nvec\_dap\_1 Nvec\_vc1.1\_XM\_048733736.1 OG: RHD\_Rel.HG1.0:like:NFAT5/NFATC1/NFATC2/NFATC3/NFATC4 PFAM: RHD\_DNA\_bind/RHD\_dimer dimont homer streme 4 Ogastro\_IRF1\_2 Deuron\_GATA\_Islet\_1 Oprecursors\_PGC Deuron\_GATA\_Islet\_2 neuron\_GATA\_Islet\_2 neuron\_Pou4\_FoxL2 meuron\_GATA\_Islet\_1 Deuron\_Pou4\_FoxL2\_3 neuron\_Pou4\_FoxL2\_2 gastro\_IRF1\_2 neuron Pou4 FoxL2 2 neuron\_Pou4\_FoxL2\_3 neuron\_Pou4\_FoxL2\_3
precursors\_PGC cnidocyte Ogastro\_IRF1\_2 neuron\_GATA\_Islet\_1 gland Oprecursors\_PGC neuron\_Pou4\_FoxL2 1 ouscle\_tentacle\_retractor gastro\_somatic\_gonad neuron GATA Islet 2 gastro\_somatic\_gonad neuron\_Pou4\_FoxL2\_1 neuron\_Pou4 FoxL2 1 precursors\_endoNPC cnidocyte cnidocyte muscle\_mesentery\_retractor epidermis\_1 muscle\_tentacle\_retractor precursors\_NPC activity activity activity digestive\_filaments\_1 muscle\_mesentery\_retractor gastro\_parietal\_muscle muscle\_tentacle\_retractor digestive\_filaments\_3 precursors\_endoNPC gastro\_circular\_muscle\_1 gastro\_parietal\_muscle 느 上 precursors\_endoNPC gastro\_somatic\_gonad cnidocyte\_gastrula 0 cnidocyte\_gastrula gland\_mucin epidermis\_1 gastro\_circular\_muscle\_2 gastro\_circular\_muscle\_1 digestive\_filaments\_1 precursors\_NPC digestive\_filaments\_1 epidermis\_2 precursors\_NPC gastro\_parietal\_muscle and\_mucin ecto\_aboral neuronal\_gastrula ecto\_aboral-gastro\_circular\_muscle\_1 \_neuronal\_gastrula gand\_mucin\_cnidocyte\_gastrula EMS\_ecto\_boundary neuronal\_gastrula <u>\_\_ectoderm</u> digestive\_filaments\_2 NPC gastro\_circular\_muscle\_2 digestive\_filaments\_2 digestive\_filaments\_3 ecto\_pharynx gastro\_circular\_muscle\_2 ecto\_pharynx EMS\_ecto\_boundary epidermis\_2 ectoderm EMS\_ecto\_boundary ecto\_pharynx digestive\_filaments\_3 ecto\_aboral epidermis\_2 EMS -3EMS EMS ectoderm

TF expression

5

TF expression

TF expression

nvec\_dap\_2 Nvec\_vc1.1\_XM\_032382466.2 OG: bZIP.HG2.5:CEBPA/CEBPB/CEBPD/CEBPE/CEBPG PFAM: bZIP\_2 archetype dimont ATGACGTCA TÇÇÇAAI gastro\_IRF1\_2 gastro\_IRF1\_2 gastro\_somatic\_gonad\_gastro\_circular\_muscle\_2 gastro\_parietal\_muscle neuron\_GATA\_Islet\_1 digestive\_filaments\_1 EMS epidermis\_1 gastro\_circular\_muscle\_1 activity neuron\_Pou4\_Fox1euron\_Pou4\_FoxL2\_1 odigestive\_filaments\_2 neuron\_Pou4\_FoxL2\_1 digestive\_filaments\_2 precursors\_PGC neuron\_GATA\_Islet\_2 digestive\_filaments\_1 neuron\_Pou4\_FoxL2\_2 neuron\_GATA\_lslet\_2 cnidocyte\_gastrylauscle\_tentacle\_retractor\_neuron\_Pou4\_FoxL2\_3 上 digestive\_filaments\_3 digestive\_filaments\_3 muscle\_mesentery\_retracto neuron\_Pou4\_FoxL2\_3 gastro\_circupk\_muscle\_1 neuronal\_gastrula epidermis\_2 NPC\_2 gland\_mucin cnidocyte ecto\_pharynx Omuscle\_mesentery\_retractor precursors\_NPC cnidocyte\_gas<mark>talitecu</mark>rsors<del>AGC</del>-ectoderm gastro\_circular\_muscla\_2\_NPC\_1 gland\_mucin neuronal\_gastrula ecto\_aboral 3 TF expression TF expression homer streme gastro\_IRF1\_2 gastro\_circular\_muscle\_2 gastro\_somatic\_gonad gastro\_somatic\_gonad gastro\_circular\_muscle\_2 gastro\_circular\_muscle\_1 digestive\_filaments\_1 activity digestive\_filaments\_1 neuron\_Pou4\_FoxL2\_2 neuron\_Pou4\_FoxL2\_2 0 precursors\_endoNPC neuron\_GATA\_Islet\_2 precursors\_PGC ectoderm muscle\_mesentery\_retractor digestive\_filaments\_2 NPC\_1 eccepidermis\_2 digestive\_filaments\_2 cnidocyte ecto\_aboral digestive\_filaments\_3 neuronal\_gastrula EMS\_ecto\_boundary digestive\_filaments\_3 NPC\_2 precursors\_NPC ecto\_pharynx muscle\_mesentery\_retractor gland\_mucin ·precursors\_NPC cnidocyte\_gastrula cnidocyte\_gastrula muscle\_tentacle\_retractor muscle\_tentacle\_retractor

TF expression

TF expression

nvec\_dap\_5 Nvec\_vc1.1\_XM\_032364784.2 (Hhex) OG: Homeodomains.HG1.28:HHEX PFAM: Homeodomain archetype dimont ATTAATEAT digestive\_filaments\_2 7.5 gastro\_parietal\_muscle\_mesentery\_retractor 5.0 ectoderm euron\_GATA\_Islet\_2 TF activity activity 0.0 neuron\_Pou4\_FoxL2\_3 muscle\_tentacle\_retractor ecto\_pharynx neuron\_Pou4\_FoxL2\_2 0.0 ectopharynx gastro\_circular\_muscle\_2 neuron\_Pou4\_FoxL2\_1 precursors\_NPC -neuron\_GATA\_Islet\_1 neuron\_Pou4\_FoxL2\_3 gastro\_circular\_muscle\_1 cnidocyte\_gastrula EMS\_ecto\_boundary Oprecursors\_PGC Oprecursors\_PGC -5.01.0 1.1 1.2 1.3 1.0 1.1 1.2 1.3 TF expression TF expression homer streme AAACAAT NPC\_1 ectoderm ANPC 1 ectoderm neuron\_Pou4\_FoxL2\_3 precursors\_NPC epidermis\_2 neuronal\_gastrula neuron\_Pou4\_FoxL2\_3 neuronal\_gastrula ectopharynx activity TF activity muscle\_tentacle\_retractor\_ digestive\_filaments\_1\_neuron\_Pou4\_FoxL2\_1 gland\_mucin\_neuron\_Pou4\_FoxL2\_1 gland digestive\_filaments\_1 ecto\_pharynx digestive\_filaments\_3 -neuron\_Pou4\_FoxL2\_2-gastro\_somatic\_gonad digestive\_filaments\_2 digestive\_filaments\_3 precursors\_endoNPC ecursors NPC cnidocyte gastro\_IRF1\_2 muscle\_tentacle\_retractor neuron\_GATA\_Islet\_1 eoidermis\_1 gastro\_parietal\_muscle <sup>1</sup>cnidocyte Oprecursors\_PGC EMS\_ecto\_boundary precursors\_endoNPC gastro\_somatic\_gonad gastro\_circular\_muscle\_2 • gastro\_circular\_muscle\_2 muscle\_mesentery\_retractor precursors\_PGC gastro\_circular\_muscle\_1 **EMS** gastro\_circular\_muscle\_1 gastro\_IRF1\_2 1.0 1.1 1.2 1.3 1.0 1.1 1.2 1.3 TF expression TF expression

nvec\_dap\_6 Nvec\_vc1.1\_XM\_001632929.3 OG: Homeodomains.HG2.41:SHOX/SHOX2 PFAM: Homeodomain archetype dimont TAATE neuron\_Pou4\_FoxL2\_3 ecto\_aboral neuron\_Pou4\_FoxL2\_2 —muscle\_mesentery\_retractor muscle\_tentacle\_retractor neuronal\_gastrula\_neuron\_GATA\_Islet\_1 ectoderm digestive\_filaments\_1\_neuron\_Pou4\_FoxL2\_1 epidermis\_2 igestive\_filaments\_3 10 ·precursors\_endoNPC gastro\_circular\_muscle\_1 g<mark>land\_mucin-</mark>neuronal\_gastrula -ectoderm —ecto\_pharynx TF activity TF activity land\_mucin\_gastro\_circular\_muscle\_2 2\_neuron\_Pou4\_FoxL2\_3 digestive\_filaments\_1 pidermis\_1 gastro\_IRF1\_2 neuron\_Pou4\_FoxL2\_1 neuron\_GATA\_Islet\_2 precursors\_PGC MS\_ecto\_boundary\_digestive\_filaments\_3 cnidocyte\_gastrula digestive\_filaments\_2 cnidocyte\_gastrula epidermis\_2 glan neuron\_GATA\_Islet\_1
precursors\_NPC muscle\_mesentery\_retractor EMS\_ecto\_boundary muscle\_tentacle\_retractor gastro\_somatic\_gonad\_cnidocyte gastro\_circular\_muscle\_1 -5.0Ogastro\_IRF1\_2 -10Oprecursors\_PGC 1.20 1.00 1.05 1.10 1.15 1.20 1.00 1.10 1.15 1.05 TF expression TF expression homer streme 15 ecto\_aboral ecto\_aboral ectoderm NPC\_1 gland\_mucin gland\_mucin neuron\_Pou4\_FoxL2\_3 -neuronal\_gastrula activity activity -digestive\_filaments\_1 6\_2\_neuronal\_gastrula neuron\_Pou4\_FoxL2\_3 digestive\_filaments\_2 digestive\_filaments\_3 epidermis\_1 neuron\_GATA\_Islet\_2 euron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_1 epidermis\_2 epidermis\_2 cnidocyte gastrula muscle\_mesentery\_retractor muscle\_tentacle\_retractor ecursors NPC gastro\_circular\_muscle\_2 precursors\_endoNPC gastro\_circular\_muscle\_2 muscle\_tentacle\_retractor gastro\_circular\_muscle\_1 gastro circular muscle 1 cnidocyte cnidocyte gastro\_IRF1\_2 gastro\_IRF1\_2 Oprecursors\_PGC Oprecursors\_PGC 1.20 1.15 1.20 1.15 1.00 1.05 1.10 1.00 1.05 1.10 TF expression TF expression

nvec\_dap\_8 Nvec\_vc1.1\_XM\_032384889.2 (Hes2) OG: HLH.HG1.63:like:HES5/HES7 PFAM: HLH/Hairy\_orange archetype dimont GeCACGIG. CAAGTGGAACGA precursors\_NPC epidermis\_2 ecto\_aboral gland\_mucin EMS\_ecto\_boundary epidermis\_1 TF activity TF activity cnidocyte\_gastrula ecto\_pharynx neuron\_Pou4\_FoxL2\_2\_gastro\_somatic\_gonad neuronal\_gastrula gastro\_IRF1\_2gastro\_circular\_muscle\_2 precursors\_PGC

