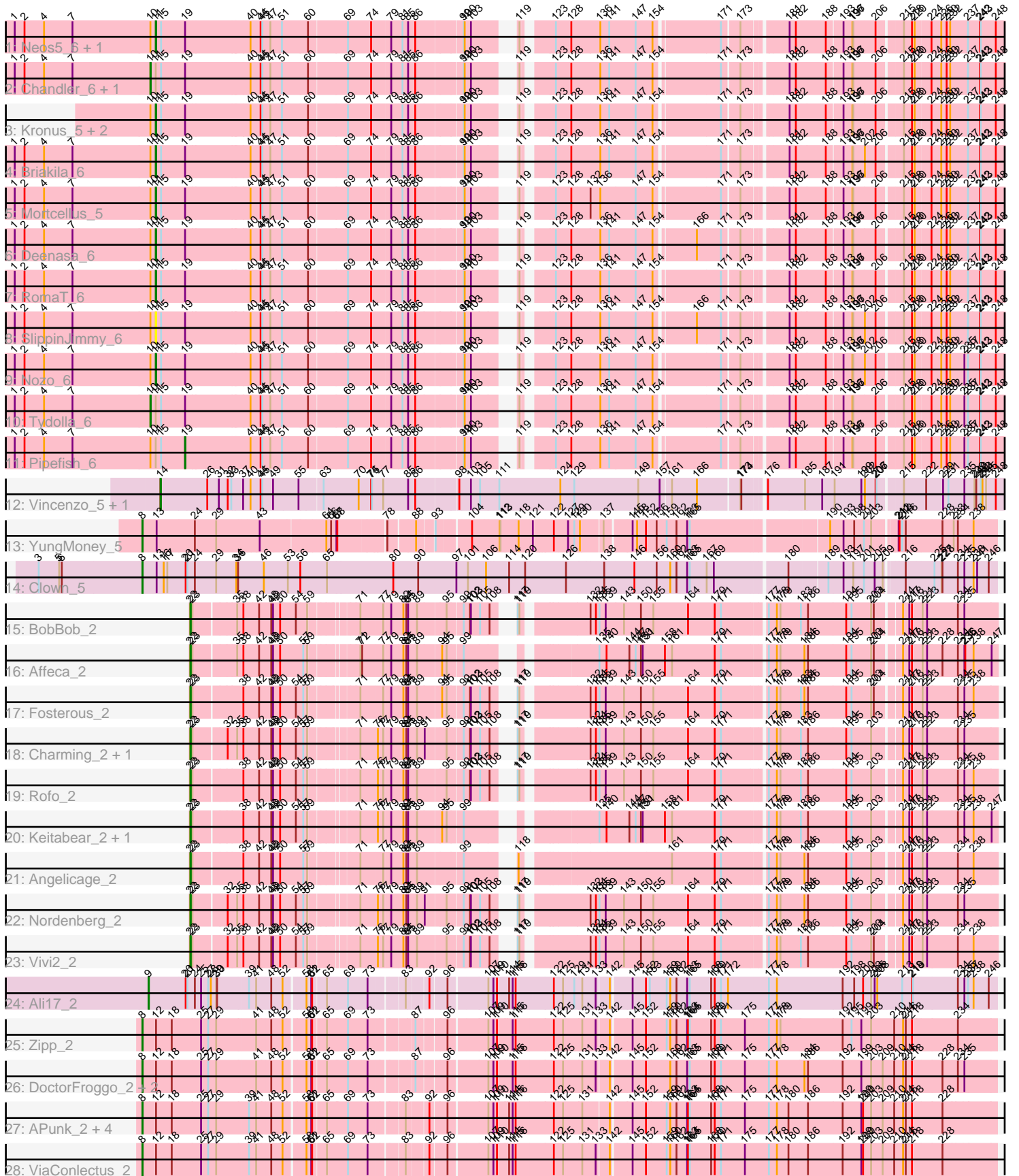


Pham 163728



Note: Tracks are now grouped by subcluster and scaled. Switching in subcluster is indicated by changes in track color. Track scale is now set by default to display the region 30 bp upstream of start 1 to 30 bp downstream of the last possible start. If this default region is judged to be packed too tightly with annotated starts, the track will be further scaled to only show that region of the ORF with annotated starts. This action will be indicated by adding "Zoomed" to the title. For starts, yellow indicates the location of called starts comprised solely of Glimmer/GeneMark auto-annotations, green indicates the location of called starts with at least 1 manual gene annotation.

## Pham 163728 Report

This analysis was run 04/28/24 on database version 559.

Pham number 163728 has 41 members, 4 are drafts.

