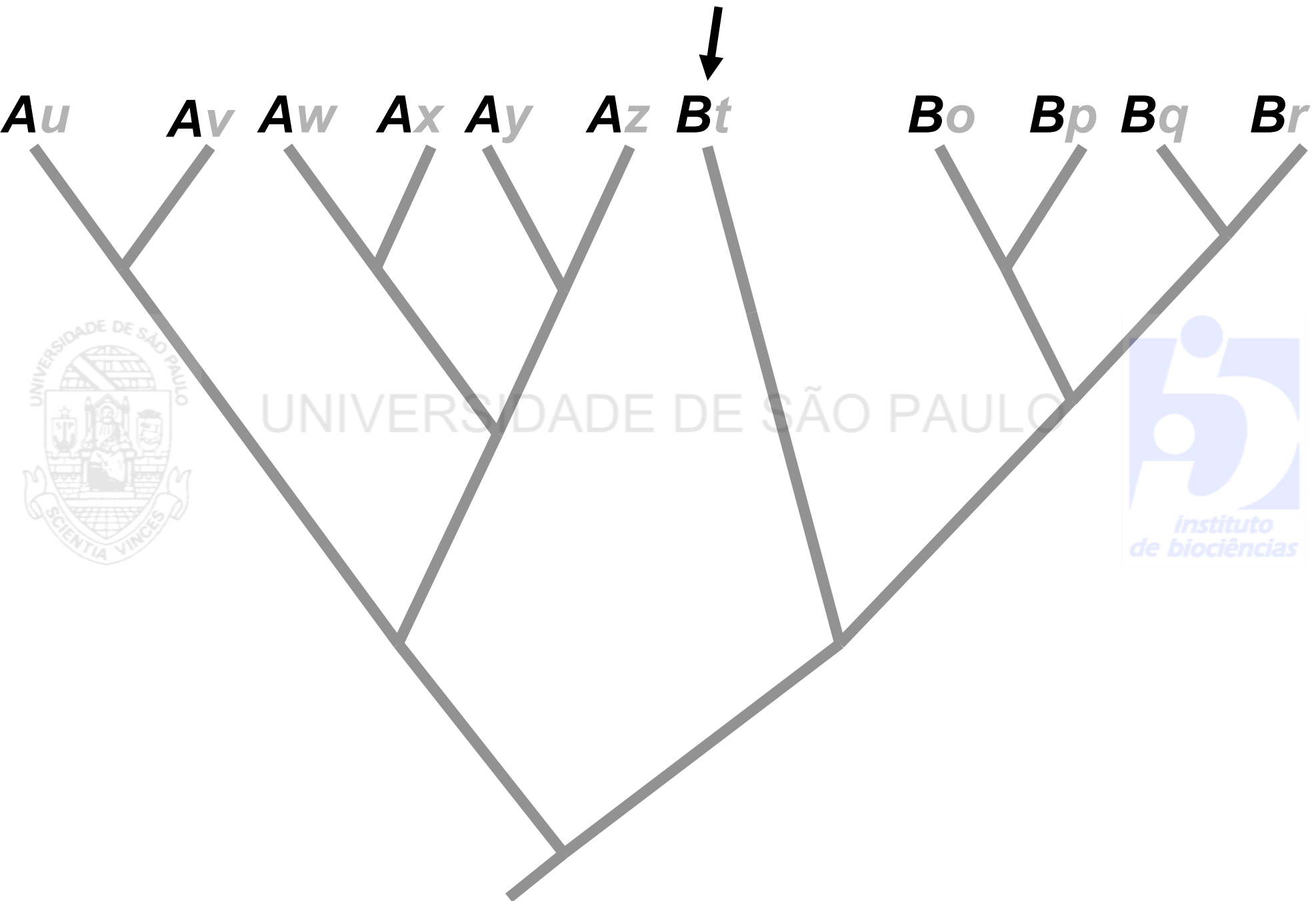


A, paraphilético
B, monofilético



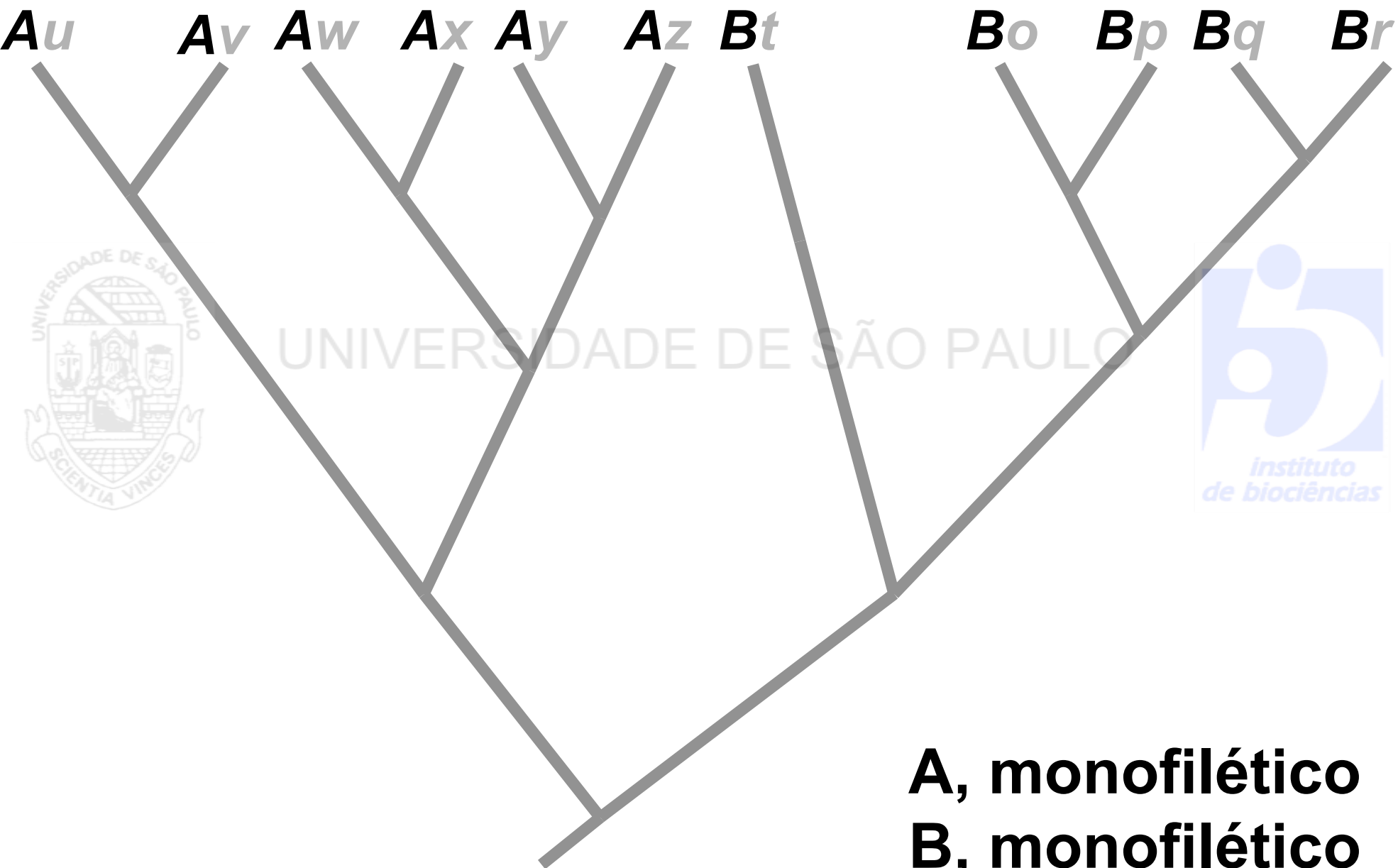
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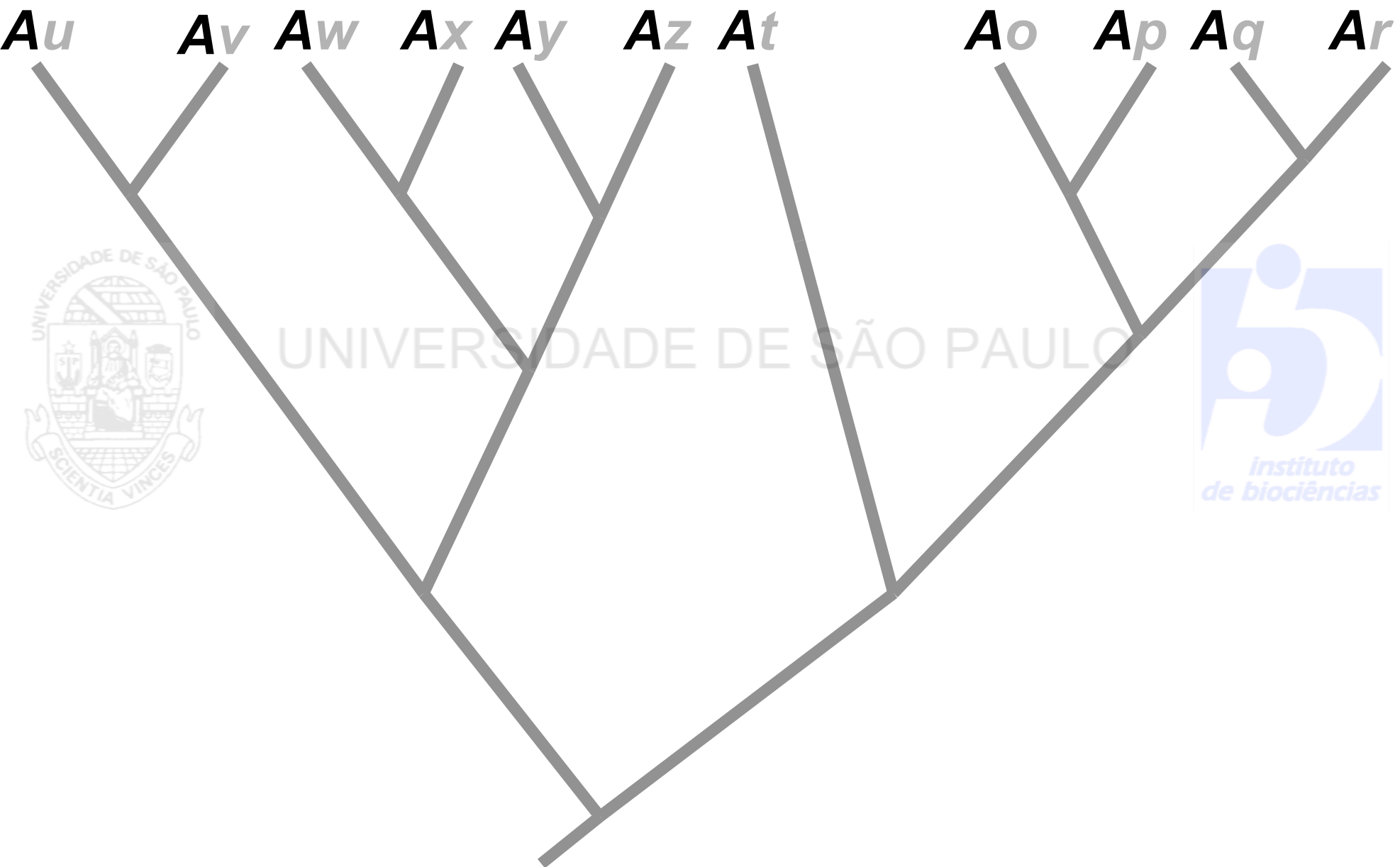