digestive filaments 2 gastro\_circular\_muscle\_2 0.0 muscle\_mesentery\_retractor muscle\_tentacle\_retractor muscle\_tentacle\_retractor digestive\_filaments\_1 digestive\_filaments\_2 neuron\_GATA\_Islet\_1 epidermis\_1 -2.5neuron\_GATA\_ digestive\_filaments\_3 3 3 TF expression TF expression homer streme CACGTG G\_CACGTG\_\_s 7.5 neuron\_GATA\_Islet\_1 neuron\_GATA\_Islet\_2 △cnidocyte\_gastrula precursors\_NPC gland\_mucip\_neuron\_Pou4\_FoxL2\_1 -EMS\_ecto\_boundary precursors\_NPC precursors\_endoNPC precursors\_PGC neuron\_Pou4\_FoxL2\_2\_neuron\_Pou4\_FoxL2\_3 TF activity NPC\_1\(\sum\_{\text{gastro}}\) somatic\_gonad digestive\_filaments\_1 digestive\_filaments\_2 ecto\_pharynx neuronal\_gastrula muscle\_tentacle\_retractor gastro\_circular\_muscle\_2 gland epidermis\_1 muscle\_mesentery\_retractor neuron\_Pou4\_Foxbastro\_somatic\_gonad precursors\_PGC digestive\_filaments\_3 gastro\_parietal\_muscle ectopharynx epidermis\_2 digestive\_filaments\_1 gastro\_parietal\_muscle ecto\_aboral ectoderm epidermis\_1 ecto\_aboral gastro\_circular\_muscle\_2 digestive\_filaments\_3 epidermis\_2 gastro\_circular\_muscle\_1 -2.5-2gastro\_circular\_muscle\_ ectoderm

TF expression

TF expression

nvec\_dap\_10 Nvec\_vc1.1\_XM\_001626717.3 OG: T-box.HG1.4:like:EOMES/TBR1/TBX19/TBX21/TBXT PFAM: T-box archetype dimont \*TCACACCT AGGTGTGAA AGGTGT ecto\_aboral EMS\_ecto\_boundary neuronal\_gastrula ecto\_pharynx precursors\_PGC gland\_mucin NPC\_2\_cnidocyte\_gastrula ~ecto\_pharynx Aeuron\_Pou4\_FoxL2\_1\_neuron\_Pou4\_FoxL2\_2 ect\_aboral\_epidermis\_1 EMS\_ecto\_boundary TF activity euronal\_gastrula ect@derm neuron\_Pou4\_FoxL2\_3 ectoderm neuron\_GATA\_Islet\_1 NPC 2 gland precursors\_NPC cnidocyte\_gastrula precursors\_endoNPC gastro\_circular\_muscle\_1 euron\_GATA\_Islet\_2 epidermis\_2 digestive\_filaments\_3 muscle\_tentacle\_retractor 0 gland\_mucin\_digestive\_filaments\_2 neuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_3 -muscle\_tentacle\_retractor\_gastro\_somatic\_gonad -neuron\_GATA\_Islet\_1 —digestive\_filaments\_1 muscle\_mesentery\_retractor precursors\_NPC gastro parietal muscle epidermis\_1 digestive\_filaments\_1 epidermis\_2 gastro\_circular\_muscle\_1 Oprecursors\_PGC gastro\_circular\_muscle\_2 2.0 2.5 1.5 2.0 2.5 1.0 1.5 1.0 TF expression TF expression homer streme 4GGTGT ç AGGTGT \_neuronal\_gastrula ecto aboral 10 neuronal\_gastrula ·ecto\_aboral gland\_mucin gland\_mucin MPC\_2 —cnidocyte\_gastrula EMS\_ecto\_boundary activity \_cnidocyte\_gastrula △ecto\_pharynx EMS\_ecto\_boundary\_neuron\_Pou4\_FoxL2\_1 ▲ecto\_pharynx ectoderm\_neuron\_GATA\_Islet\_2 neuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_3 gland peuron\_Pou4\_FoxL2\_2 neuron\_GATA\_Islet\_2 ocyte\_gastro\_circular\_muscle\_1 neuron\_GATA\_lslet\_1 prodursors\_endenPC precursors\_NPC 0 gastro\_somatic\_gonad digestive\_filaments\_2 neuron\_GATA\_Islet\_1 neuron Pou4 FoxL2 3 cnidocyte gastro\_circular\_Muscle\_2 digestive\_filaments\_1 gastro\_parietal\_muscle precursors\_endoNPC tentacle\_retractor\_muscle\_mesentery\_retractor digestive\_filaments\_1 muscle\_tentacle\_retractor precursors\_PGC epidermis\_1 oidermis\_2 gastro\_IRF1\_2 gastro\_IRF1\_2 epidermis\_2 precursors\_NPC

2.5

2.0

TF expression

epidermis\_1

1.0

1.5

2.0

TF expression

2.5

precursors\_PGC

1.5

1.0

Nvec\_vc1.1\_XM\_032364331.2 OG: TEA.HG1.0:TEAD1/TEAD2/TEAD3/TEAD4 PFAM: TEA archetype dimont TCASCA GISTS gastro\_circular\_muscle\_1 gastro\_circular\_muscle\_1 \_gastro\_circular\_muscle\_2 gastro\_parietal\_muscle digestive\_filaments\_2 EMS gastro\_somatic\_gonad gastro\_parietal\_muscle gastro\_circular\_muscle\_2 muscle\_mesentery\_retractor digestive\_filaments\_1 TF activity activity cnidocyte\_gastrula gastro\_somatic\_gonad muscle\_mesentery\_retractor neuron\_GATA\_lslet\_2-gastro\_IRF1\_2-digestive\_filaments\_1 -digestive\_filaments\_3 euron\_Pou4\_FoxL2\_1-epidermis\_1 브 land\_mucin\_neuron\_Pou4\_FoxL2\_2 precursors\_endoNPC muscle\_tentacle\_retractor\_neuron\_Pou4\_FoxL2\_2 muscle\_tentacle\_retractor\_digestive\_filaments\_3 cnidocyte\_gastrula cursors\_NRe0ron\_GATA\_Islet\_1 precursors\_PGC ecto\_aboral neuronal\_gastrula neuron\_Pou4\_FoxL2\_3 EMS\_ecto\_boundary neuronal\_gastrula ecto\_pharynx neuron\_Pou4\_FoxL2\_3 gastro\_IRF1\_2 ectoderm precursors\_endoNPC neuron\_GATA\_Islet\_ precursors\_PGC 2 3 4 5 5 TF expression TF expression homer streme gastro\_circular\_muscle\_2 digestive\_filaments\_1 gastro\_circular\_muscle\_1 gastro\_circular\_muscle\_1 epidermis\_2 digestive\_filaments\_1 gastro\_circular\_muscle\_2 2.5 -gastro\_parietal\_muscle gastro\_parietal\_muscle epidermis\_1 euron\_Pou4\_FoxL2\_2 muscle\_mesentery\_retractor muscle\_mesentery\_retractor epidermis\_1 gastro\_somatic\_gonad epidermis\_2 neuron\_Pou4\_FoxL2\_2 muscle\_tentacle\_retractor digestive\_filaments\_2 digestive\_filaments\_2 neuron\_Pou4\_FoxL2\_3 neuron\_Pou4\_FoxL2\_1 activity activity gastro\_somatic\_gonad precursors\_endoNPC 0.0 muscle\_tentacle\_retractor neuron\_GATA\_Islet\_2 precursors\_PGC neuron\_Pou4\_FoxL2\_1 gland neuron\_GATA\_lslet\_1 neuron\_Pou4\_FoxL2\_3 precursors\_NPC cnidocyte , digestive\_filaments\_3 ecto\_aboral precursors\_PGC -digestive\_filaments\_3 cnidocyte\_gastrula stro\_IRF1\_2\_EMS\_ecto\_boundary cnidocyte\_gastrula ectoderm/neuronal\_gastrula <del>\_\_gland\_mucin\_</del>EMS\_ecto\_boundary ▲ecto\_pharynx EMS neuronal\_gastrula 2 5 5 1 TF expression TF expression

nvec\_dap\_11

nvec\_dap\_13 Nvec\_vc1.1\_XM\_001631763.3 (PaxA) OG: Homeodomains.HG2.49:like:PAX1/PAX9 PFAM: PAX archetype dimont **ACCGTGA=CAC** GTCACCCTTEA TE EMS -epidermis\_2 10 epidermis\_1 cnidocyte\_gastrula gland\_mucin ecto\_aboral -muscle\_mesentery\_retractor ectoderm gastro\_circular\_muscle\_1 muscle\_mesentery\_retractor ecto\_pharynx\_NPC\_1 <u>qastro\_parietal\_muscle\_neuronal\_gastrula</u> TF activity TF activity ecto\_pharynx-gastro\_IRF1\_2-gastro\_circular\_muscle\_2 gastro\_parietal\_muscle EMS\_ecto\_boundary digestive\_filaments\_2 gastro\_circular\_muscle\_2 cnidocyte\_gastrula gastro\_somatic\_gonad precursors\_NPC gastro\_circular\_muscle\_1 epidermis 1 precursors\_endoNP6 cnidocyte digestive\_filaments\_3 IRF1\_conidocyte ecto\_aboral Adigestive\_filamentsuscle\_tentacle\_retracteNPC\_2 1\_precursors\_NPC precursors\_endoNPC precursors\_PGC neuron\_Pou4\_FoxL2\_2 gland\_mucin-neuron\_Pou4\_FoxL2\_2 neuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_3-muscle\_tentacle\_retractor -digestive\_filaments\_1 ▲neuronal\_gastrula -neuron\_Pou4\_FoxL2\_1 gland\_neuron\_Pou4\_FoxL2\_3 neuron GATA Islet 1 neuron\_GATA\_Islet\_2 -10neuron\_GATA\_Islet\_2 neuron\_GATA\_Islet\_1 digestive\_filaments\_digestive\_filaments\_3 precursors\_PGC 4 2 4 TF expression TF expression homer streme TCAAGCGT ectoderm ectoderm 15epidermis\_2 epidermis\_2 ecto\_aboral epidermis\_1 \_ecto\_aboral epidermis\_1 10-NPC\_1 activity activity ecto\_pharynx ecto\_pharynx 5 cnidocyte\_gastrula precursors NPC precursors\_NPC cnidocyte\_gastrula **EMS**-digestive\_filaments\_3 EMS\_digestive\_filaments\_3 digestive\_filameMts\_ecto\_boundary NPC\_2 EMS\_ecto\_boundary ocnidocyte gland\_mucin\_digestive\_filaments\_2 muscle mesentery\_retractor -digestive\_filaments\_1 gastro\_circular\_muscle\_1 digestive\_filaments\_1 neuronal\_gastrula gastro\_parietal\_muscle gastro\_parietal\_muscle gastro IRF1 2 gastro\_IRF1\_2 -neuron\_Pou4\_FoxL2\_3 -5glanneuron\_Pou4\_FoxL2\_3 -neuron\_GATA\_Islet\_1 neuron\_GATA\_Islet\_2 neuron\_GATA\_Islet\_2 precursors\_PGC neuron\_GATA\_Islet\_1 precursors\_PGC 4 TF expression TF expression