Phages represented in each track:

- Track 1 : Neos5\_6, Phlyer\_6
- Track 2 : Chandler\_6, Athena\_6
- Track 3 : Kronus\_5, Marley1013\_6, Morty007\_6
- Track 4 : Briakila\_6
- Track 5 : Mortcellus\_5
- Track 6 : Deenasa\_6
- Track 7 : RomaT\_6
- Track 8 : SlippinJimmy\_6
- Track 9 : Nozo\_6
- Track 10 : Tydolla\_6
- Track 11 : Pipefish\_6
- Track 12 : Vincenzo\_5, AlanGrant\_5
- Track 13 : YungMoney\_5
- Track 14 : Clown\_5
- Track 15 : BobBob\_2
- Track 16 : Affeca\_2
- Track 17 : Fosterous\_2
- Track 18 : Charming\_2, Tangent\_2
- Track 19 : Rofo\_2
- Track 20 : Keitabear\_2, Sedona\_2
- Track 21 : Angelicage\_2
- Track 22 : Nordenberg\_2
- Track 23 : Vivi2\_2
- Track 24 : Ali17\_2
- Track 25 : Zipp\_2
- Track 26 : DoctorFroggo\_2, Delrey21\_2, Verity\_2
- Track 27 : APunk\_2, Sampson\_2, Scioto\_2, Natkenzie\_2, Abblin\_2
- Track 28 : ViaConlectus\_2

### ***Summary of Final Annotations (See graph section above for start numbers):***

The start number called the most often in the published annotations is 22, it was called in 11 of the 37 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Affeca\_2, Angelicage\_2, BobBob\_2, Charming\_2, Fosterous\_2, Keitabear\_2, Nordenberg\_2, Rofo\_2, Sedona\_2, Tangent\_2, Vivi2\_2,

Genes that have the "Most Annotated" start but do not call it:

- 

Genes that do not have the "Most Annotated" start:

- APunk\_2, Abblin\_2, AlanGrant\_5, Ali17\_2, Athena\_6, Briakila\_6, Chandler\_6, Clown\_5, Deenasa\_6, Delrey21\_2, DoctorFroggo\_2, Kronus\_5, Marley1013\_6, Mortcellus\_5, Morty007\_6, Natkenzie\_2, Neos5\_6, Nozo\_6, Phlyer\_6, Pipefish\_6, RomaT\_6, Sampson\_2, Scioto\_2, SlippinJimmy\_6, Tydolla\_6, Verity\_2, ViaConlectus\_2, Vincenzo\_5, YungMoney\_5, Zipp\_2,

### Summary by start number:

Start 8:

- Found in 12 of 41 ( 29.3% ) of genes in pham
- Manual Annotations of this start: 9 of 37
- Called 100.0% of time when present
- Phage (with cluster) where this start called: APunk\_2 (DE4), Abblin\_2 (DE4), Clown\_5 (DC2), Delrey21\_2 (DE4), DoctorFroggo\_2 (DE4), Natkenzie\_2 (DE4), Sampson\_2 (DE4), Scioto\_2 (DE4), Verity\_2 (DE4), ViaConlectus\_2 (DE4), YungMoney\_5 (DC1), Zipp\_2 (DE4),

Start 9:

- Found in 1 of 41 ( 2.4% ) of genes in pham
- Manual Annotations of this start: 1 of 37
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Ali17\_2 (DE2),

Start 10:

- Found in 15 of 41 ( 36.6% ) of genes in pham
- Manual Annotations of this start: 3 of 37
- Called 20.0% of time when present
- Phage (with cluster) where this start called: Athena\_6 (B3), Chandler\_6 (B3), Tydolla\_6 (B3),

Start 11:

- Found in 15 of 41 ( 36.6% ) of genes in pham
- Manual Annotations of this start: 10 of 37
- Called 73.3% of time when present
- Phage (with cluster) where this start called: Briakila\_6 (B3), Deenasa\_6 (B3), Kronus\_5 (B3), Marley1013\_6 (B3), Mortcellus\_5 (B3), Morty007\_6 (B3), Neos5\_6 (B3), Nozo\_6 (B3), Phlyer\_6 (B3), RomaT\_6 (B3), SlippinJimmy\_6 (B3),

Start 14:

- Found in 2 of 41 ( 4.9% ) of genes in pham
- Manual Annotations of this start: 2 of 37
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AlanGrant\_5 (B4), Vincenzo\_5 (B4),

Start 19:

- Found in 15 of 41 ( 36.6% ) of genes in pham
- Manual Annotations of this start: 1 of 37
- Called 6.7% of time when present
- Phage (with cluster) where this start called: Pipefish\_6 (B3),