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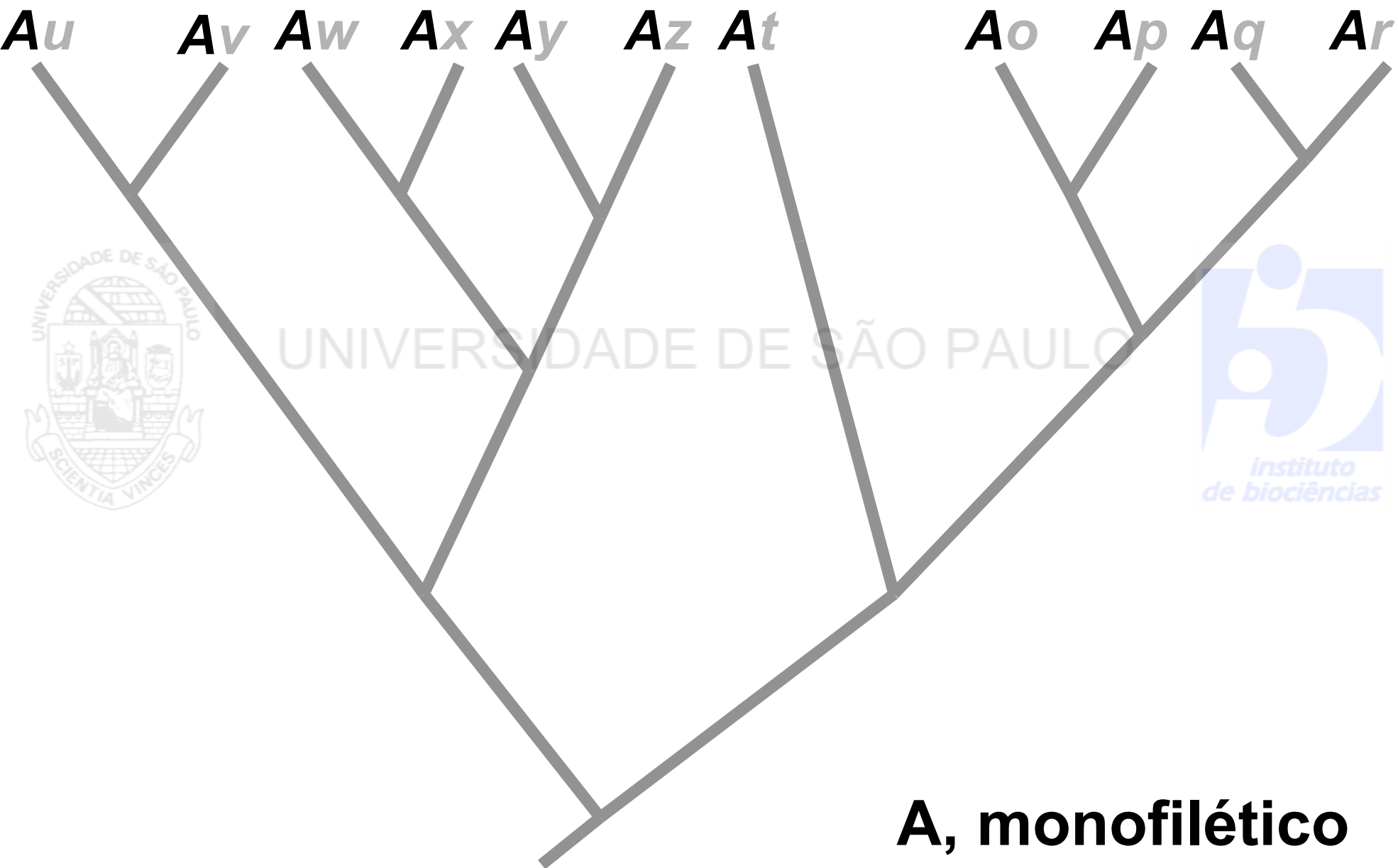


A, monofilético
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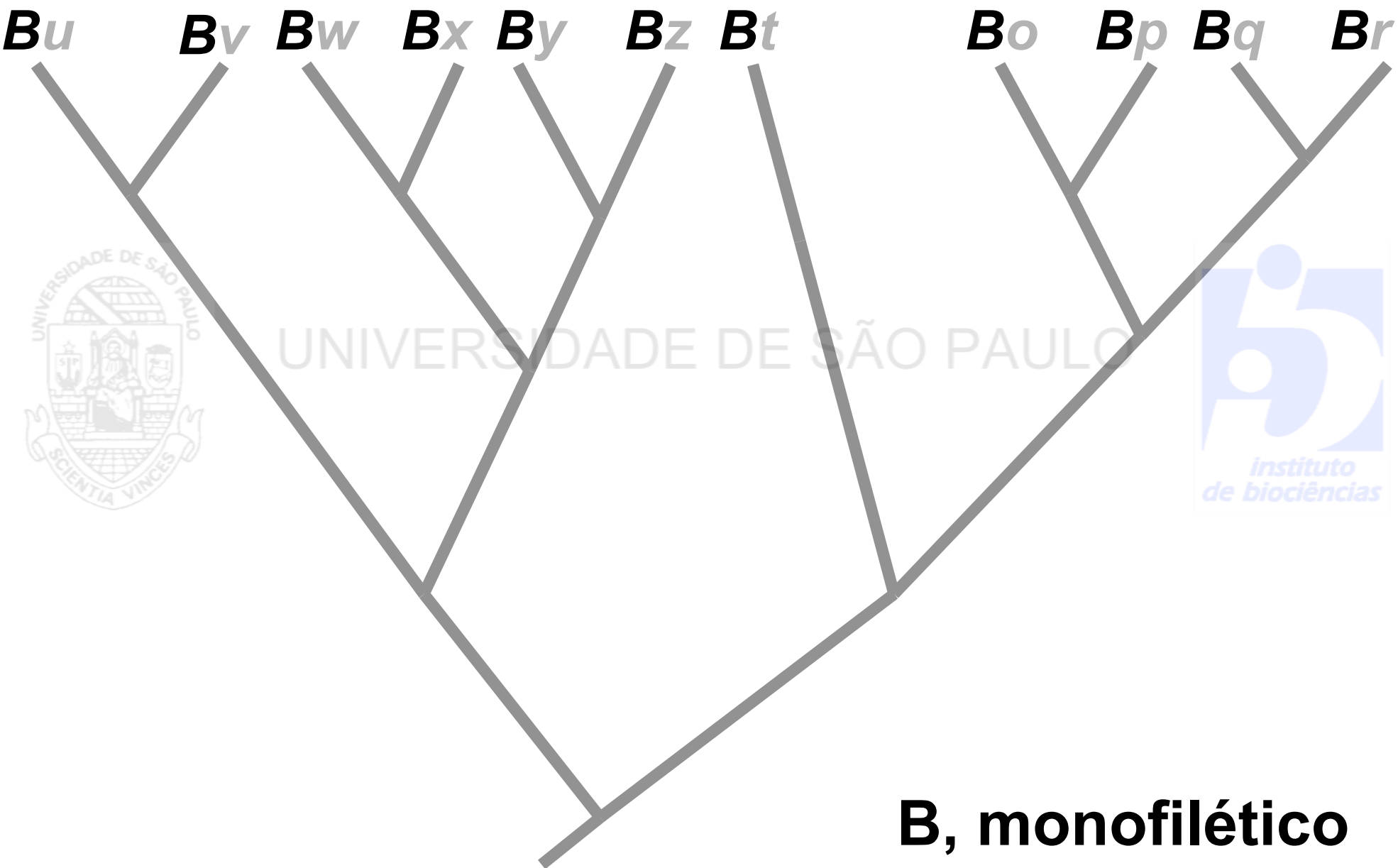




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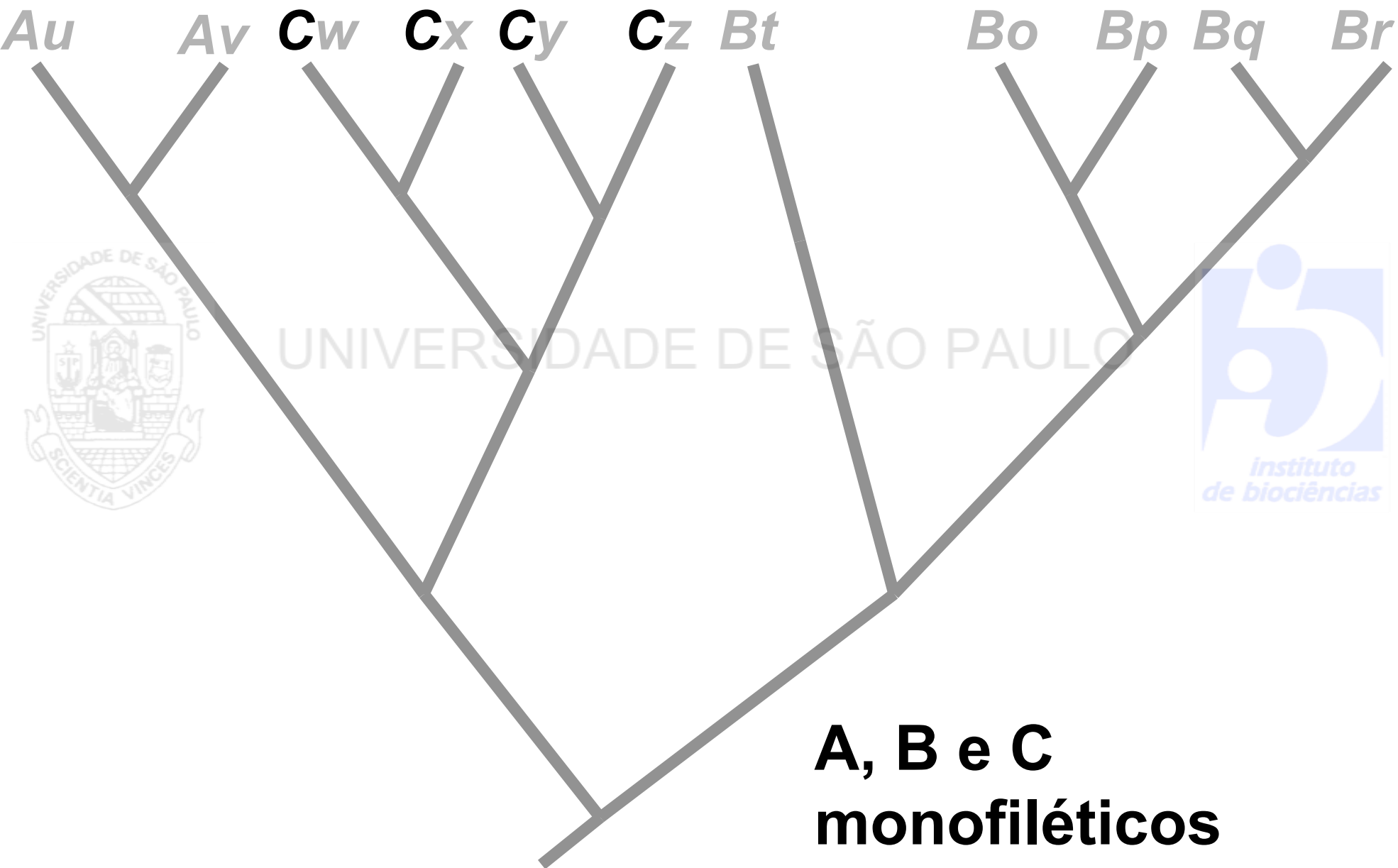
A, monofilético