nvec\_dap\_14 Nvec\_vc1.1\_XM\_001637374.3 OG: Ets.HG1.2:ELK1/ELK3/ELK4 PFAM: Ets archetype dimont CTTCCGg CCGGAAG Ogastro\_IRF1\_2 10 10 ogastro\_IRF1\_2 EMS\_ecto\_boundary EMS\_ecto\_boundary TF activity -gastro\_circular\_muscle\_1 —gastro\_parietal\_muscle gastro\_somatic\_gonad gastro\_circular\_muscle\_1 \_gastro\_circular\_muscle\_2 gastro\_circular\_muscle\_2 neuron\_GATA\_Islet\_1 digestive\_filaments\_2 digestive\_filaments\_1 neuronal\_gastrula digestive\_filaments\_2 -epidermis\_1 <del>ecto\_pharynx</del>precursors\_endeNPC ·cnidocyte\_gastrula muscle\_mesentery\_retractor neuron\_GATA\_Islet\_2 precursors\_PG `epidermis\_1 digestive\_filaments\_3 -NPC\_2 \digestive\_filaments\_3 neuron\_Pou4\_FoxL2\_1 epidermis\_2 epidermis\_2 neuron\_Pou4\_FoxL2\_3 ectoderm 1.2 1.4 1.8 1.2 1.8 1.0 1.6 1.0 1.4 1.6 TF expression TF expression homer streme 15 ogastro\_IRF1\_2 EMS Ogastro\_IRF1\_2 **EMS** 10 10 EMS\_ecto\_boundary EMS\_ecto\_boundary \_gastro\_somatic\_gonad gastro\_parietal\_muscle activity -gastro\_circular\_muscle\_1 gastro\_parietal\_muscle gastro\_circular\_muscle\_1 Ogastro\_circular\_muscle\_2 neuron\_GATA\_Islet\_1 gastro\_circular\_muscle\_2 neuron\_GATA\_Islet\_1 digestive\_filaments\_1 digestive\_filaments\_2 Oneuron\_GATA\_Islet\_2 digestive\_filaments\_1 digestive\_filaments\_2 ecto\_pharynx neuronal\_gastrula precursors endoNPC —precursors\_endoNPC -neuronal\_gastrula epidermis\_1 ecto\_pharynx neuron\_GATA\_Islet\_2 digestive\_filaments\_3 muscle\_mesentery\_retractor digestive\_filaments\_3 epidermis\_2 muscle\_mesentery\_retractor nd\_mucin cnidocyte\_gastrula precursors\_NPC\_muscle\_tentacle\_retractor neuron\_Pou4\_FoxL2\_1 epidermis\_2 neuron\_Pou4\_FoxL2\_2 neuron\_Pou4\_FoxL2\_3 ectoderm ectoderm 1.2 1.8 1.8 1.4 1.6 1.0 1.2 1.6 1.0 1.4 TF expression TF expression

nvec\_dap\_15 Nvec\_vc1.1\_XM\_032371744.2 OG: Doublesex\_DM.HG1.12:DMRTA1/DMRTA2/DMRTB1 PFAM: DM/DMA dimont homer streme precursors\_PGC neuron\_Pou4\_FoxL2\_2 neuron\_Pou4\_FoxL2\_2 gastro\_circular\_muscle\_2 neuron\_Pou4\_FoxL2\_3 gastro\_circular\_muscle\_2 gland muscle\_mesentery\_retractor Precursors\_PGC muscle\_mesentery\_retractor neuron\_Pou4\_FoxL2\_1 reuron\_Pou4\_FoxL2\_glastro\_parietal\_muscle eneuron\_Pou4\_FoxL2\_2 muscle\_mesentery\_retractor Peuron\_Pou4\_FoxL2\_3\_neuron\_GATA\_Islet\_2 neuron\_GATA\_lslet\_2 gastro\_somatic\_gonad gastro\_circular\_muscle\_2 gland gastro\_circular\_muscle\_1 gastro\_parietal\_muscle precursors\_endoNPC \_\_euron\_GATA\_Islet\_2 gastro\_circular\_muscle\_1 oprecursors\_PGC gastro\_somatic\_gonad neuron\_GATA\_Islet\_1 —muscle\_tentacle\_retractor precursors\_endoNPC cnidocyte gastro\_somatic\_gonad neuron\_Pou4\_FoxL2\_1 cnidocyte digestive\_filaments\_1 gastro\_circular\_muscle\_1 gland\_mucin gastro\_IRF1\_2 epidermis\_2 gastro\_parietal\_muscle gastro\_IRF1\_2 precursors\_endoNPC muscle\_tentacle\_retractor neuron\_GATA\_Islet\_1 epidermis\_1 neuron\_Pou4\_FoxL2\_3 gastro\_IRF1\_2 epidermis\_2 0 \_neuron\_GATA\_lslet\_1 precursors\_NPC precursors\_NPC activity activity activity NPC\_2 cnidocyte\_gastrula -cnidocyte\_gastrula △cnidocyte\_gastrula neuronal gastrula digestive\_filaments\_3 epidermis\_1 digestive\_filaments\_1 NPC\_2 digestive\_filaments\_2 neuronal\_gastrula 片 neuronal\_gastrula gland\_mucin digestive\_filaments\_1 epidermis\_2 muscle\_tentacle\_retractor \_ecto\_aboral digestive\_filaments\_2 epidermis\_1 orecursors\_NPC digestive\_filaments\_2 digestive\_filaments\_3 digestive\_filaments\_3 EMS\_ecto\_boundary ecto\_aboral ▲ecto aboral EMS ecto\_pharynx -5.0ecto\_pharynx △EMS\_ecto\_boundary EMS\_ecto\_boundary ecto\_pharynx ectoderm

2.0

TF expression

2.5

1.0

1.5

2.0

TF expression

2.5

1.0

1.5

2.0

TF expression

2.5

1.5

1.0

nvec\_dap\_16 Nvec\_vc1.1\_XM\_032375228.2 (Rfx4) OG: RFX.HG1.3:like:RFX4/RFX6/RFX8 PFAM: RFX\_DNA\_binding archetype dimont GTTGCCAI gland\_mucin gland\_mucin 20 15 15 10 TF activity neuron\_GATA\_Islet\_2 cniclocyte\_gastrufa neuron\_Pou4\_FoxL2\_2 neuronal\_gastrula nidocyte EMS\_ecto\_boundary epidermis\_1 precursors\_endoNPC muscle\_tentacle\_retractor 3.0 2.0 2.5 1.5 2.0 2.5 3.0 1.0 1.5 1.0 TF expression TF expression homer streme gland\_mucin gland\_mucin 20 20 TF activity neuron\_GATA\_Islet\_2 neuron\_GATA\_Islet\_2 neuron Pou4 FoxL2 1 neuron\_Pou4\_FoxL2\_1 ectoderm neuron\_Pou4\_FoxL2\_3\_NPC\_1 ecto\_aborat\_neuron\_Pou4\_FoxL2\_3 NPC\_1

NPC\_2\_cnidocyte\_gastrula\_neuronal\_gastrula -digestive\_filaments\_1 ecto\_aboral\_cnidocyte\_gastrula -neuronal\_gastrula digestive\_filaments\_3 precursors\_PGC nidocyte EMS\_ecto\_boundary EMS\_ecto\_boundary epidermis\_1 muscle\_mesentery\_retractor epidermis\_1 astro\_circular\_muscle\_2 gastro\_somatic\_gonad <del>astro\_parietal\_mu</del>scle gastro\_IRF1\_ gastro\_circular\_muscle\_1 1.5 2.5 3.0 2.5 3.0 1.0 2.0 1.5 2.0 1.0 TF expression TF expression

nvec\_dap\_17 Nvec\_vc1.1\_XM\_001634111.3 PFAM: Forkhead archetype

TF expression

## OG: Forkhead.HG1.1:FOXA1/FOXA2/FOXA3/FOXB1/FOXB2/FOXD1/FOXD2/FOXD3/FOXD4/ dimont CAAACA JTAGGTTAG precursors\_NPC **△**gland\_mucin epidermis\_2 neuron\_Pou4\_FoxL2\_3 muscle\_mesentery\_retractor ecto\_aboral NPC\_2\_neuron\_GATA\_Islet\_2 gastro\_parietal\_muscle digestive\_filaments\_1 TF activity activity neuron\_Pou4\_FoxL2\_1 neuronal\_gastrula neuron\_Pou4\_FoxL2\_1 digestive\_filaments\_1 0 neuron\_GATA\_Islet\_1 nidocyte\_gastrula-neuron\_Pou4\_FoxL2\_2 neuron\_GATA\_Islet\_2 cnaocxte\_gastrula EMS\_ecto\_boundary -muscle\_mesentery\_retractor gastro\_circular\_muscle\_1 gastro\_circular\_muscle\_2 EMS\_ecto\_boundary\_digestive\_filaments\_3 precursors\_NPC **EMS** precursors\_PGC 1.2 1.0 1.2 1.4 1.6 1.6 1.0 TF expression TF expression homer streme aTAACI\_IA ecto\_aboral ecto\_aboral gland\_mucin gland\_mucin digestive\_filaments\_1 ectoderm NPC\_2neuron\_GATA\_Islet\_2 muscle\_mesentery\_retractor activity activity neuron\_Pou4\_FoxL2\_1 digestive\_filaments\_3 gastro\_circular\_muscle\_1 digestive\_filaments\_2 muscle\_tentacle\_retractor neuron\_Pou4\_FoxL2\_3 gastro\_circular\_muscle\_1 neuron\_Pou4\_Foxt2gastro\_circular\_muscle\_2\_\_\_epidermis\_2 gastro\_circular\_muscle\_2 neuron\_GATA\_Islet\_1\_muscle\_tentacle\_retractor neuron\_GATA\_Islet\_1 gland epidermis\_1 EMS gastro\_IRF1\_2 cnidocyte\_gastrula\_precursors\_NPC cnidocyte\_gastrula EMS precursors\_PGC cnidocy precursors\_endoNPC EMS\_ecto\_boundary EMS\_ecto\_boundary precursors\_NPC precursors\_PGC \_3 | gastro\_IRF1 1.6 1.2 1.6 1.0 1.0 TF expression

nvec\_dap\_21 Nvec\_vc1.1\_XM\_032362713.2 (Islet) OG: Homeodomains.HG2.19:ISL1/ISL2 PFAM: LIM/LIM/Homeodomain archetype dimont CasTTAsIG neuron\_GATA\_Islet\_2 gland\_mucin neuronal\_gastrula neuronal\_gastrula gland\_mucin NPC\_1 neuron\_GATA\_Islet\_1 neuron\_GATA\_Islet\_1 NPC\_2 digestive\_filaments\_1 activity TF activity neuron\_Pou4\_FoxL2\_3 ectoderm neuron\_Pou4\_FoxL2\_1 gastro\_parietal\_muscle neuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_2 muscle\_tentacle\_retractor 느 digestive\_filaments\_3 digestive\_filaments\_2 muscle\_mesentery\_retractor precursors\_NPC precursors\_NPC cnidocyte gastro\_IRF1\_2 epidermis\_2 precursors\_PGC 1.5 1.0 1.5 2.5 2.5 2.0 1.0 2.0 TF expression TF expression homer streme GCACT 10 neuron\_GATA\_Islet\_1 neuron\_GATA\_Islet\_1 ecto\_aboral neuron\_GATA\_Islet\_2 Ogastro\_circular\_muscle\_1 ecto\_aboral 2.5 digestive\_filaments\_1 neuron\_GATA\_Islet\_2 activity precursors\_endoNPC neuronal\_gastrula\_gland precursors\_endoNPC gastro\_somatic\_gonad\_digestive\_filaments\_2 muscle\_mesentery\_retractorepidermis\_1 neuron\_Pou4\_FoxL2\_1 \_gastro\_parietal\_muscle neuron\_Pou4\_FoxL2\_1 gastro\_somatic\_gonad \_gland\_mucin digestive\_filaments\_3 ectoderm neuron\_Pou4\_FoxL2\_2 neuron\_Pou4\_FoxL2\_3 neuron\_Pou4\_FoxL2\_2\_gastro\_IRF1\_2 EMS ecto\_baindary epidermis\_1 gastro\_circular\_muscle\_2 cnidocyte EMS\_ecto\_boundary-muscle\_tentacle\_retractor gastro\_IRF1\_2 ecto\_pharynx\_gastro\_circular\_muscle\_2 digestive\_filaments\_3 precursors\_NPC muscle\_tentacle\_retractor precursors\_NPC cnidocyte precursors\_PGC epidermis\_2 epidermis\_2 -5precursors\_PGC 2.0 1.0 2.5 1.0 2.0 1.5 1.5 2.5