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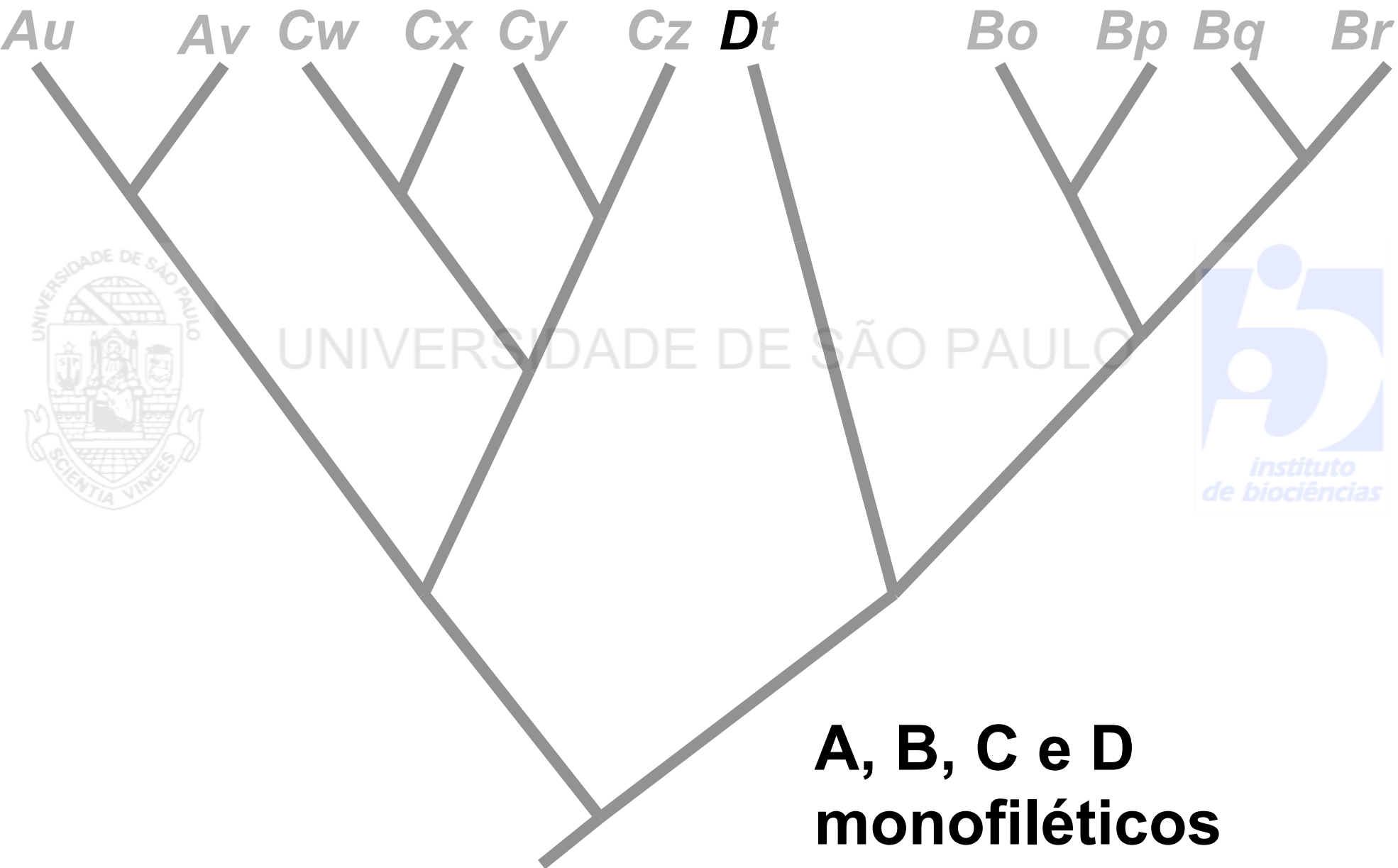
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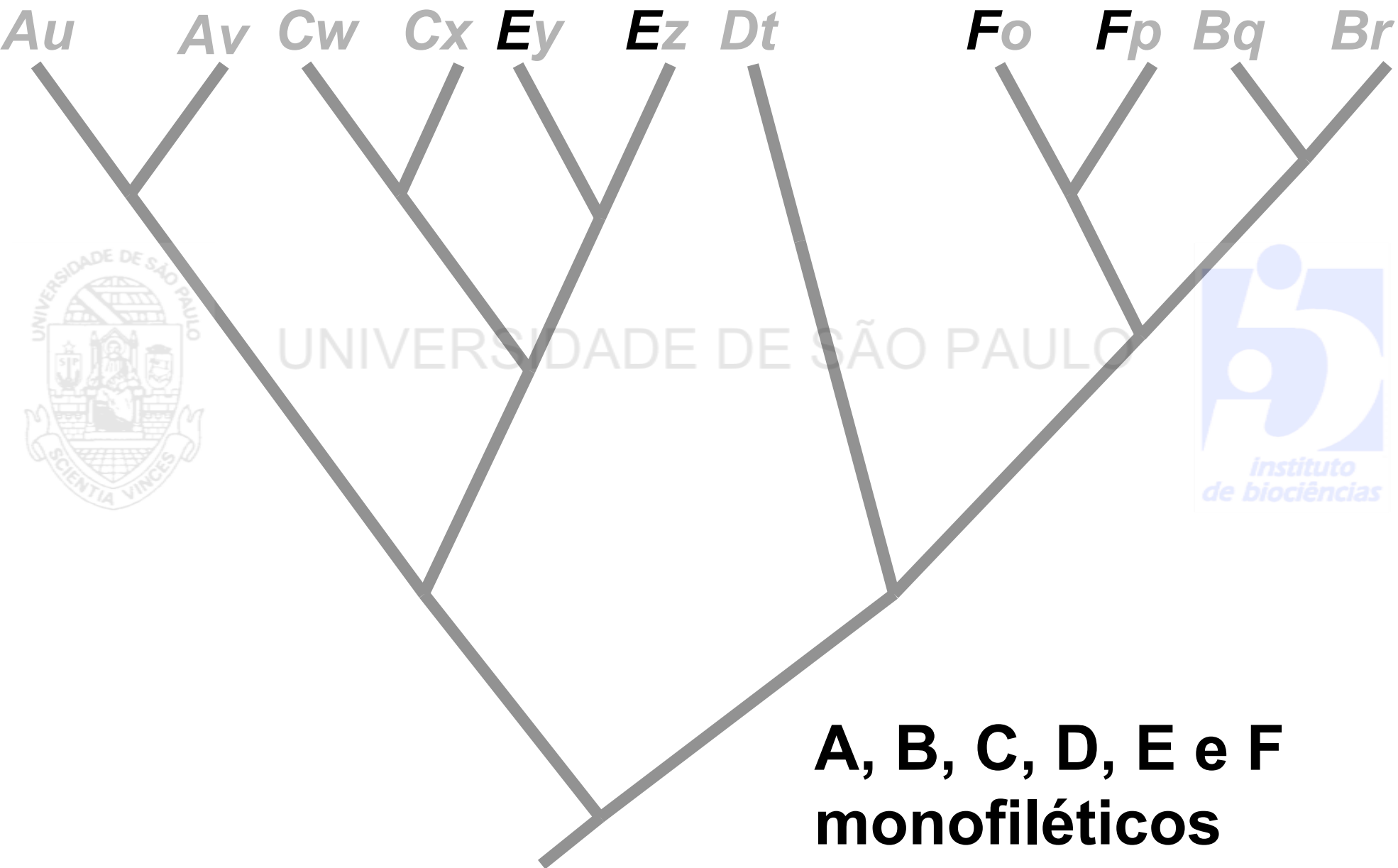


**A, B e C
monofiléticos**



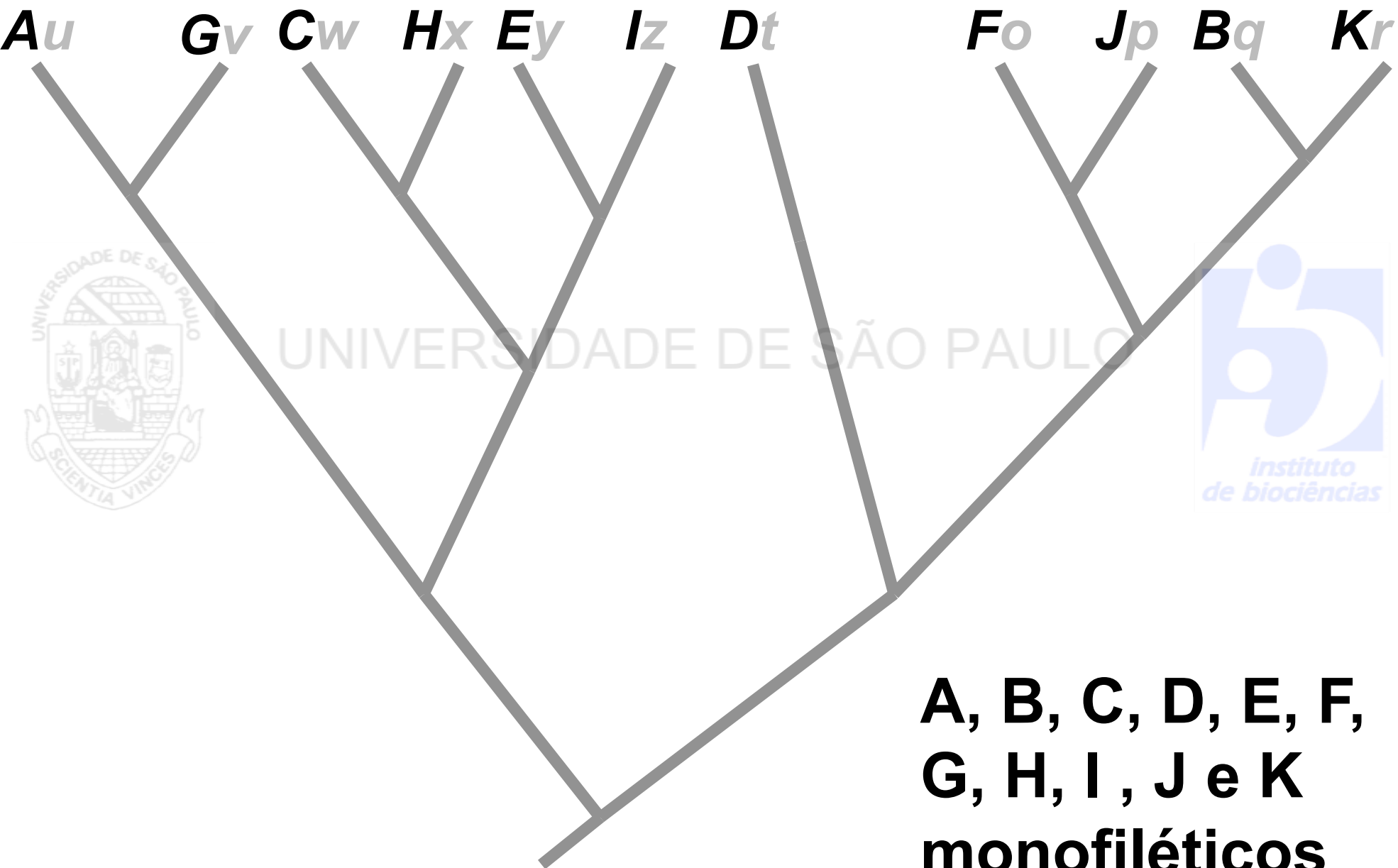
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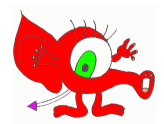




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**A, B, C, D, E, F,
G, H, I, J e K
monofiléticos**