TF expression

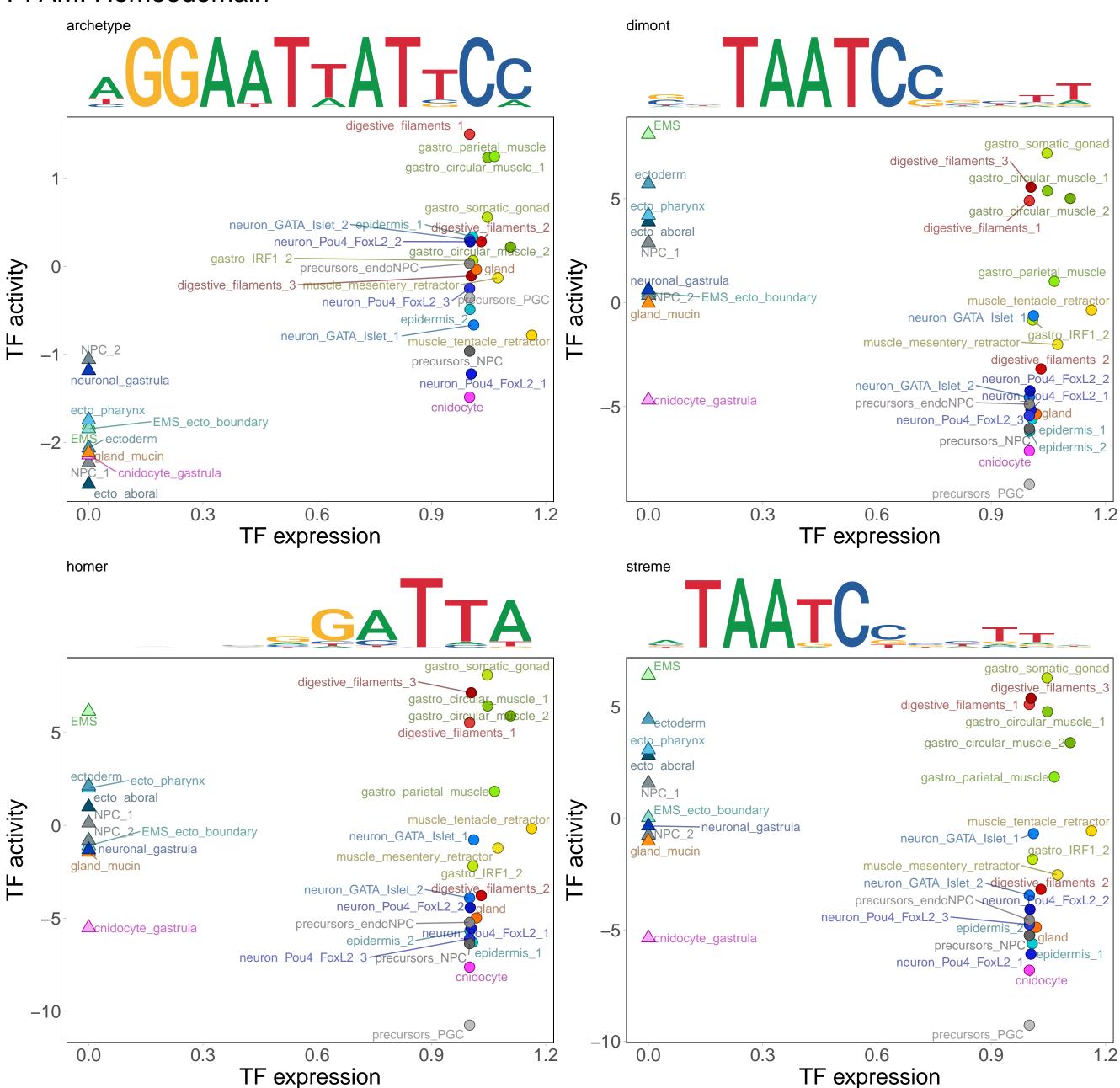
TF expression

nvec\_dap\_22 Nvec\_vc1.1\_XM\_032379400.2 OG: Homeodomains.HG2.76:like:DMBX1 PFAM: Homeodomain archetype dimont TAATCC\_\_\_ gastro\_somatic\_gonad gastro\_somatic\_gonad gastro\_circular\_muscle\_2 digestive\_filaments\_3 gastro\_circular\_muscle\_1 5 digestive\_filaments\_3 digestive\_filaments\_1 \_ecto\_pharynx ecto\_aboral ecto\_pharynx digestive\_filaments\_1 cto\_abora gastro\_parietal\_muscle gastro\_circular\_muscle\_1 neuronal\_gastrula TF activity TF activity NPC\_2 gastro\_circular\_muscle\_2 —NPC\_2 EMS\_ecto\_boundary -**G**gland\_mucin EMS\_ecto\_boundary-gastro\_parietal\_muscle neuron\_GATA\_Islet\_1 neuronal\_gastrula\_muscle\_tentacle\_retractor \_muscle\_mesentery\_retractor gastro\_IRF1\_2 muscle\_mesentery\_retractor\_neuron\_GATA\_Islet\_1 digestive\_filaments\_2 -digestive\_filaments\_2 neuron\_GATA\_Islet\_2 Acnidocyte\_gastrula\_neuron\_Pou4\_FoxL2\_1\_neuron\_GATA\_Islet\_2 neuron\_Pou4\_FoxL2\_2

cnidocyte gland

neuron\_Pou4\_FoxL2\_3 precursors\_NPC cnidocyte precursors\_QPC precursors\_endoNPC epidermis\_1 -10precursors\_PGC precursors\_PGC 1.2 1.3 1.2 1.0 1.1 1.4 1.1 1.3 1.4 1.0 TF expression TF expression homer streme gastro\_somatic\_gonad gastro\_somatic\_gonad EMS gastro\_circular\_muscle\_1 EMS gastro\_circular\_muscle\_1 digestive\_filaments\_3 gastro\_circular\_muscle\_2 ectoderm gastro\_circular\_muscle\_2 digestive\_filaments\_1 digestive\_filaments\_3 digestive\_filaments\_1 ecto\_aboral gastro\_parietal\_muscle ectoderm gastro\_parietal\_muscle TF activity activity \_muscle\_tentacle\_retractor △ecto\_pharynx EMS\_ecto\_boundary\_neuron\_GATA\_Islet\_1
\_\_\_\_muscle\_mesentery\_retractor ecto\_aboral neuron\_GATA\_Islet\_1 gland\_mucin neuronal\_gastrula EMS\_ecto\_boundarWPC\_2-neuronal\_gastrula gastro\_IRF1\_2/digestive\_filaments\_2 gland\_mucin muscle\_mesentery\_retractor -cnidocyte\_gastrula\_neuron\_GATA\_lslet\_2 neuron\_Pou4\_FoxL2\_2 gastro\_IRF1\_2 -muscle\_tentacle\_retractor neuron Pou4 Fox 2 precursors endoNPC cnidocyte\_gastrula\_digestive\_filaments\_2 -neuron\_Pou4\_FoxL2\_1 precursors\_NPC\_epidermis\_2 neuron\_Pou4\_FoxL2\_1 neuron\_GATA\_Islet\_2
neuron\_Pou4\_FoxL2\_3 precursors\_endoNPC cnidocyte epidermis\_1 epidermis\_1 epidermis\_2 precursors\_PGC -10precursors\_NPC precursors\_PGC 1.4 1.2 1.3 1.4 1.0 1.2 1.3 1.1 1.1 1.0 TF expression TF expression

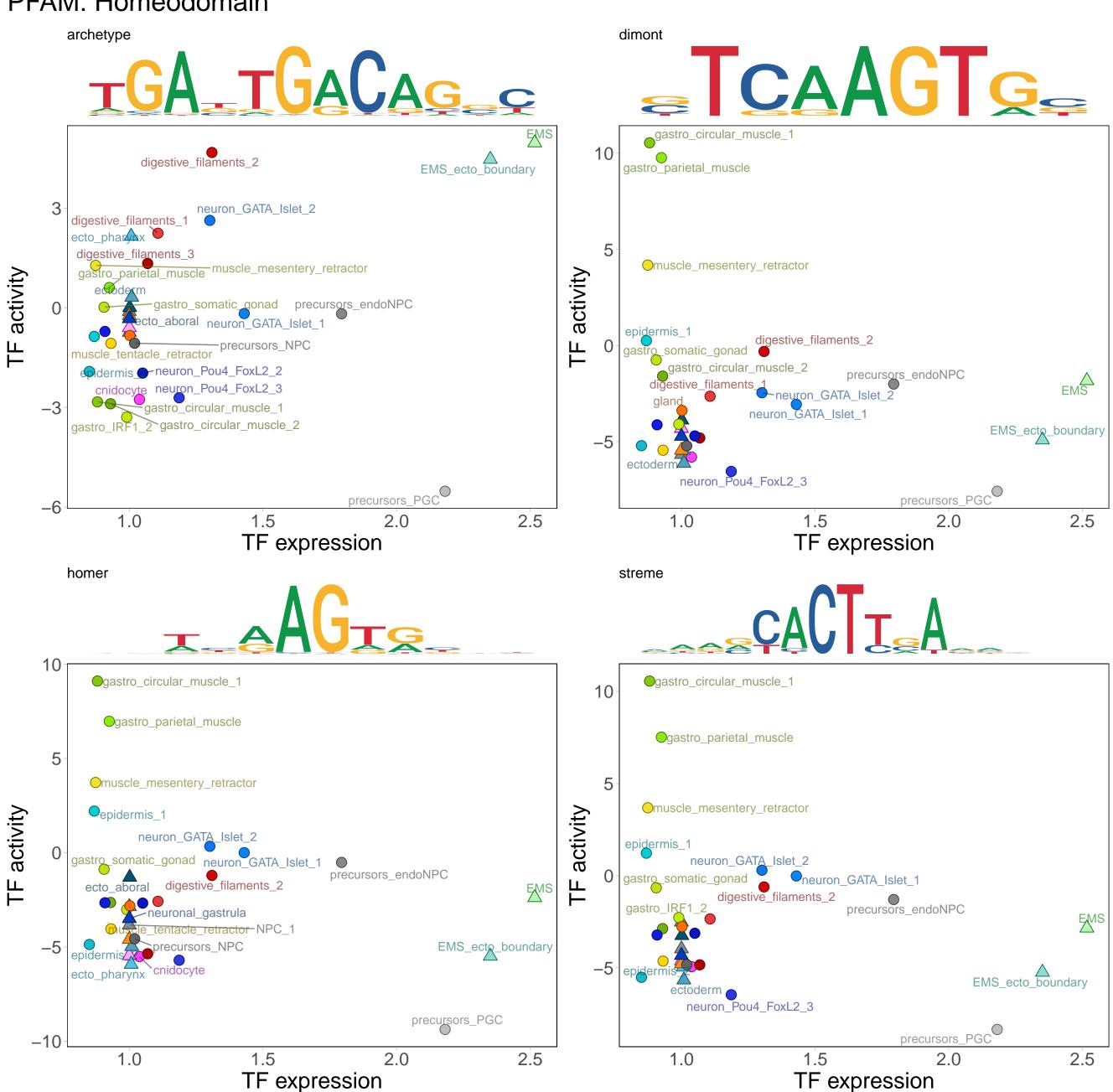
nvec\_dap\_24 Nvec\_vc1.1\_XM\_001630676.3 OG: Homeodomains.HG2.68:like:ARX/OTP PFAM: Homeodomain archetype digestive\_filaments\_1



nvec\_dap\_25

Nvec\_vc1.1\_XM\_032373618.2 (Nkx-2.2a)