Au

Av Aw Ax Ay Az At

Bo

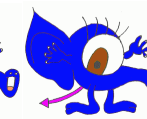
Bp Bq

Br



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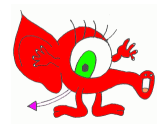
Bq

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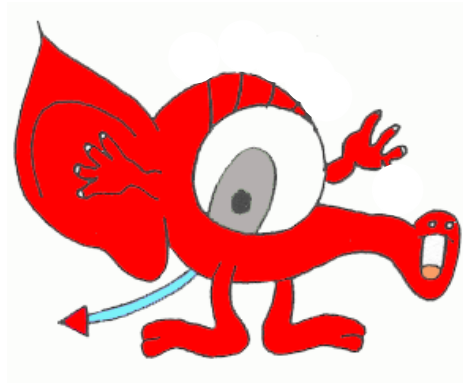
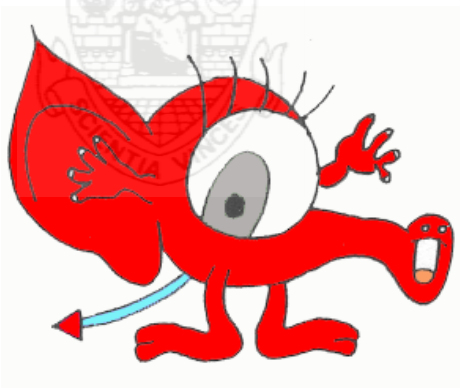
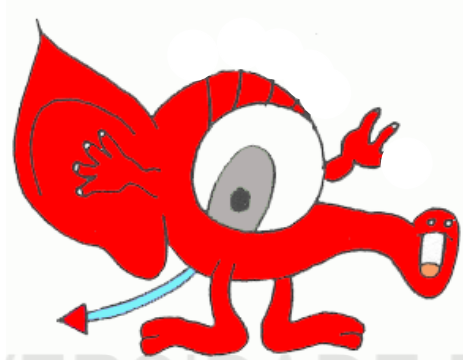


**táxon vermelho:
parafilético**

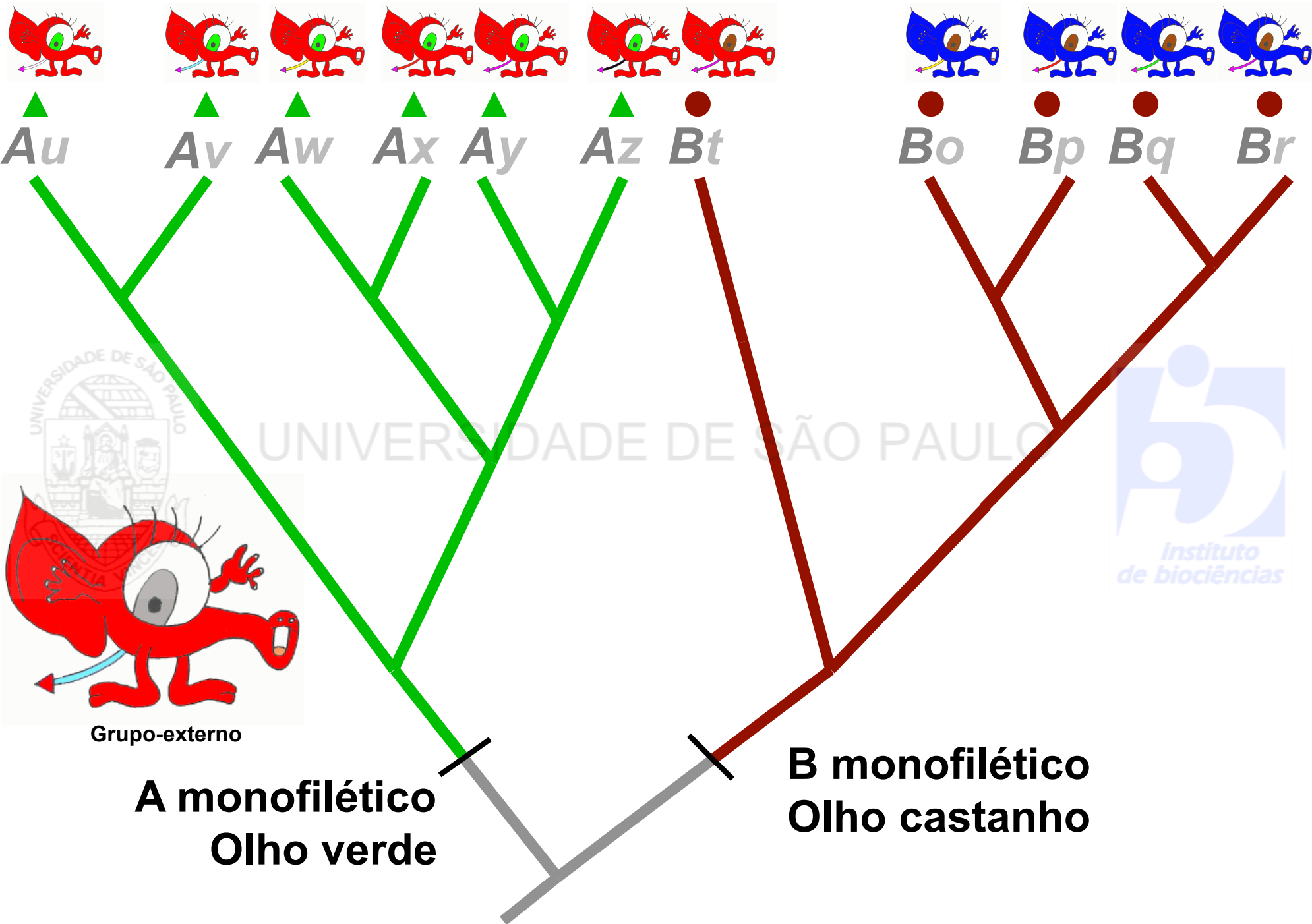
**táxon azul:
monofilético**



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Grupo-externo



Au

Av

Aw

Ax

Ay

Az

Bt

Bo

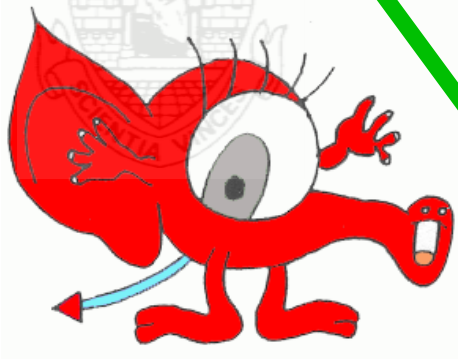
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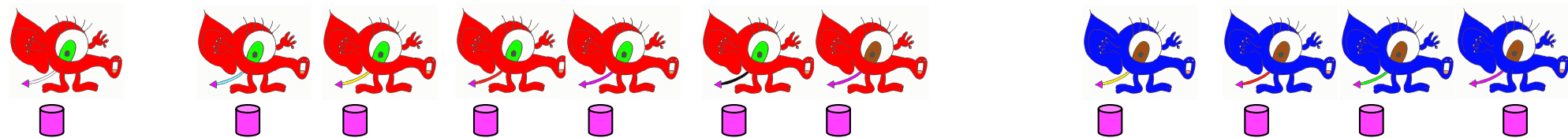
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Grupo-externo