OG: Homeodomains.HG1.19:NKX2-1/NKX2-2/NKX2-3/NKX2-4/NKX2-5/NKX2-6/NKX2-8/I PFAM: Homeodomain

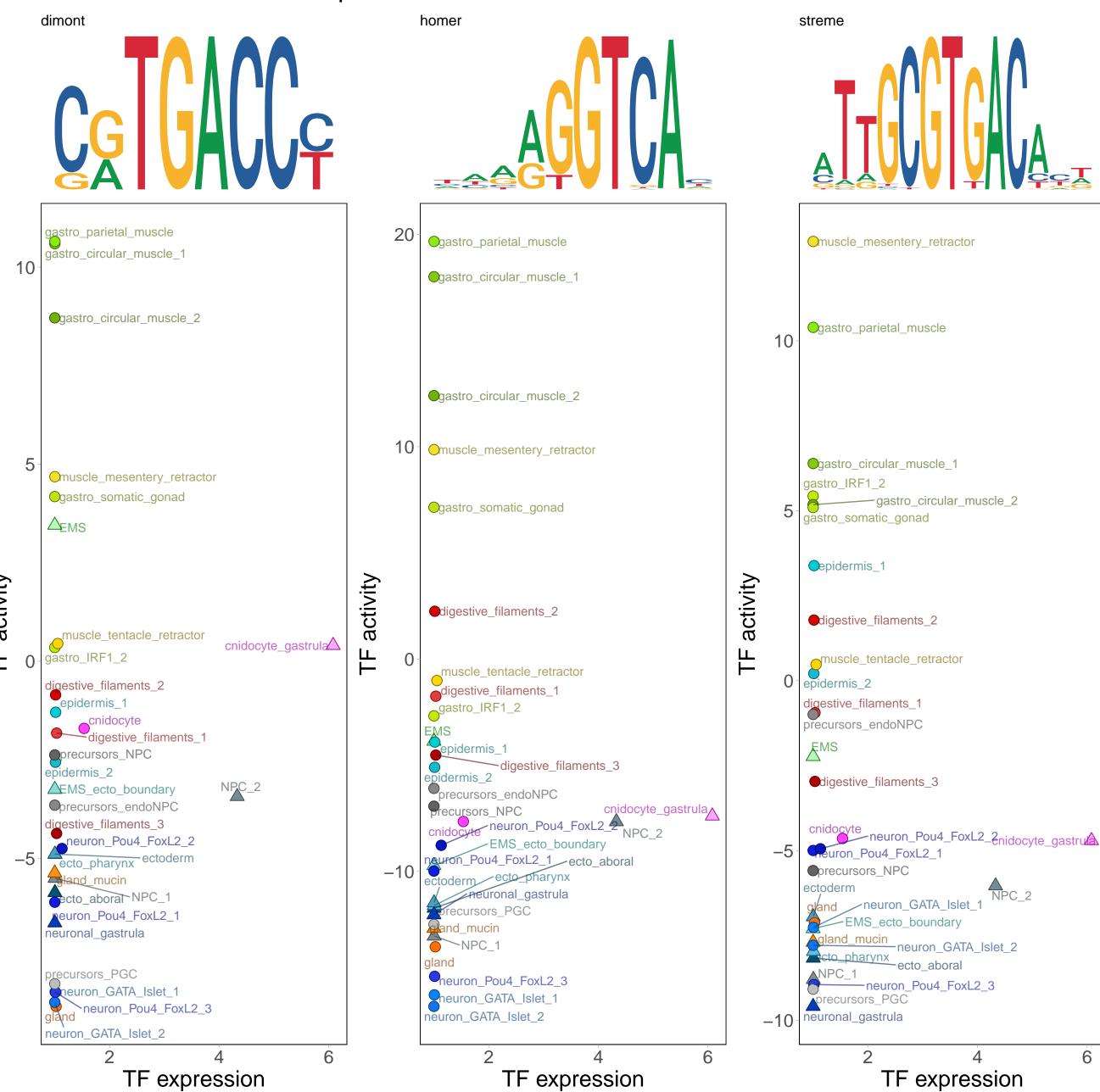


nvec\_dap\_27 Nvec\_vc1.1\_2

Nvec\_vc1.1\_XM\_001634328.3 (NR12)

OG: zf-C4\_Nuclear\_receptors.HG1.24:like:NR2F1/NR2F2/NR2F6

PFAM: zf-C4/Hormone\_recep



nvec\_dap\_29 Nvec\_vc1.1\_XM\_032381270.2 OG: zf-C2H2.HG7.4:SCRT1/SCRT2 PFAM: zf-C2H2/zf-C2H2/zf-C2H2/zf-C2H2 archetype dimont A\_ACGCCAACAGGT 5.0 EMS cnidocyte\_gastrula oprecursors\_PGC gastro\_circular\_muscle\_1 5.0 2.5 gastro\_circular\_muscle\_2 gastro\_parietal\_muscle NPC\_2 EMS\_ecto\_boundary TF activity activity gland\_mucin neuron\_Pou4\_FoxL2\_2 muscle\_tentacle\_retractor gastro\_somatic\_gonac 0.0 neuronal\_gastrula 브 cto\_pharynx 0.0 digestive\_filaments\_3 neuron\_Pou4\_FoxL2\_2 epidermis\_1 digestive\_filaments\_ ecto\_aboral neuronal\_gastrulgastro\_parietal\_muscle\_gastro\_circular\_muscle\_2 **▲**ectoderm neuron\_Pou4\_FoxL2\_3 -2.5gastro\_circular\_muscle\_1 **△**ecto\_pharynx ·EMS\_ecto\_boundary ectoderm ecto\_aboral -5.0precursors PGC 0.5 1.5 1.5 0.0 0.0 0.5 1.0 TF expression TF expression homer streme △cnidocyte\_gastrula △cnidocyte\_gastrula 15 cnidocyte cnidocyte 15 NPC\_2 NPC\_2 10 activity precursors\_NPC 10 precursors NPC neuron\_Pou4\_FoxL2\_2 5 neuronal\_gastrula neuron Pou4 FoxL2 neuron\_Pou4\_FoxL2\_1 neuronal\_gastrula NPC\_1 gland\_mucin NPC\_1 precursors\_endoNPC precursors\_endoNPC EMS\_ecto\_boundary muscle\_mesentery\_retractor gland\_mucin ecto\_aboral muscle\_mesentery\_retracto neuron\_Pou4\_FoxL2\_3 EMS\_ecto\_boundary precursors\_PGC gastro\_circular\_muscle\_ ecto\_pharynx -ecto\_aboral recursors PGC gland neuron\_Pou4\_FoxL2\_3 ecto\_pharynx ectoderm gastro circular muscle 1 neuron\_GATA\_Islet\_2 ectoderm **EMS** neuron\_GATA\_Islet 2 digestive\_filaments\_3 digestive filaments 2 epidermis\_2 neuron\_GATA\_Islet\_1 digestive\_filamentsrdn\_GATA\_Islet\_1 0.0 1.5 0.5 0.0 0.5 1.0 1.5 TF expression TF expression

nvec\_dap\_30 Nvec\_vc1.1\_XM\_001634505.3 (FoxA) OG: Forkhead.HG1.1:FOXA1/FOXA2/FOXA3/FOXB1/FOXB2/FOXD1/FOXD2/FOXD3/FOXD4/ PFAM: Forkhead\_N/Forkhead/HNF\_C archetype dimont **EGTASACA** 10 digestive\_filaments\_2 digestive\_filaments\_2 digestive\_filaments\_3 digestive\_filaments\_3 EMS\_ecto\_boundary ▲EMS\_ecto\_boundary ecto\_pharynx TF activity ecto\_pharynx neuron\_GATA\_Islet\_2 digestive\_filaments\_1 gastro\_somatic\_gonad gastro\_somatic\_gonad digestive\_filaments\_1 neuron\_GATA\_Islet\_2 gastro\_parietal\_muscle neuron\_Pou4\_FoxL2\_1 -neuron\_GATA\_Islet\_1 neuron\_GATA\_Islet\_1 gastro\_IRF1\_2 -5oprecursors\_PGC precursors\_PGC 2 6 6 TF expression TF expression homer streme 10 digestive\_filaments\_3 digestive\_filaments\_3 EMS\_ecto\_boundary digestive\_filaments\_2 ecto\_pharynx 10 digestive\_filaments\_2 5 △EMS\_ecto\_boundary ecto\_pharynx TF activity digestive\_filaments\_1 gland TF activity toderm gastro\_somatic\_gonad neuron\_GATA\_Islet\_2 digestive\_filaments\_1 -neuron\_Pou4\_FoxL2\_3 gastro\_somatic\_gonad NPC\_2 cnidocyte neuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_3 neuron\_GATA\_Islet\_2 0 -muscle\_tentacle\_retractor neuronal\_gastrula neuron\_Pou4\_FoxL2\_1 —precursors\_endoNPC gland\_mucin cnidocyte epidermis\_1 muscle\_mesentery\_retractor gastro\_circular\_muscle\_2 gastro\_parietal\_muscle

nvec\_dap\_33 Nvec\_vc1.1\_XM\_001623467.3 OG: bZIP.HG1.12:CREBZF PFAM: bZIP\_2 archetype dimont <u>TGACGTCA</u> gastro\_IRF1\_2 2 muscle\_mesentery\_retractor digestive\_filaments\_2 gastro\_parietal\_muscle\_digestive\_filaments\_2 neuron\_GATA\_Islet\_1 epidermis\_1 neuron\_GATA\_Islet\_2 epidermis\_1 EMS gastro\_circular\_muscle\_1 neuron\_Pou4\_FoxL2\_2 neuron\_GATA\_Islet\_2 precursors\_PGC TF activity activity gastro\_somatic\_gonad neuron\_Pou4\_FoxL2\_2 cnidocyte\_gastrutagestive\_filaments\_3 neuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_1 gastro\_somatic\_gonadneuron\_Pou4\_Fo<del>@2\_3</del>\_precursors\_endoNPC digestive\_filaments\_1 digestive\_filaments\_3 느 gastro\_parietal\_muscle-epidermis\_2 gastro\_circular\_muscle\_2 precursors\_NPC \_\_ecto\_pharynx\_muscle\_tentacle\_retractor neuronal\_gastrula precursors\_NPC gastro\_circular\_muscle\_2 ecto\_aborak 5 TF expression TF expression homer streme ▲TGACGTCA<sub>E</sub> gastro\_IRF1\_2 neuron\_GATA\_Islet\_1 neuron\_GATA\_Islet\_2 ·digestive\_filaments\_1 EMS\_ecto\_boundary neuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_2 activity \_\_gland\_mucin 0 gastro\_somatic\_gonad epidermis\_1 Omuscle\_mesentery\_retractor neuron\_Pou4\_FoxL2\_3 cnidocyte\_gastrula digestive\_filaments\_2 gland muscle\_tentacle\_retractor neuron\_Pou4\_FoxL2\_2 muscle\_tentacle\_retractor gastro\_circular\_muscle precursors\_endoNPC precursors\_PGC ungestive\_filaments\_1 neuron\_Pou4\_FoxL2\_1 EMS\_ecto\_boundary precursors\_PGC gastro\_circular\_nuation\_Pou4\_FoxL2\_3 digestive\_filaments\_3 cnidocyte\_gastrula gastro\_circular\_muscle\_2 ecto\_pharynx precursors\_endoNPC ecto\_pharynx epidermis\_2 NPC\_1 ecto\_aboral NPC\_1 ectoderm epidermis\_2 ectoderm -4 cnidocyte ecto\_aboral precursors\_NPC precursors\_NPC 5 TF expression TF expression