A monofilético
Olho verde

B monofilético
Olho castanho



Au

Av

Aw

Ax

Ay

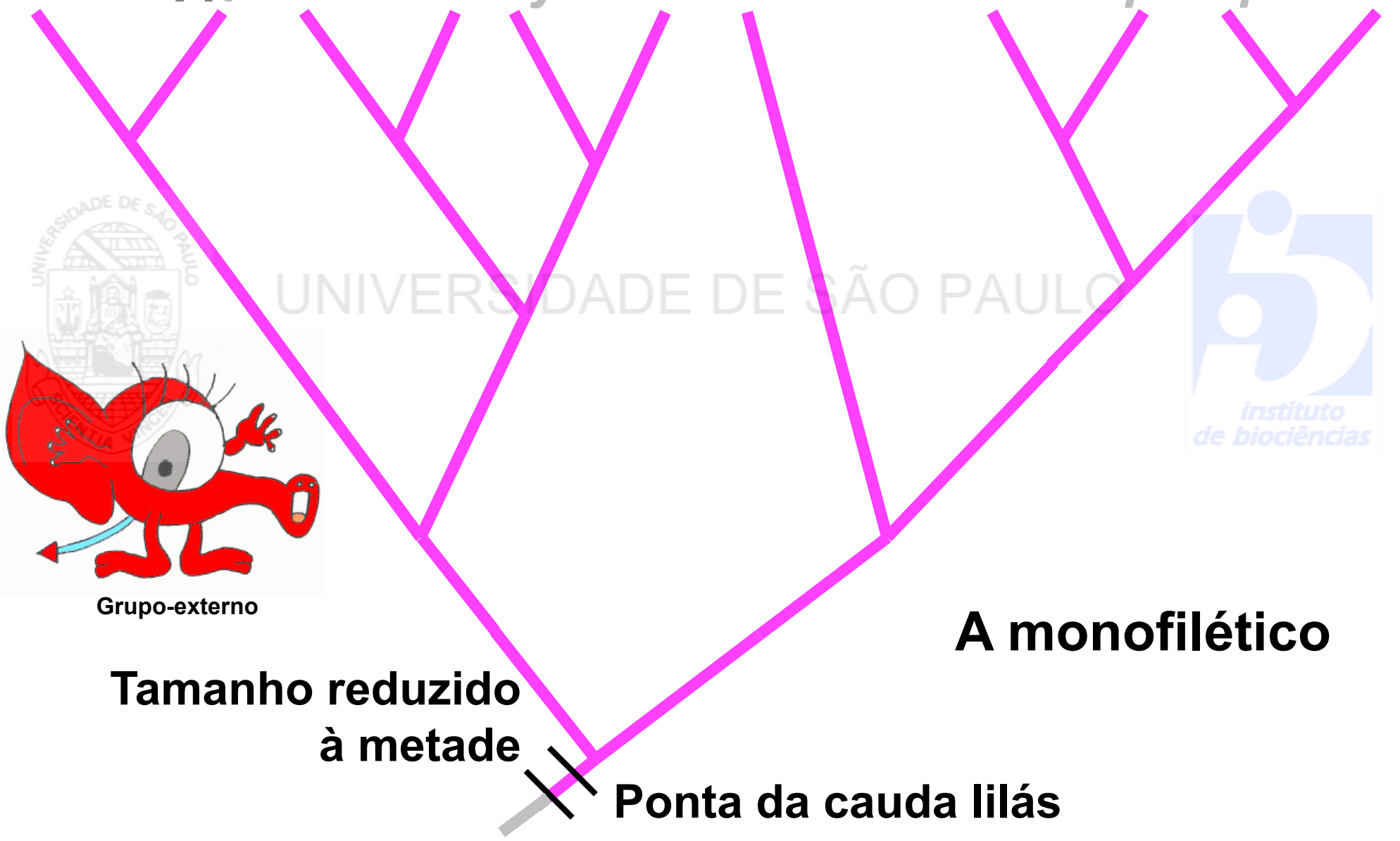
Az At

Ao

Ap

Aq

Ar



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A monofilético

Grupo-externo

**Tamanho reduzido
à metade**

Ponta da cauda lilás



Polítomias





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politomia

tricotomia



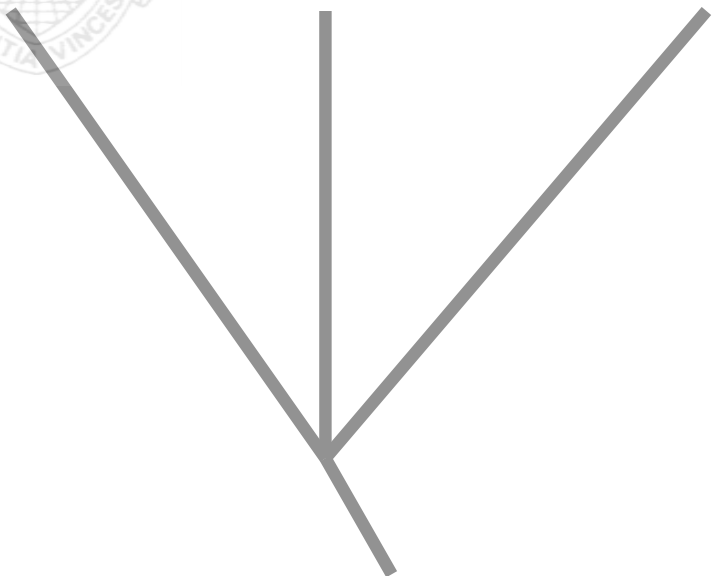
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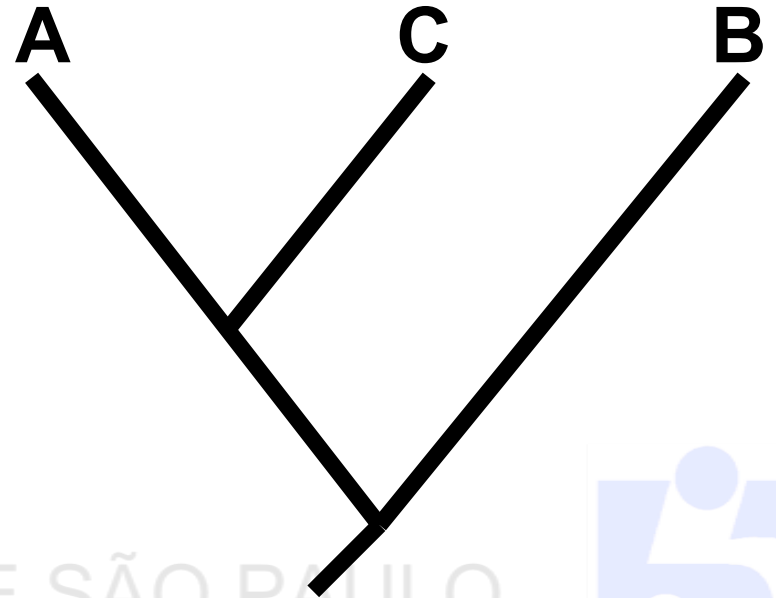
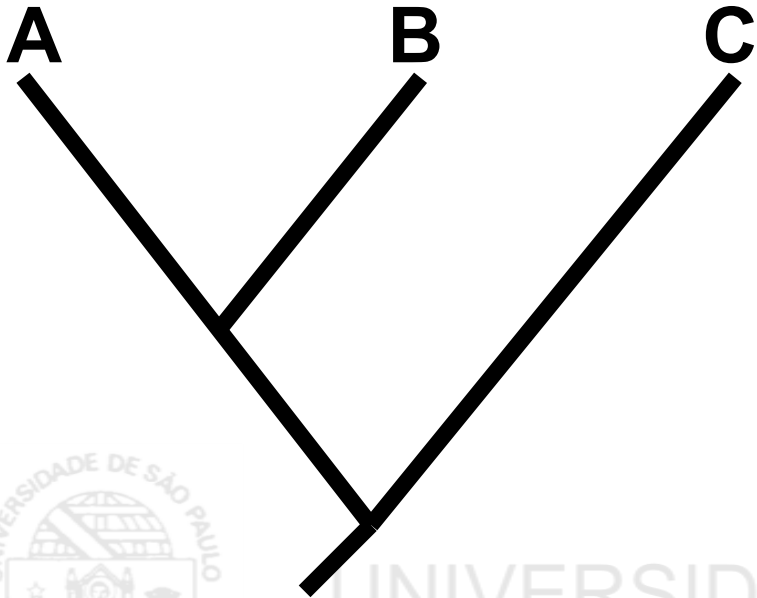


A

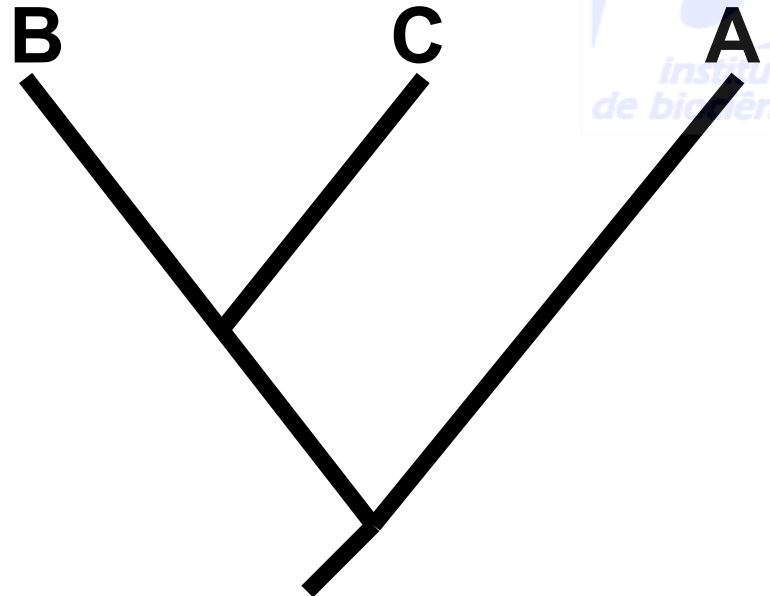
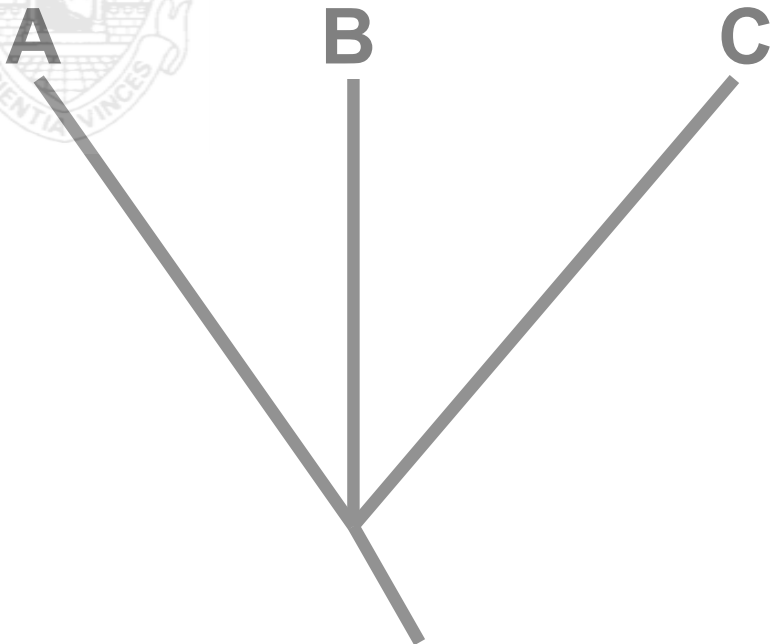
B

C





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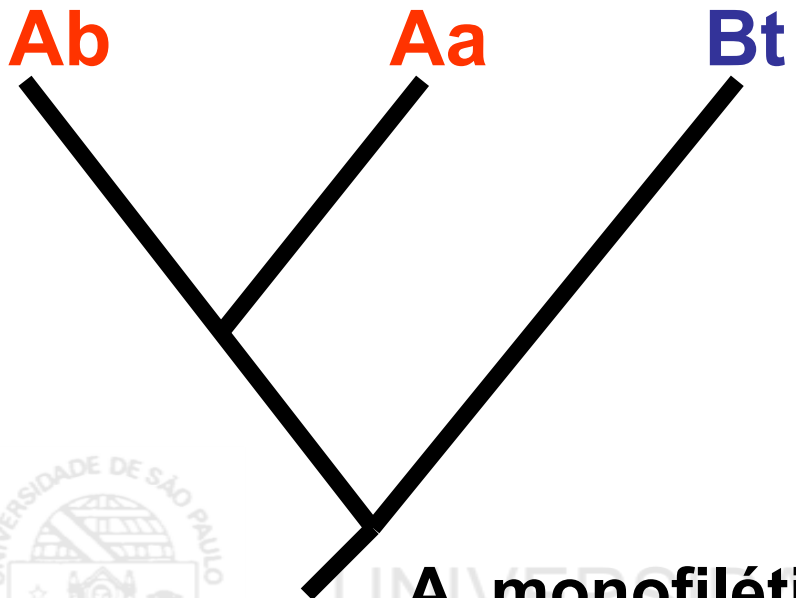


Aa

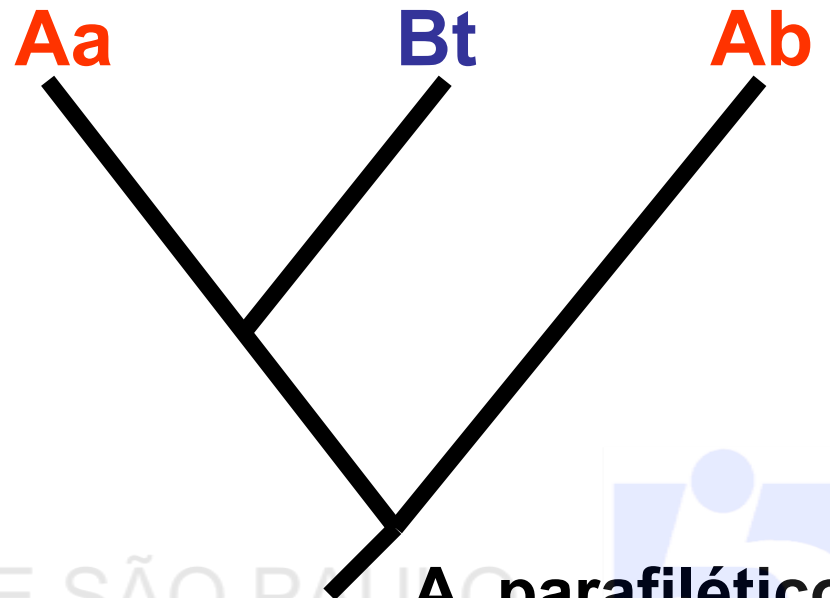
Ab

Bt

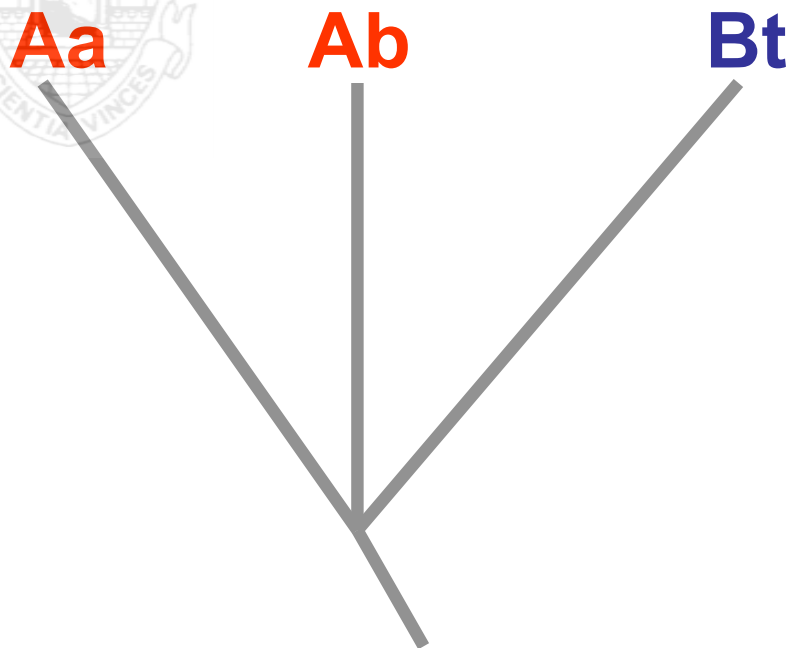




A, monofilético



A, parafilético



A, parafilético



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- reiniana* D.G. Frodin in *Proc. Acad. Nat. Sci. Philadelphia*, 140(2): 337 (1988), nom. nov.: *S. aromatica* f. *scandens* Hochreutiner.
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- rodriguesiana* Frodin ex Marchal & J.F.M. Cannon in *Bull. Brit. Mus. (Nat. Hist.), Bot.*, 19: 6 (1989), nom. nov.: *Didymopanax pittieri* Marchal.
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- obatae* H. St. John in *Phytologia*, 64(3): 178 (1988)—Hawaiian Is.
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- chartacea* (L.O. Wms.) P. Burns-Balogh in *Orquídea (México)*, 10(1): 92 (1986): *Spiranthes chartacea*.
- dendroneura* (Sheviak & Bye) P. Burns-Balogh in *Orquídea (México)*, 10(1): 92 (1986): *Spiranthes dendroneura*.
- diaphana* (Lindl.) P. Burns-Balogh & Greenwood in *Orquídea (México)*, 10(1): 93 (1986): *Spiranthes diaphana*.
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- durangensis* (A. & S.) P. Burns-Balogh in *Orquídea (México)*, 10(1): 93 (1986): *Spiranthes durangensis*.

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- hutchellii* (K. Schum.) K. Schum. in *Austrobaileya*, 1(1): 1 (1989)—Australia (W. Australia).
- praematurum* (Fern.) C.F. Reed in *Phytologia*, 67(6): 451 (1989): *Andropogon praematurus*.
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- corymbosum* I.A. Al-Shehbaz in *Harvard Pap. Bot.*, 1: 41 (1989)—Chile.
- maipoanum* P. Ravenna in *Onira, Bot. Leaflet*, 1(4): 32 (1988), as *Physopetalon*—Chile.

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- hydrangeoides* (L.) (Honda) Hara ex H. Ohba in *J. Jap. Bot.*, 64(11): 325 (1989): *S. hydrangeoides* var. *mollis*.

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- pellucidum* D. Frame in *R. McV. Galiciana*, 15: 272 (1989)—Mexico.
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- × *kuekenthalianus* (Junge) D.H. Keiser in *Phytologia*, 18(2): 213 (1990): *Scirpus* × *kuekenthalianus*.
- lacustris* (L.) (Vahl) T. Koyama in *Occas. Pap.*, 29: 128 (1989): *Scirpus lacustris*.

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- eberhardtii* (Finet) L.V. Aver'yanov in *Phytologia*, 73(1): 107 (1988): *Saccolabium eberhardtii*.
- endertii* (J.J. Smith) E.A. Christenson in *Lindleyana*, 5(2): 101 (1990): *Robinsonia endertii*.

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- altum* I. Kukkonen in *Notes Roy. Bot. Gard. Edinburgh*, 43(3): 365 (1986)—South Africa (Cape Province).
- bracteosum* I. Kukkonen in *Notes Roy. Bot. Gard. Edinburgh*, 43(3): 365 (1986)—South Africa (Cape Province, Natal), Lesotho.
- burtii* I. Kukkonen in *Notes Roy. Bot. Gard. Edinburgh*, 43(3): 365 (1986)—Natal.
- molle* I. Kukkonen in *Notes Roy. Bot. Gard. Edinburgh*, 43(3): 366 (1986)—Natal.
- strictum* I. Kukkonen in *Notes Roy. Bot. Gard. Edinburgh*, 43(3): 366 (1986)—Natal.

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- clarkii* J.A. Steyermark in *Ann. Missouri Bot. Gard.*, 75(3): 1061 (1988)—Venezuela.

BOTÂNICA**BACTERIOLOGIA****ZOOLOGIA****REINO*****REINO***
Sub-Reino**DIVISÃO**(-phyta)
(-myceta)**(DIVISÃO)**(Superfilo)
FILO

Subdivisão

(-phytina)
(-mycotina)**(Subdivisão)**

Subfilo

CLASSE*(-phyceae)
(-mycetes)
(-opsida)**CLASSE*****CLASSE***

Subclasse

(-idae)

Subclasse

Superordem

ORDEM*

(Subordem)

-ales
-ineae**ORDEM***

Subordem

-ales
-ineae

Superordem

ORDEM*

Subordem

Infraordem

FAMÍLIA

Subfamília

Tribo

Subtribo

-aceae
-oideae
-eae
-inae**FAMÍLIA**

(Subfamília)

Tribo

(Subtribo)

-aceae
-oideae
-eae
-inae

Superfamília

FAMÍLIA

Subfamília

Tribo

Subtribo

(-oidea)
-idae
-inae
(-ini)
(-ina)**GÊNERO***

Subgênero

Seção

Subseção

Série

Subsérie

GÊNERO*

(Subgênero)

GÊNERO*

Subgênero

Seção

Subseção

Série

Subsérie

ESPÉCIE*

Subespécie

Variedade

(Subvariedade)

Forma

(Subforma)

ESPÉCIE*

(Subespécie

= Variedade)

ESPÉCIE*

Subespécie



BOTÂNICA**BACTERIOLOGIA****ZOOLOGIA****REINO*****REINO***

Sub-Reino

DIVISÃO(-phyta)
(-myceta)**(DIVISÃO)**

(Superfilo)

FILO

Subdivisão

(-phytina)
(-mycotina)

(Subdivisão)

Subfilo

CLASSE*(-phyceae)
(-mycetes)
(-opsida)**CLASSE*****CLASSE***

Subclasse

(-idae)

Subclasse

Superordem

ORDEM*

(Subordem)

-ales
-ineae**ORDEM***

Subordem

-ales
-ineae

Superordem

ORDEM*Subordem
Infraordem**FAMÍLIA**

Subfamília

Tribo

Subtribo

-aceae

-oideae

-eae

-inae

FAMÍLIA

(Subfamília)

Tribo

(Subtribo)

-aceae

-oideae

-eae

-inae

Superfamília

FAMÍLIA

Subfamília

Tribo

Subtribo

(-oidea)

-idae

-inae

(-ini)

(-ina)

GÊNERO*

Subgênero

Seção

Subseção

Série

Subsérie

GÊNERO*

(Subgênero)

GÊNERO*

Subgênero

Seção

Subseção

Série

Subsérie

ESPÉCIE*

Subespécie

Variedade

(Subvariedade)

Forma

(Subforma)

ESPÉCIE*

(Subespécie

= Variedade)

ESPÉCIE*

Subespécie



BOTÂNICA

ORDEM

FAMÍLIA

-ales

-aceae

BACTERIOLOGIA

ORDEM

FAMÍLIA

-ales

-aceae

ZOOLOGIA

ORDEM

FAMÍLIA

-idae



Backlund & Bremer (1988). To be or not to be
– principles of classification and monotypic plant families.
Taxon 47: 391-400.

Princípio primário: Monofiletismo

Princípios secundários:

Maximizar:

Estabilidade nomenclatural

Facilidade de identificação

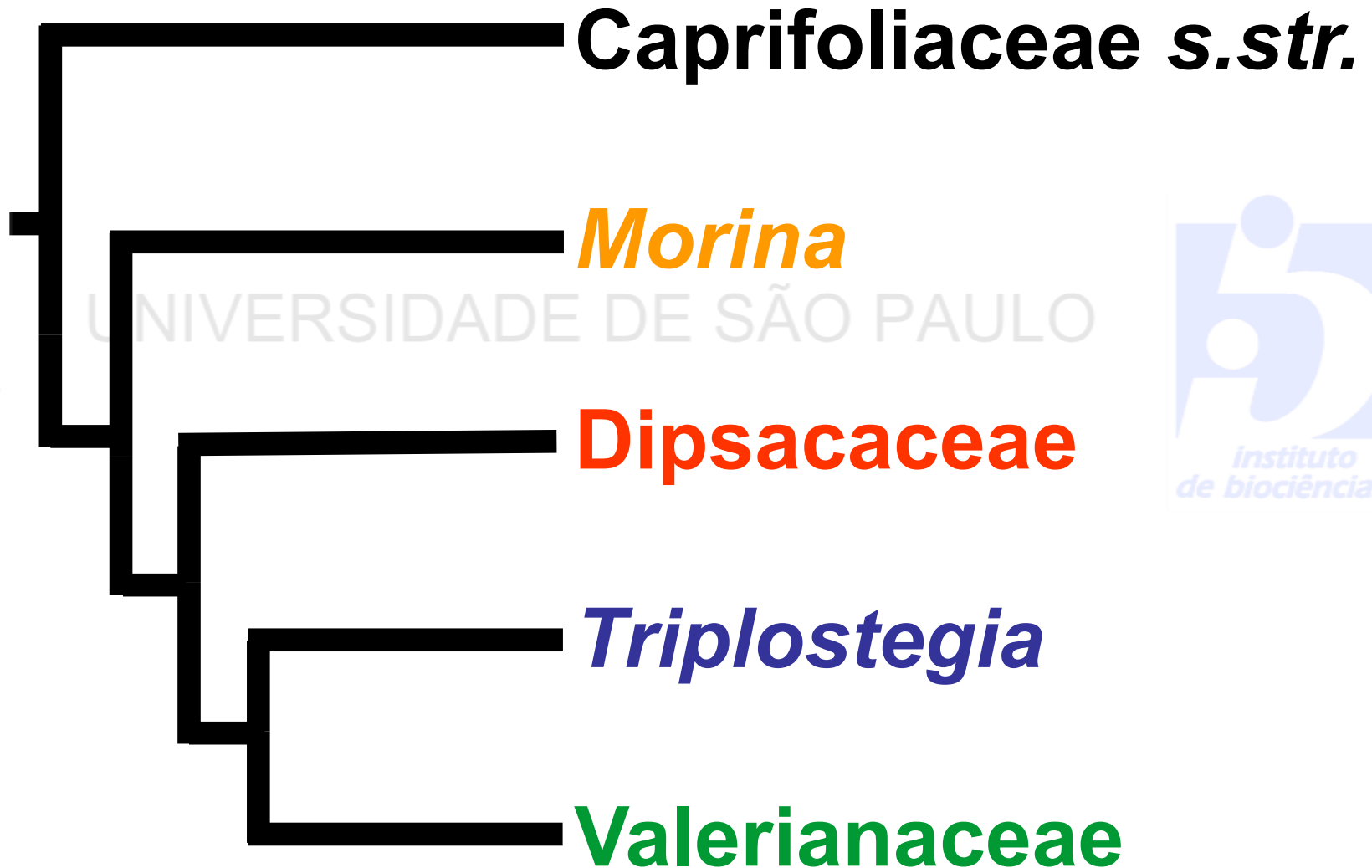
Informação filogenética

Sustentação do monofiletismo



Dipsacales

Backlund & Donoghue (1996) - Morfologia
Blackund & Bremer (1998) - *rbcl*

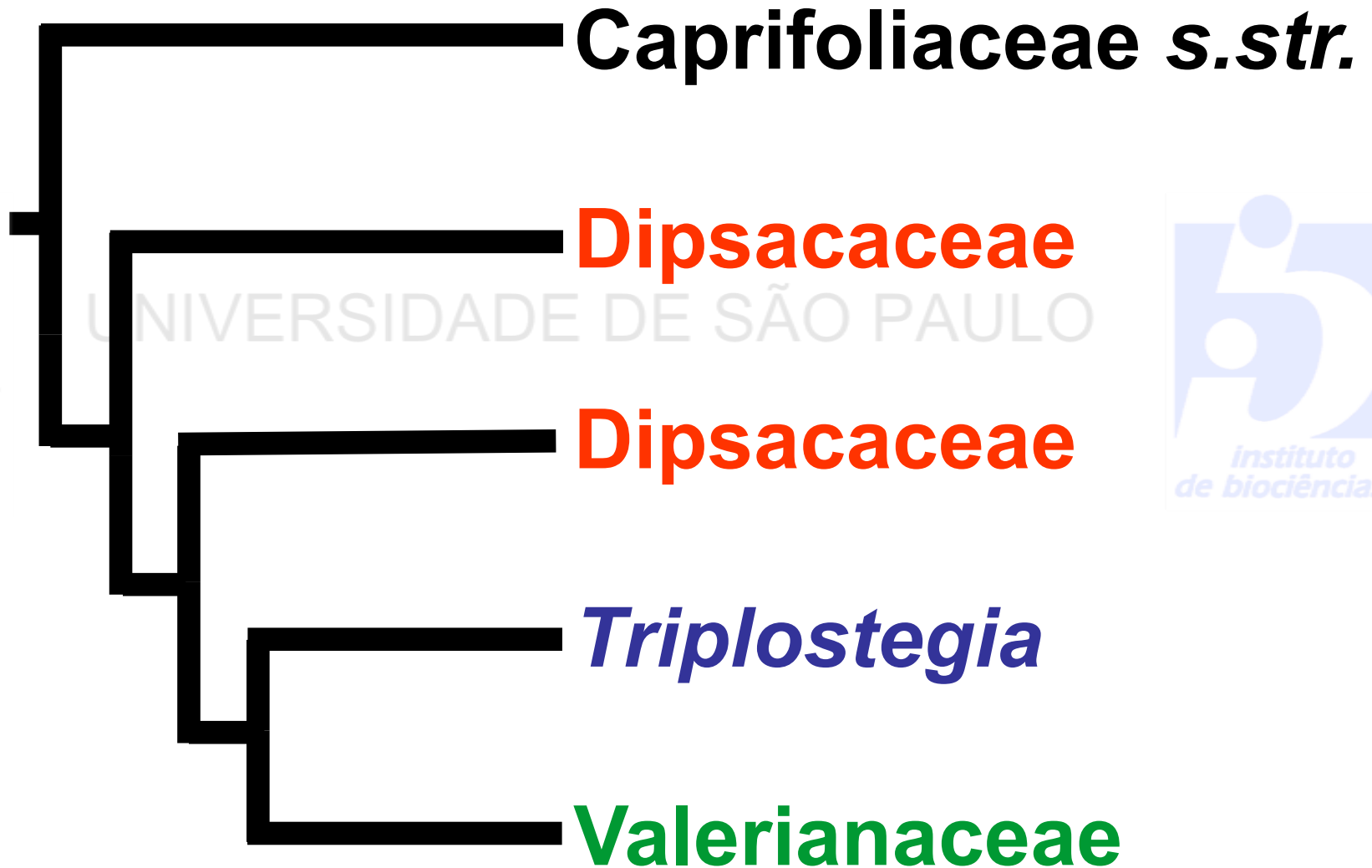


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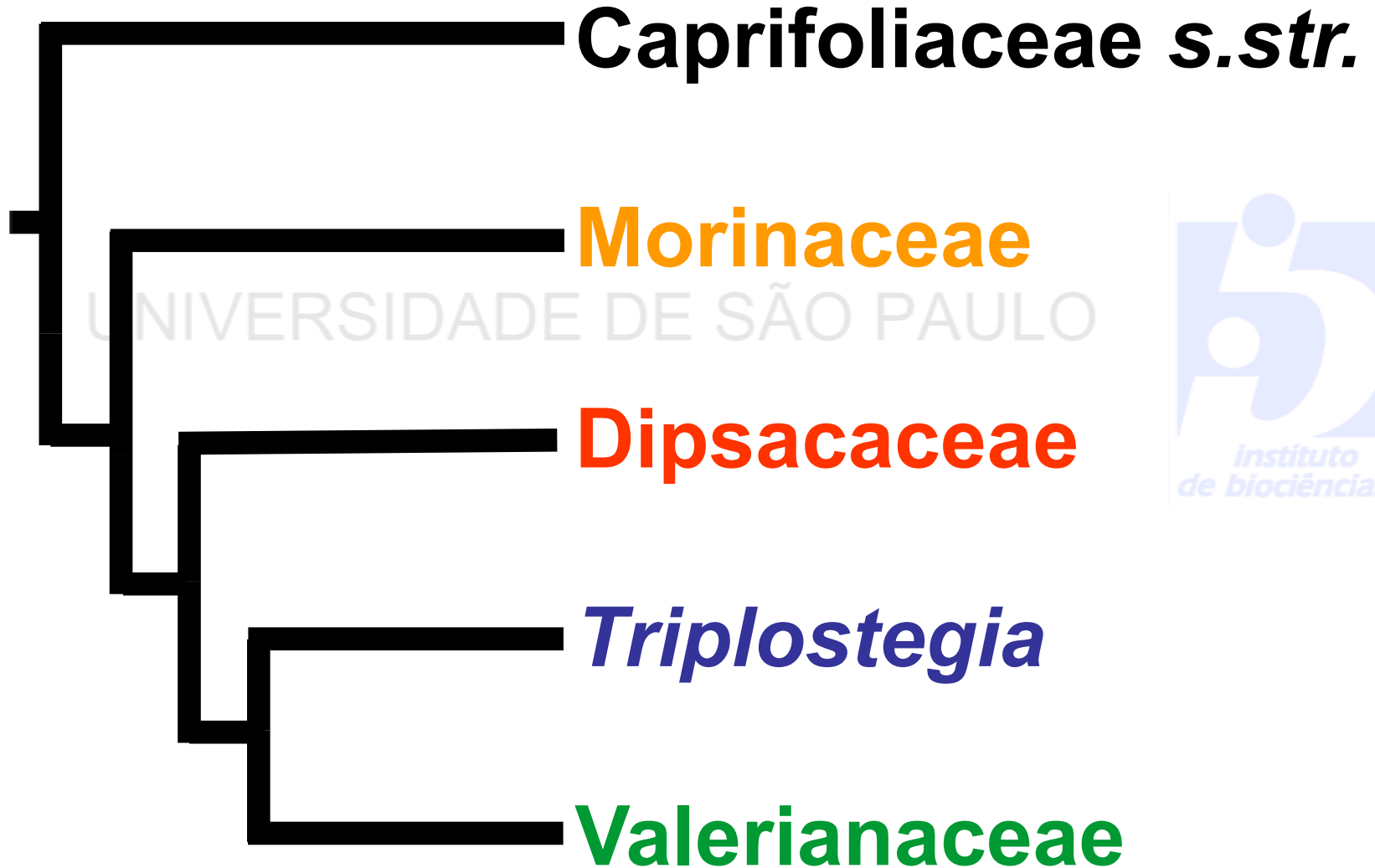


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Dipsacales

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Blackund & Bremer (1998) - *rbcl*



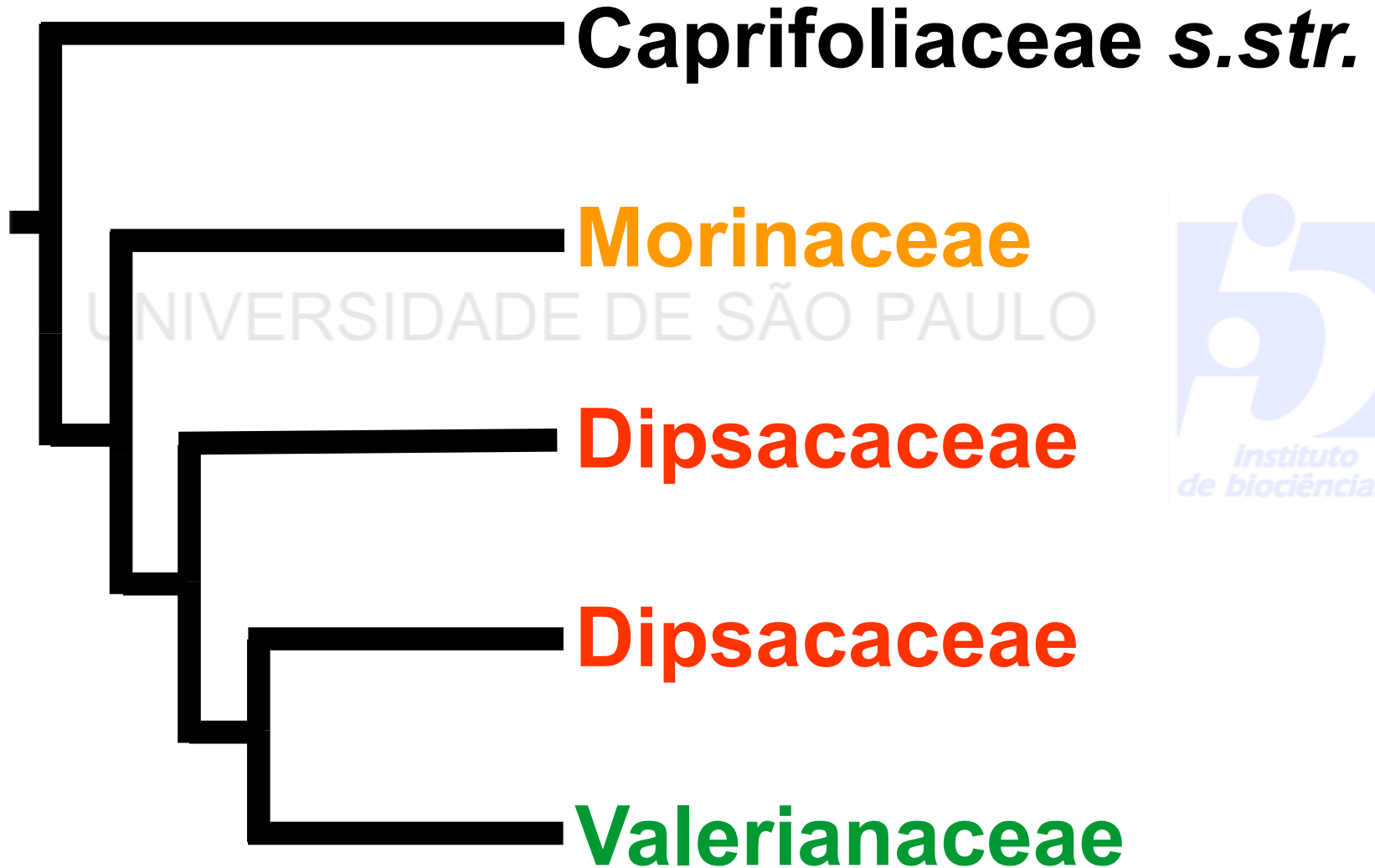
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Monofiletismo