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OG: HLH.HG1.15:like:TFAP4
PFAM: HLH

archetype

CAGGGTG

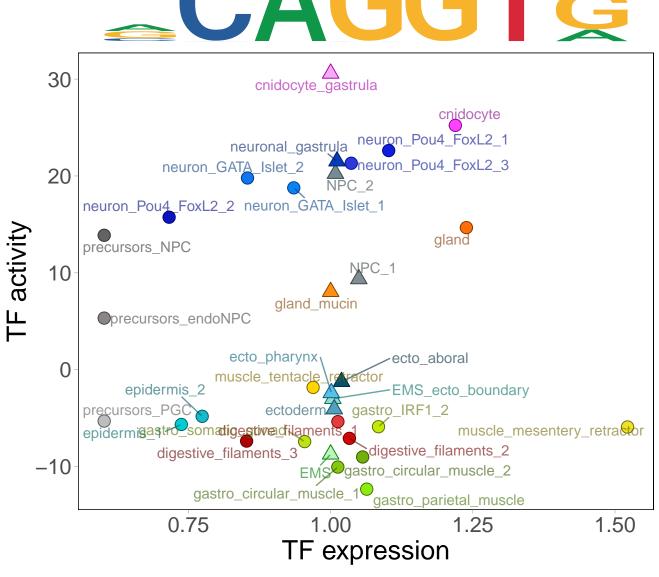
cnidocyte\_gastrula

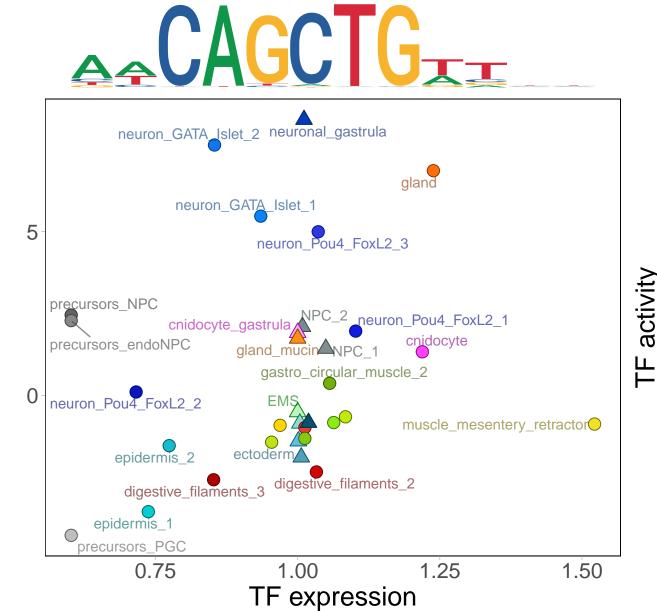
cnidocyte

neuron\_Pou4\_FoxL2\_1

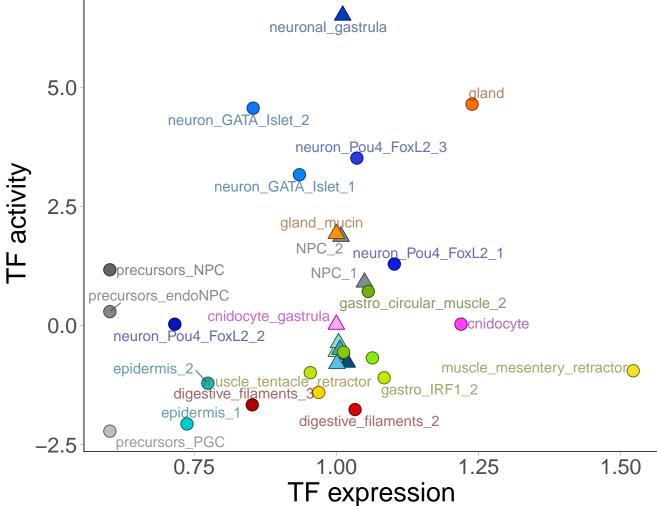
homer

activity

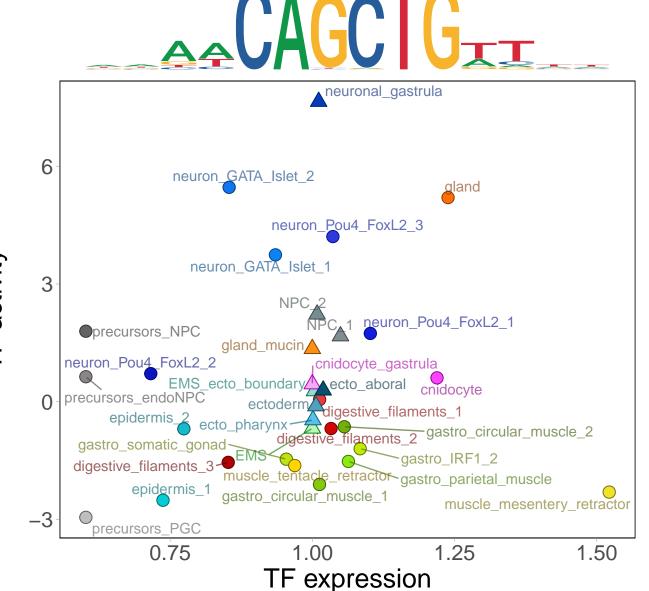








streme



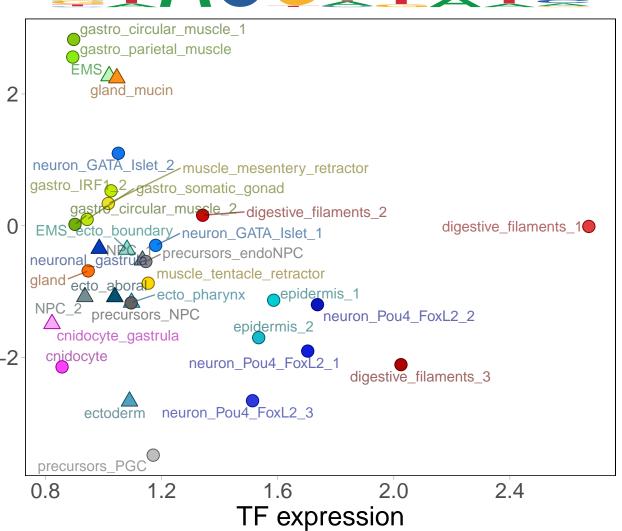
nvec\_dap\_35 Nvec\_vc1.1\_XM\_032367127.2 OG: bZIP.HG2.10:DBP/HLF/TEF PFAM: bZIP\_2 archetype dimont aTIACGT RAIS TSACSCTSA 5.0 gastro\_IRF1\_2 5.0 muscle\_mesentery\_retractor precursors\_PGC digestive\_filaments\_2 gastro\_parietal\_muscle neuron\_GATA\_Islet\_1 cnidocyte\_gastrula—EMS\_ecto\_boundary EMS\_ecto\_boundarx digestive\_filaments\_3 TF activity TF activity epidermis\_1 gland\_mucin\_gastro\_somatic\_gonad muscle\_mesentery\_retractorEMS digestive\_filaments\_1 gastro\_IRF1 gastro\_circular\_muscle\_1 digestive\_filaments\_2 cnidocyte\_gastrulagastro\_parietal\_muscle\_astro\_somatic\_gonad\_precursors\_endoNPC cnidocyte\_gastro\_circular\_muscle\_1 muscle\_tentacle\_retractor recursors\_NPC epidermis\_1 neun\_Pou4\_FoxL2\_2 GATA\_Isla neuron\_Pou4\_FoxL2\_3 gastro\_circular\_muscle\_2 ecto\_pharynx epidermis\_2 precursors\_NPC neuron\_Pou4\_FoxL2\_1 epidermis\_2 \_\_\_gland\_mucin digestive\_filaments\_3 -2.5neuronal\_gastrula muscle\_tentacle\_retractor neuron\_Pou4\_FoxL2\_3 precursors\_PG ecto\_aboral -5.01.50 1.25 2.00 1.25 1.00 1.75 1.50 1.75 2.00 1.00 TF expression TF expression homer streme GACG SAT gastro\_IRF1\_2 gastro\_IRF1\_2 EMS\_ecto\_boundary 4 gastro\_parietal\_muscle\_digestive\_filaments\_2 epidermis\_1 neuron\_GATA\_Islet\_1 2 precursors\_PGC muscle\_mesentery\_retractor activity activity gastro\_circular\_muso@gastro\_somatic\_gonad digestive\_filaments\_2 cnidocyte\_gastrula gastro\_circular\_muscle\_2 digestive\_filaments\_3 gland\_mucin acto\_pharynx\_digestive\_filaments\_1 `EMS\_ecto\_boundary epidermis\_2 gastro\_circular\_muscle\_1\_neuron\_Pou4\_FoxL2\_1 NPC gland\_mucin neuron\_Pou4\_Foll\_2 neuron\_GATA\_Islet\_2 ectopharynx muscle\_mesentery\_retractor precursors\_endoNPC precursors\_NPC gastro\_circular\_muscle\_2 cnidocyte muscle\_tentacle\_retractor\_ neuronal\_gastrula neuron\_Pou4\_FoxL2\_3 neuronal\_gasrula ecto\_aboral NPC\_1 epidermis\_2 ectoderm NPC 1 -2ecto\_aboral precursors\_NPC ectoderm 1.25 1.50 1.75 2.00 1.25 1.50 1.75 1.00 1.00 2.00 TF expression TF expression

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OG: HLH.HG1.19:HELT
PFAM: HLH/Hairy\_orange

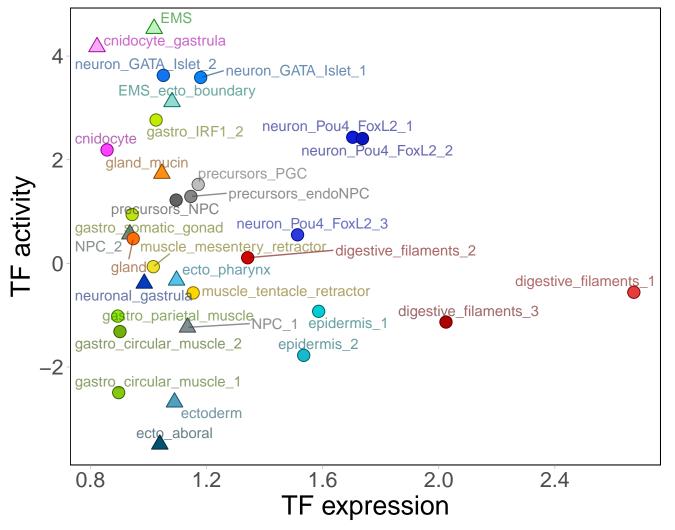
archetype

ACGTCT

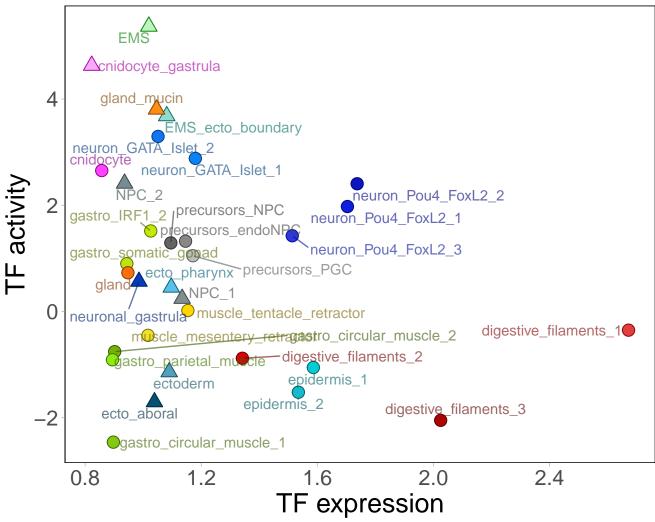
homer



## TCACGTGA

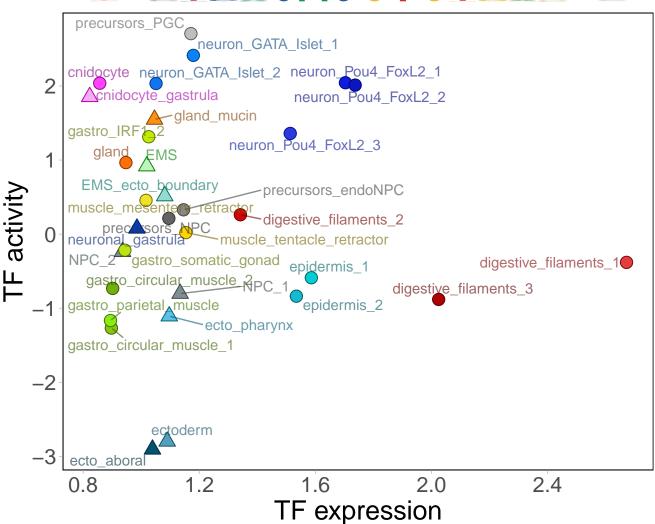


## CACCTCAC



## STCACGTGAS

streme



nvec\_dap\_37 Nvec\_vc1.1\_XM\_032381586.2 OG: zf-C2H2.HG2.21:KLF5 PFAM: zf-C2H2/zf-C2H2/zf-C2H2 archetype dimont SCACACCC ECCACECCE 10 6 gastro\_circular\_muscle\_1 gastro\_IRF1\_2 gastro\_circular\_muscle\_1 gastro\_circular\_muscle\_2 gastro\_IRF1\_2 gastro\_circular\_muscle\_2 cnidocyte\_gastrula muscle\_tentacle\_retractor cnidocyte\_gastrula TF activity TF activity gastro\_somatic\_gonad\_gastro\_parietal\_muscle digestive\_filaments\_3 muscle\_tentacle\_retractor estive\_filaments\_1 EMS\_ecto\_boundary gastro\_parietal\_muscle ectoderm digestive\_filaments\_2 EMS\_ecto\_boundary ectoderm epidermis\_2 -neuron\_Pou4\_FoxL2\_2 epidermis\_2 —digestive\_filaments\_3 precursors\_NPC digestive\_filaments\_1 neuron\_Pou4\_FoxL2\_3 digestive\_filaments\_2 -5Oneuron\_GATA\_Islet\_2 neuron\_GATA\_Islet\_2 2 6 6 TF expression TF expression homer streme 10 gastro\_IRF1\_2 Ogastro\_circular\_muscle\_1 cnidocyte\_gastrula gastro\_circular\_muscle\_1 activity cnidocyte\_gastrula gastro\_circular\_muscle\_2 gastro\_circular\_muscle\_2 muscle\_tentacle\_retractor gastro\_somatic\_gonad muscle\_tentacle\_retractor gastro\_parietal\_muscle precursors\_PGC epidermis\_1 gastro\_somatic\_epidermis\_1
cnidocyte epidermis\_2 EMS\_ecto\_boundary
NPC\_2 ecto\_aboral gastro\_parietal\_muscle ectoderm newon\_Pou4\_Food 2e 1mesentery\_ atractor neuron\_GATA\_Islet\_1 EMS\_ecto\_boundary ecto\_aboral ectoderm precursors\_PGE digestive\_filaments\_3 neurdigastivastifilariants epidermis\_2 —digestive\_filaments\_2 gland digestive\_filaments\_1 precursors\_NPC neuron\_Pou4\_FoxL2\_3 digestive\_filaments\_2 neuron\_GATA\_Islet\_2 neuron\_GATA\_Islet\_2 6 6 TF expression TF expression

nvec\_dap\_39 Nvec\_vc1.1\_XM\_032381562.2 OG: zf-C2H2.HG2.18:like:KLF5/KLF6/KLF7 PFAM: zf-C2H2/zf-C2H2/zf-C2H2 archetype dimont RCCACRCCCA SCACCOCC C 10 gastro\_IRF1\_2 2 gastro\_circular\_muscle\_1 cnidocyte\_gastrula muscle\_tentacle\_retractor gastro\_circular\_muscle\_2 TF activity 0 0 precursors\_NPC muscle\_mesentery\_retractor gastro\_circular\_muscle\_2 ecto\_pharyn epidermis\_2 neuron\_Pou4\_FoxL@gestive\_filaments\_2 digestive\_filaments\_3 NPC\_2 precursors\_PGC -5neuron\_GATA\_Islet\_2 0.75 1.50 1.50 0.50 1.25 0.50 0.75 1.25 1.00 1.00 TF expression TF expression homer streme CCAC CCC 10 gastro\_IRF1\_2 gastro\_circular\_muscle\_1 \_\_\_\_\_cnidocyte\_gastrula △cnidocyte\_gastrula gastro\_circular\_muscle\_1 activity activity gastro\_circular\_muscle\_2 EMS\_ecto\_boundary cnidocyte muscle\_tentacle\_retractor epidermis\_1 gastro\_parietal\_muscle\_pidermis\_ precursors PGC neuron\_Pou4\_FoxL2\_1 EMS\_ecto\_boundary 0 0 NPC\_2 NPC\_2 neuronal\_gastrula digestive\_filaments\_3 digestive\_filaments\_1 precursors\_NPC neuron\_Pou4\_FoxL2\_ digestive\_filaments\_2 digestive\_filaments\_1 precursørs\_endoNPC precursors\_NPC digestive\_filaments\_2 -5neuron\_GATA Islet 1.50 0.50 1.25 0.50 0.75 0.75 1.25 1.50 1.00

TF expression

TF expression

nvec\_dap\_40 Nvec\_vc1.1\_XM\_048732532.1 OG: Ets.HG1.8:ETS1/ETS2 PFAM: Ets archetype dimont <u>ACTTCCGGT</u> 10 gastro\_IRF1\_2 gastro\_IRF1\_2 EMS 10 EMS\_ecto\_boundary gastro\_somatic\_gonad gastro\_parietal\_muscle gastro\_circular\_muscle\_1 activity gastro\_circular\_muscle\_1 TF activity Ogastro\_circular\_muscle\_2 gastro\_circular\_muscle\_2 digestive\_filaments\_2 digestive\_filaments\_1 precursors\_PG@nuscle\_mesentery\_retractor digestive\_filaments\_2 digestive\_filaments\_1 precursors\_endoNPC muscle\_mesentery\_retractor\_digestive\_filaments\_3 neuron\_GATA\_Islet\_2 epidermis\_1 neuronal\_gastrula epidermis\_2 muscle\_tentacle\_retractor neuron\_Pou4\_FoxL2\_3 neuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_3 precursors\_NPC NPC\_1 ectoderm ectoderm 1.25 1.75 1.25 0.75 1.00 1.50 1.00 1.50 0.75 TF expression TF expression homer streme 15 15 gastro\_IRF1\_2 EMS\_ecto\_boundary 10 10 EMS\_ecto\_boundary gastro\_circular\_muscle\_1 activity gastro\_parietal\_muscle gastro\_somatic\_gonad activity gastro\_somatic\_gonad gastro\_circular\_muscle\_1 gastro\_circular\_muscle\_2 \_gastro\_circular\_muscle\_2 neuron\_GATA\_Islet\_1 digestive\_filaments\_2 digestive\_filaments\_2 digestive ors\_PGC neuron\_GATA\_Islet\_1 digestive\_fila

precursors\_endoNPC ecto\_pharynx digestive\_filaments\_3 precursors\_PGC digestive\_filaments\_1 neuronal\_gastrula neuron\_GATA\_lslet\_2 precursors\_endoNPC\_ecto\_pharynx muscle\_mesentery\_retractor\_digestive\_filaments\_3 cnidocyte\_gland\_neuron\_Poud\_Fox1\_3\_2 muscle\_mesentery\_retractoneuron\_GATA\_lslet\_2 neuron\_Pou4\_FoxL precursors Pou4 FoxL2\_3
precursors Pou4 FoxL2\_1 ecto\_aboral codocyte\_gastrelad\_mucin epidermis\_2 precursors\_NPC gland \_ecto\_aboral NPC\_1