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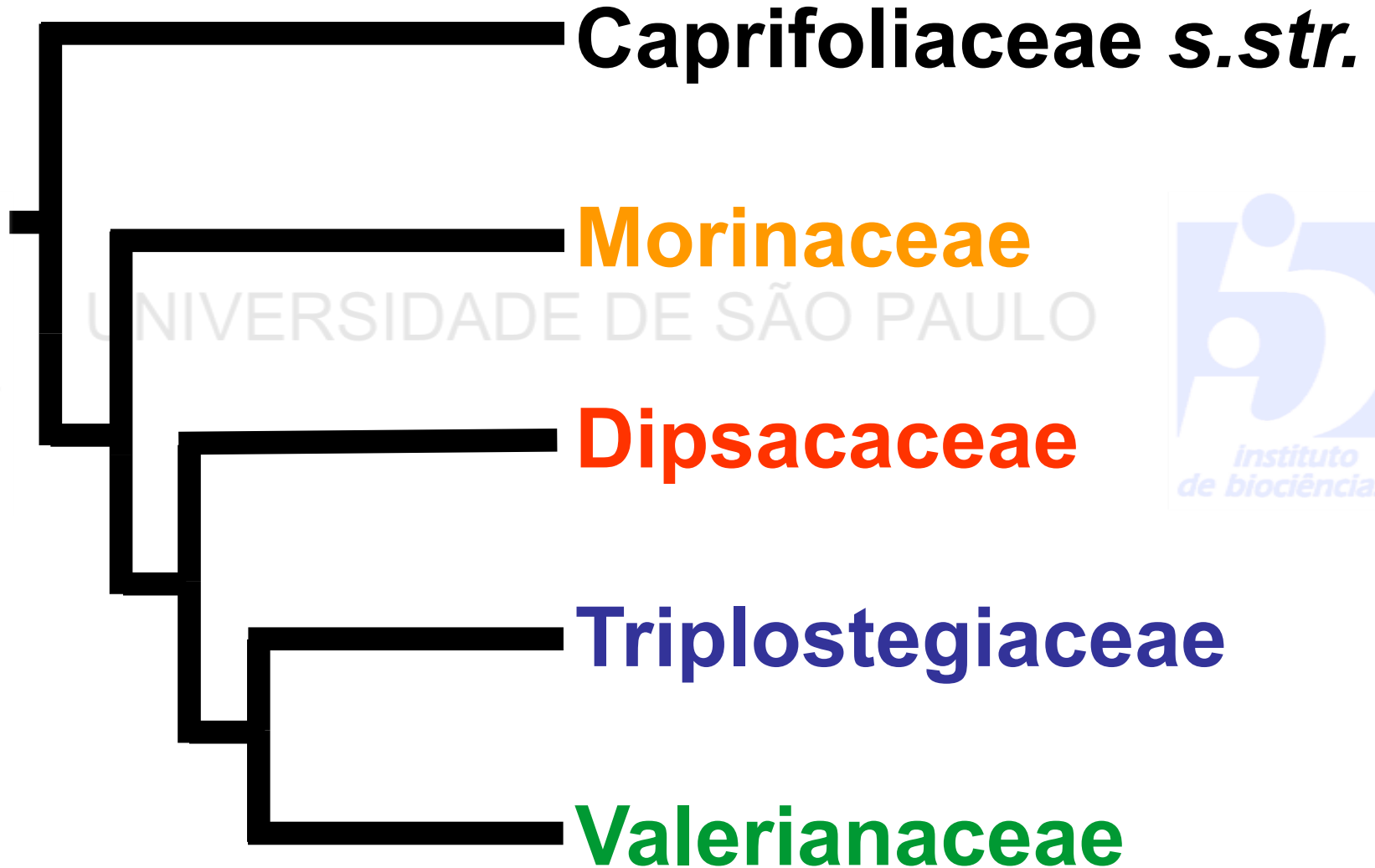


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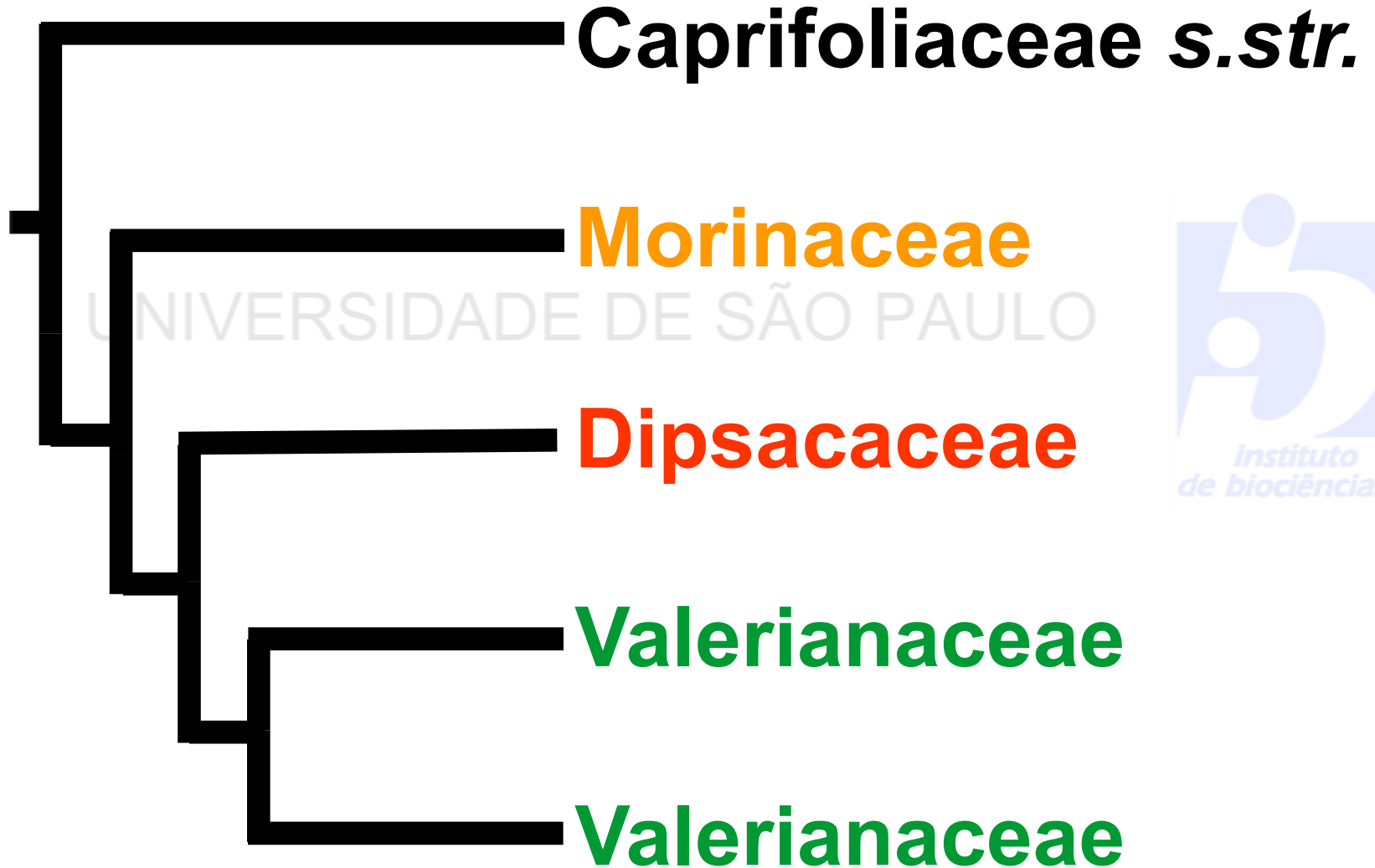
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Monofiletismo

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Blackund & Bremer (1998) - *rbcl*

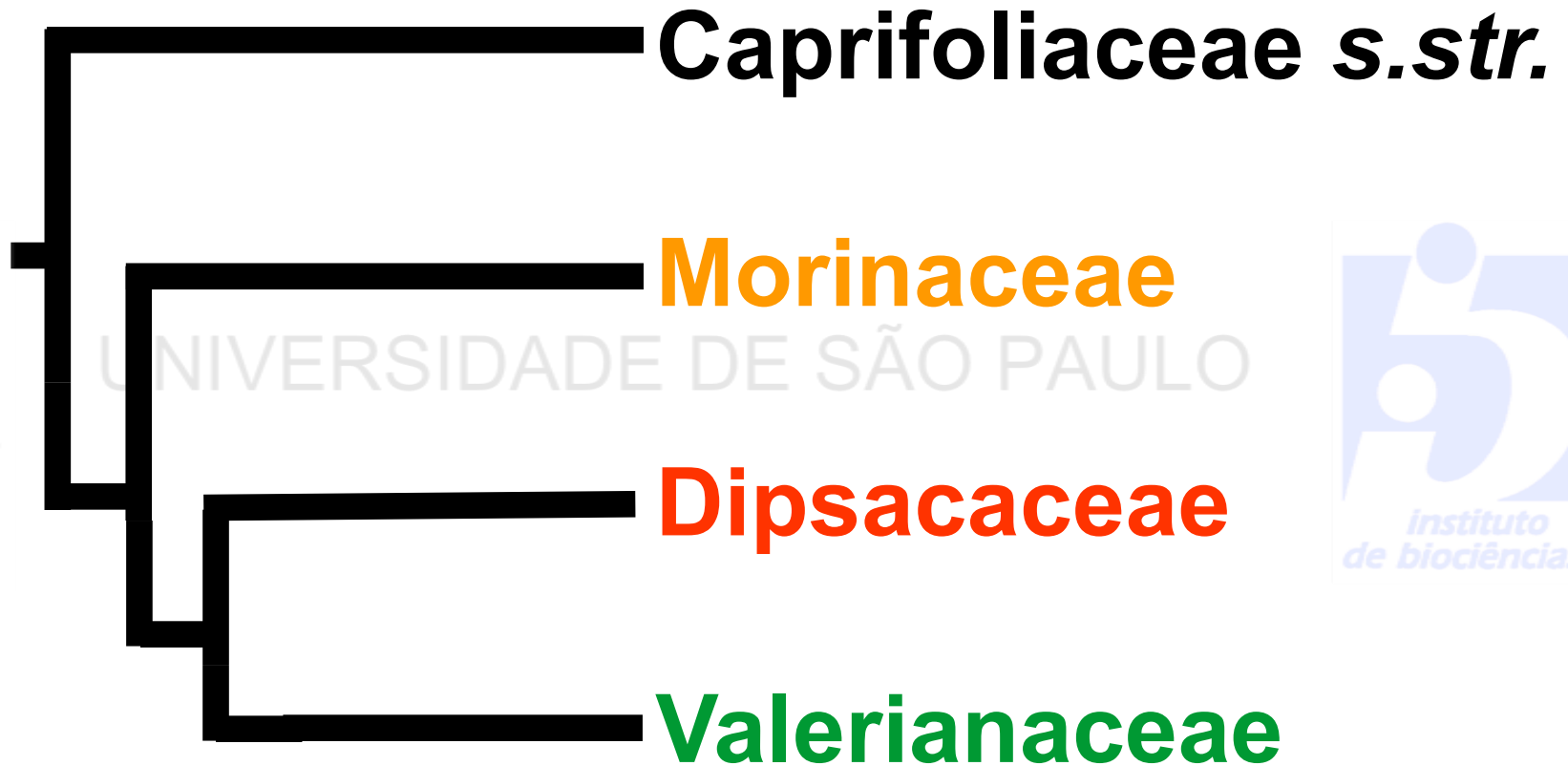


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Dipsacales

Backlund & Donoghue (1996) - Morfologia
Blackund & Bremer (1998) - *rbcL*



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Informação filogenética



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