ectoderm

1.00

0.75

1.25

TF expression

1.50

1.75

0.75

NPC\_1 neuron\_Pou4\_FoxL2\_3

1.00

ectoderm

1.50

1.25

TF expression

1.75

1.75

nvec\_dap\_41 Nvec\_vc1.1\_XM\_001634160.3 OG: Homeodomains.HG2.57:RAX/RAX2 PFAM: Homeodomain/OAR archetype dimont S\_TAATIA\_\_\_ ecto\_aboral ecto\_aboral neuron\_GATA\_Islet\_2 NPC\_1 epidermis\_1 10 gland\_mucin TF activity TF activity ecto\_pharynx\_neuronal\_gastrula neuron\_GATA\_Islet\_1 neuron\_Pou4\_FoxL2\_3 neuron\_Pou4\_FoxL2\_3 neuronal\_gastrula digestive\_filaments\_1 gastro\_circular\_rouscle\_2 EMS\_ecto\_boundameuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL22 digestive\_filamentdig ive\_filaments\_3 neuron\_GATA\_Islet\_2 gland\_mucin neuron\_Pou4\_incodc2e\_1mesentery\_retract EMS' neuron\_GATA\_Islet\_1 muscle\_tentacle\_retractor\_gland precursors\_NPC gastro\_somatic\_gonad precursors\_endoNPC gastro\_circular\_muscle\_1 \cnidocyte EMS\_ecto\_boundary-gastro\_somatic\_gonad\_precursors\_NPC cnidocyte\_gastrula gastro\_IRF1\_2 gastro\_IRF1\_2 digestive\_filaments\_3 ecto\_pharynx -10digestive\_filaments\_2\_precursors\_endoNPC precursors\_PGC precursors\_PGC 1.4 1.2 1.0 1.2 1.4 1.0 TF expression TF expression homer streme 10 ecto\_pharynx\_neuronal\_gastrula neuron\_Pou4\_FoxL2\_3 10 gland\_mucin NPC\_2 gland\_mucin neuron\_Pou4\_FoxL2\_1 activity TF activity ecto\_pharynx neuron\_Pou4\_FoxL2\_2\_digestive\_filaments\_1 neuron\_GATA\_Islet\_2 digestive\_filaments\_3 NPC\_2 neuronal\_gastrula digestive\_filaments\_2 muscle\_tentacle\_retractor digestive\_filaments\_1 epidermis\_2 epidermis\_2 片 EMS\_ecto\_boundary —neuron\_Pou4\_FoxL2\_3 astro\_parietal\_muscle neuron\_Pou4\_FoxL2\_1 EMS neuron\_GATA\_Islet\_2 cnidocyte\_gatro\_circular\_muscle\_2 precursors\_endoNPC \neuron\_GATA\_Islet\_1 neuron\_Pou4\_FoxL2 epidermis 1 gastro\_somatic\_gonad muscle\_mesentery\_retractor neuron\_GATA\_Islet\_1 gastro\_circular\_muscle\_1 gastro\_IRF1\_2 gastro\_parietal\_muscle gastro\_somatic\_gonad gastro\_circular\_muscle gastro\_muscle mesentery retract cnidocyte muscle\_mesentery\_retractor -10gastro\_IRF1\_2 precursors\_PGC precursors\_PGC 1.4 1.2 1.4 1.0 1.0 TF expression TF expression

nvec\_dap\_47 Nvec\_vc1.1\_XM\_032379688.2 (NVHD033-ANTP) OG: Homeodomains.HG1.39:BARHL1/BARHL2 PFAM: Homeodomain archetype dimont 15 Ogastro\_parietal\_muscle ecto aboral gastro\_circular\_muscle\_1 gastro\_circular\_muscle\_2 10 gland\_mucin-neuron\_GATA\_Islet\_1 neuronal\_gastrula gastro\_somatic\_gonad -ectoderm TF activity activity muscle\_mesentery\_retractor neuron\_GATA\_Islet\_2 precursors\_endoNPC digestive\_filaments\_1 digestive\_filaments\_1 gastro\_IRF1\_2 digestive\_filaments\_2 ш precursors\_endoNPC EMS\_ecto\_boundary neuron\_GATA\_Islet\_2 neuron\_Pou4\_FoxL2\_3 EMS\_ecto\_boundary epidermis\_2 cnidocyte\_gastrula neuron\_Pou4\_FoxL2\_3 and\_mucin-NPC\_1 precursors\_NPC ecto\_pharynx ecto\_aboral gastro\_IRF1\_2 precursors\_PGC ectoderm 1.50 1.75 2.00 2.2 1.50 1.75 2.00 2.25 1.25 1.25 1.00 1.00 TF expression TF expression homer streme ▲ecto\_aboral \_ecto\_aboral ectoderm neuronal\_gastrula gland\_mucin gland\_mucin activity activity neuronal\_gastrula NPC\_2 digestive\_filaments\_1 NPC\_2\_ecto\_pharynx neuron\_GATA\_Islet\_2 euron\_Pou4\_FoxL2\_3 neuron\_GATA\_Islet\_2 neuron\_GATA\_Islet\_1 neuron\_Pou4\_FoxL2\_3 digestive\_filaments\_1 ecto\_pharynx\_gastro\_parietal\_muscle neuron\_GATA\_Islet\_1 muscle\_mesentery\_retractor EMS\_ecto\_boundary precursors\_NPC neuron\_Pou4\_FoxL2\_1 digestive\_filaments\_2 EMS precursors\_endoNPC cnidocyte EMS\_ecto\_boundary cnidocyte muscle\_mesentery\_retractor gastro\_IRF1\_2 gastro\_IRF1\_2 Oprecursors\_PGC Oprecursors\_PGC 2.25 1.25 2.00 1.25 1.50 1.75 2.00 1.50 1.75 1.00 2.2 1.00 TF expression TF expression

nvec\_dap\_51 Nvec\_vc1.1\_XM\_001628087.3

OG: Doublesex\_DM.HG1.12:DMRTA1/DMRTA2/DMRTB1 PFAM: DM/DMA dimont homer streme gastro\_circular\_muscle\_2 gastro\_circular\_muscle\_2 gastro\_circular\_muscle\_2 gastro\_parietal\_muscle gastro\_circular\_muscle\_1 gastro\_circular\_muscle\_1 4 gastro\_somatic\_gonad 2.5 gastro\_circular\_muscle\_1 neuron\_Pou4\_FoxL2\_2 muscle\_mesentery\_retractor neuron\_Pou4\_FoxL2\_2 neuron\_GATA\_Islet\_2 \_muscle\_mesentery\_retractor neuron\_Pou4\_FoxL2\_1 gastro\_somatic\_gonad muscle\_mesentery\_retractor gastro\_somatic\_gonad neuron\_Pou4\_FoxL2\_1 neuron\_Pou4\_FoxL2\_2 digestive\_filaments\_1 precursors\_PGC precursors\_endoNPC precursors\_PGC neuron\_Pou4\_FoxL2\_1 -neuron\_GATA\_Islet\_2 gland precursors\_endoNPC gastro\_IRF1\_2 0.0 0.0 gastro\_IRF1 2 neuron\_Pou4\_FoxL2\_3 activity precursors\_endoNPC activity activity neuron\_Pou4\_FoxL2\_3 digestive\_filaments\_1 neuron\_GATA\_Islet\_2 ·muscle\_tentacle\_retractor neuron\_GATA\_Islet\_1 neuron\_GATA\_Islet\_1 epidermis\_1 muscle\_tentacle\_retractor neuron\_Pou4\_FoxL2\_3 느 —neuron\_GATAmusiele\_tentacle\_retractor NPC 2 gland\_mucin cnidocyte digestive\_filaments\_1 cnidocyte gastro\_IRF1\_2 precursors\_PGC epidermis\_1 Depidermis\_1 NPC\_2 cnidocyte\_gastrula neuronal\_gastrula cnidocyte\_gastrula NPC\_2 destive\_filaments\_3 epidermis\_2 -epidermis\_2 -epidermis\_2 cnidocyte\_gastrula drestive\_filaments\_3 digestive\_filaments\_2 digestive\_filaments\_2 precursors\_NdR@stive\_filaments\_2 neuronal\_gastrula precursors\_NPC gland\_mucin NPC\_1 precursors\_NPC digestive\_filaments\_3 neuronal\_gastrula -2.5▲ecto\_aboral ecto aboral ecto\_aboral EMS\_ecto\_boundary EMS ecto boundary EMS\_ecto\_boundary **△**ecto\_pharynx **△**ecto\_pharynx -5.0ectoderm **\_**ectoderm **\_**ectoderm ecto\_pharynx -5.0TF expression

TF expression

TF expression

nvec\_dap\_52 Nvec\_vc1.1\_XM\_032385745.2 (Prdm14d) OG: zf-C2H2.HG19.1:PRDM14 PFAM: zf-C2H2/zf-C2H2 archetype dimont **agCGCAgCCC** △<sup>EMS</sup> ▲gland\_mucin 2 Omuscle\_tentacle\_retractor 2 gastro\_IRF1\_2 precursors\_endoNPC neuronal\_gastrula, neuron\_Pou4\_FoxL2\_ cnidocyte<u>gastrula</u> muscle\_tentacle\_retractor gastro\_circular\_muscle\_2 gastro\_circular\_muscle\_2 TF activity digestive\_filaments\_3 gastro\_somatic\_gonad epidermis\_2\_neuron\_Pou4\_FoxL2\_3 igestive\_filaments\_2 neuron\_Pou4\_FoxL2\_1 ectoderm\_gland\_mucin\_neuron\_Pou4\_FoxL2\_2 IS\_ecto\_boundary\_precursors\_NPC NPC\_1 digestive\_filaments\_1 muscle\_mesentery\_retractor\_ecto\_pharynx NPC\_2 neuronal\_gastrula \_ectoderm gastro\_circular\_muscle\_1 cnidocyte ecto\_pharynx EMS\_ecto\_boundary neuron\_GATA\_Islet\_1 neuron\_Pou4\_FoxL2\_1 craidocyte\_gastroleauron\_GATA\_Islet\_2 ecto\_aboral\_gland\_gastro\_circular\_muscle\_1 cnidocyte gastro\_parietal\_muscle epidermis\_1 \_\_neuron\_GATA\_lslet\_2 precursors\_PGCO gastro\_IRF1\_2 epidermis\_2 <u>gastro\_parietal\_muscle</u>\_gastro\_somatic\_gonad precursors\_PGC muscle\_mesentery\_retractor digestive\_filaments\_3 precursors\_endoNPC digestive\_filaments\_1 precursors\_NPC digestive\_filaments\_2 epidermis\_1 1.2 1.3 1.4 1.1 1.2 1.3 1.4 1.0 1.1 1.0 TF expression TF expression homer streme gastro\_circular\_muscle\_1 ecto\_aboral gastro\_parietal\_muscle EMS gland\_mucin ecto\_aboral gastro\_circular\_muscle\_1 gastro\_circular\_muscle\_2 gastro\_parietal\_muscle-cnidocyte\_gastrula NPC\_1\_gland\_mucin neuronal\_gastrula muscle\_mesentery\_retraction neuronal\_gastrula ·gastro\_somatic\_gonad neuron\_Pou4\_FoxL2\_1 ectoderm enidocyte\_gastrula activity glang gastro\_circular\_muscle\_2
ecto\_pharynx neuron\_Pou4\_FoxL2\_3 ecto\_pharynx-muscle\_tentacle\_retractor EMS\_ecto\_boundary muscle\_mesentery\_retractor euron\_Pou4\_FoxL2\_2\_gland digestive\_filaments\_2\_neuron\_GATA\_Islet\_2 -neuron\_GATA\_Islet\_2 gastro\_somatic\_gonad digestive\_filaments\_3 precursors\_NPC digenive\_filaments\_-gastro\_IRF1\_2 cnidocyte digestive\_filaments\_2 digestive\_filaments\_3 neuron\_Pou4\_FoxL2\_1 neuron\_GATA\_Islet\_1 neuron\_GATA\_Islet\_1 epidermis\_1 neuron\_Pou4\_FoxL2\_3 epidermis\_2 epidermis\_1 gastro\_IRF1\_2 precursors\_NPC epidermis\_2 cnidocyte precursors\_PGC\_ precursors\_PGC -4precursors\_endoNPC precursors\_endoNPC 1.2 1.2 1.4 1.1 1.1 1.3 1.0 1.0 1.4 1.3 TF expression TF expression

FoxQ\_S5

Nvec\_vc1.1\_XM\_032385706.2 (FoxQ2d)

OG: Forkhead.HG1.14:like:FOXN1/FOXN2/FOXN3/FOXN4/FOXR1/FOXR2

PFAM: Forkhead