Start 22:

- Found in 11 of 41 ( 26.8% ) of genes in pham
- Manual Annotations of this start: 11 of 37
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Affeca\_2 (DE1), Angelicage\_2 (DE1), BobBob\_2 (DE1), Charming\_2 (DE1), Fosterous\_2 (DE1), Keitabear\_2 (DE1), Nordenberg\_2 (DE1), Rofo\_2 (DE1), Sedona\_2 (DE1), Tangent\_2 (DE1), Vivi2\_2 (DE1),

### **Summary by clusters:**

There are 7 clusters represented in this pham: DE1, DE2, DE4, B4, B3, DC2, DC1,

Info for manual annotations of cluster B3:

- Start number 10 was manually annotated 3 times for cluster B3.
- Start number 11 was manually annotated 10 times for cluster B3.
- Start number 19 was manually annotated 1 time for cluster B3.

Info for manual annotations of cluster B4:

- Start number 14 was manually annotated 2 times for cluster B4.

Info for manual annotations of cluster DC1:

- Start number 8 was manually annotated 1 time for cluster DC1.

Info for manual annotations of cluster DC2:

- Start number 8 was manually annotated 1 time for cluster DC2.

Info for manual annotations of cluster DE1:

- Start number 22 was manually annotated 11 times for cluster DE1.

Info for manual annotations of cluster DE2:

- Start number 9 was manually annotated 1 time for cluster DE2.

Info for manual annotations of cluster DE4:

- Start number 8 was manually annotated 7 times for cluster DE4.

### **Gene Information:**

Gene: APunk\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for APunk\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (39, 833), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (83, 1283), (92, 1346), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (114, 1580), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (142, 1889), (145, 1949), (152, 1991), (159, 2051), (160, 2063), (162, 2084), (163, 2120), (164, 2123), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (180, 2462), (186, 2522), (192, 2636), (199, 2699), (200, 2705), (203, 2732),

(209, 2768), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (228, 2963),

Gene: Abblin\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for Abblin\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (39, 833), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (83, 1283), (92, 1346), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (114, 1580), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (142, 1889), (145, 1949), (152, 1991), (159, 2051), (160, 2063), (162, 2084), (163, 2120), (164, 2123), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (180, 2462), (186, 2522), (192, 2636), (199, 2699), (200, 2705), (203, 2732), (209, 2768), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (228, 2963),

Gene: Affeca\_2 Start: 514, Stop: 2901, Start Num: 22

Candidate Starts for Affeca\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (35, 652), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (57, 865), (59, 877), (71, 1006), (72, 1012), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (94, 1249), (95, 1264), (99, 1312), (135, 1639), (140, 1663), (144, 1738), (147, 1759), (150, 1777), (151, 1783), (158, 1855), (161, 1879), (170, 2023), (171, 2044), (177, 2176), (178, 2203), (179, 2215), (184, 2296), (186, 2308), (194, 2434), (195, 2452), (203, 2518), (204, 2527), (214, 2599), (217, 2620), (218, 2629), (221, 2659), (223, 2674), (228, 2725), (234, 2773), (235, 2791), (236, 2794), (238, 2821), (247, 2881),

Gene: AlanGrant\_5 Start: 3145, Stop: 5796, Start Num: 14

Candidate Starts for AlanGrant\_5:

(Start: 14 @3145 has 2 MA's), (26, 3295), (31, 3334), (32, 3364), (33, 3376), (37, 3412), (40, 3436), (44, 3469), (45, 3475), (49, 3511), (55, 3592), (63, 3667), (70, 3784), (74, 3826), (75, 3829), (77, 3862), (85, 3934), (86, 3952), (98, 4081), (103, 4114), (105, 4144), (111, 4207), (124, 4408), (129, 4453), (149, 4663), (157, 4735), (161, 4768), (166, 4852), (173, 4981), (174, 4984), (176, 5041), (185, 5155), (187, 5212), (191, 5254), (199, 5344), (202, 5353), (206, 5389), (207, 5392), (215, 5464), (222, 5539), (229, 5593), (231, 5611), (235, 5665), (239, 5698), (240, 5704), (243, 5719), (244, 5725), (245, 5737), (248, 5770),

Gene: Ali17\_2 Start: 534, Stop: 3170, Start Num: 9

Candidate Starts for Ali17\_2:

(Start: 9 @534 has 1 MA's), (20, 657), (21, 663), (24, 687), (25, 708), (27, 732), (28, 741), (29, 759), (30, 762), (39, 864), (41, 888), (48, 933), (52, 963), (58, 1020), (61, 1035), (62, 1038), (65, 1080), (69, 1149), (73, 1212), (83, 1314), (92, 1377), (96, 1428), (107, 1545), (109, 1560), (110, 1572), (114, 1611), (115, 1623), (116, 1629), (122, 1752), (125, 1779), (129, 1812), (131, 1836), (133, 1881), (142, 1920), (145, 1980), (152, 2022), (153, 2028), (159, 2082), (160, 2094), (162, 2115), (163, 2151), (165, 2160), (168, 2232), (170, 2244), (171, 2265), (172, 2289), (177, 2427), (178, 2454), (192, 2673), (198, 2712), (200, 2742), (203, 2769), (205, 2781), (208, 2787), (213, 2868), (218, 2901), (219, 2904), (234, 3045), (235, 3063), (237, 3075), (238, 3093), (246, 3144),

Gene: Angelicage\_2 Start: 514, Stop: 2901, Start Num: 22

Candidate Starts for Angelicage\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (57, 865), (59, 877), (71, 1006), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (99, 1312), (118, 1420), (161, 1879), (170, 2023), (171, 2044), (177, 2176), (178, 2203), (179, 2215), (184, 2296), (186, 2308), (194, 2434), (195, 2452), (203, 2518), (214, 2599), (217, 2620), (218, 2629), (221, 2659), (223, 2674), (234, 2773), (238, 2821),

Gene: Athena\_6 Start: 2696, Stop: 5236, Start Num: 10

Candidate Starts for Athena\_6:

(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: BobBob\_2 Start: 514, Stop: 2907, Start Num: 22

Candidate Starts for BobBob\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (35, 652), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (54, 841), (59, 877), (71, 1006), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (95, 1264), (99, 1312), (102, 1327), (103, 1330), (105, 1360), (108, 1390), (117, 1417), (119, 1423), (132, 1615), (134, 1633), (135, 1645), (139, 1666), (143, 1726), (150, 1783), (155, 1822), (164, 1939), (170, 2029), (171, 2050), (177, 2182), (178, 2209), (179, 2221), (183, 2290), (186, 2314), (194, 2440), (195, 2458), (203, 2524), (204, 2533), (214, 2605), (217, 2626), (218, 2635), (221, 2665), (223, 2680), (234, 2779), (235, 2797),

Gene: Briakila\_6 Start: 2714, Stop: 5236, Start Num: 11

Candidate Starts for Briakila\_6:

(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (202, 4790), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Chandler\_6 Start: 2696, Stop: 5236, Start Num: 10

Candidate Starts for Chandler\_6:

(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Charming\_2 Start: 514, Stop: 2907, Start Num: 22

Candidate Starts for Charming\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (32, 622), (35, 652), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (54, 841), (57, 865), (59, 877), (71, 1006), (76, 1060), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (91, 1198), (95, 1264), (99, 1312), (102, 1327), (103, 1330), (105, 1360), (108, 1390), (117, 1417), (119, 1423), (132, 1615), (134, 1633), (135, 1645), (139, 1666), (143, 1726), (150, 1783), (155, 1822), (164, 1939), (170, 2029), (171, 2050), (177, 2182), (178, 2209), (179, 2221), (183, 2290), (186, 2314), (194, 2440), (195, 2458), (203, 2524), (214, 2605), (217, 2626), (218, 2635), (221, 2665), (223, 2680), (234, 2779), (235, 2797),

Gene: Clown\_5 Start: 1817, Stop: 4576, Start Num: 8

Candidate Starts for Clown\_5:

(3, 1472), (5, 1541), (6, 1550), (Start: 8 @1817 has 9 MA's), (13, 1865), (16, 1889), (17, 1901), (20, 1961), (21, 1967), (24, 1988), (29, 2060), (34, 2126), (36, 2132), (46, 2219), (53, 2300), (56, 2342), (65, 2432), (80, 2654), (90, 2738), (97, 2867), (101, 2906), (106, 2966), (114, 3041), (120, 3095), (126,

3230), (138, 3356), (146, 3455), (156, 3524), (160, 3569), (162, 3590), (163, 3626), (165, 3635), (167, 3692), (169, 3716), (180, 3938), (189, 4058), (193, 4106), (197, 4139), (201, 4175), (205, 4211), (209, 4235), (216, 4289), (225, 4379), (227, 4403), (228, 4406), (234, 4454), (235, 4472), (238, 4502), (241, 4514), (246, 4550),

Gene: Deenasa\_6 Start: 2714, Stop: 5236, Start Num: 11

Candidate Starts for Deenasa\_6:

(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (166, 4301), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Delrey21\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for Delrey21\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (87, 1307), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (133, 1850), (142, 1889), (145, 1949), (152, 1991), (160, 2063), (162, 2084), (163, 2120), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (184, 2510), (186, 2522), (192, 2636), (199, 2699), (203, 2732), (209, 2768), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (228, 2963), (234, 3011), (235, 3029),

Gene: DoctorFroggo\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for DoctorFroggo\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (87, 1307), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (133, 1850), (142, 1889), (145, 1949), (152, 1991), (160, 2063), (162, 2084), (163, 2120), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (184, 2510), (186, 2522), (192, 2636), (199, 2699), (203, 2732), (209, 2768), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (228, 2963), (234, 3011), (235, 3029),

Gene: Fosterous\_2 Start: 514, Stop: 2907, Start Num: 22

Candidate Starts for Fosterous\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (54, 841), (57, 865), (59, 877), (71, 1006), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (94, 1249), (95, 1264), (99, 1312), (102, 1327), (103, 1330), (105, 1360), (108, 1390), (117, 1417), (119, 1423), (132, 1615), (134, 1633), (135, 1645), (139, 1666), (143, 1726), (150, 1783), (155, 1822), (164, 1939), (170, 2029), (171, 2050), (177, 2182), (178, 2209), (179, 2221), (183, 2290), (184, 2302), (186, 2314), (194, 2440), (195, 2458), (203, 2524), (204, 2533), (214, 2605), (217, 2626), (218, 2635), (221, 2665), (223, 2680), (234, 2779), (235, 2797), (238, 2827),

Gene: Keitabear\_2 Start: 514, Stop: 2901, Start Num: 22

Candidate Starts for Keitabear\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (54, 841), (57, 865), (59, 877), (71, 1006), (76, 1060), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (94, 1249), (95, 1264), (99, 1312), (135, 1639), (140, 1663), (144, 1738), (147, 1759), (150, 1777), (151, 1783), (158, 1855), (161, 1879), (170, 2023), (171, 2044), (177, 2176), (178, 2203), (179, 2215), (183, 2284), (186, 2308), (194, 2434), (195, 2452), (203, 2518), (214, 2599), (217, 2620), (218, 2629), (221, 2659), (223, 2674), (234, 2773), (235, 2791), (238, 2821), (247, 2881),

Gene: Kronus\_5 Start: 2562, Stop: 5084, Start Num: 11

Candidate Starts for Kronus\_5:

(Start: 10 @2544 has 3 MA's), (Start: 11 @2562 has 10 MA's), (15, 2580), (Start: 19 @2661 has 1 MA's), (40, 2874), (44, 2904), (45, 2910), (47, 2937), (51, 2973), (60, 3057), (69, 3183), (74, 3261), (79, 3318), (81, 3351), (85, 3369), (86, 3387), (99, 3531), (100, 3534), (103, 3549), (119, 3642), (123, 3717), (128, 3762), (136, 3855), (141, 3885), (147, 3972), (154, 4026), (171, 4227), (173, 4281), (181, 4401), (182, 4422), (188, 4518), (193, 4569), (196, 4599), (197, 4602), (206, 4674), (215, 4749), (218, 4776), (220, 4785), (224, 4836), (226, 4869), (230, 4884), (232, 4896), (237, 4956), (242, 4995), (243, 4998), (248, 5049),

Gene: Marley1013\_6 Start: 2714, Stop: 5236, Start Num: 11

Candidate Starts for Marley1013\_6:

(Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Mortcellus\_5 Start: 2562, Stop: 5084, Start Num: 11

Candidate Starts for Mortcellus\_5:

(1, 2088), (2, 2121), (4, 2187), (7, 2283), (Start: 10 @2544 has 3 MA's), (Start: 11 @2562 has 10 MA's), (15, 2580), (Start: 19 @2661 has 1 MA's), (40, 2874), (44, 2904), (45, 2910), (47, 2937), (51, 2973), (60, 3057), (69, 3183), (74, 3261), (79, 3318), (81, 3351), (85, 3369), (86, 3387), (99, 3531), (100, 3534), (103, 3549), (119, 3642), (123, 3717), (128, 3762), (132, 3822), (136, 3855), (147, 3972), (154, 4026), (171, 4227), (173, 4281), (181, 4401), (182, 4422), (188, 4518), (193, 4569), (196, 4599), (197, 4602), (206, 4674), (215, 4749), (218, 4776), (220, 4785), (224, 4836), (226, 4869), (230, 4884), (232, 4896), (237, 4956), (242, 4995), (243, 4998), (248, 5049),

Gene: Morty007\_6 Start: 2714, Stop: 5236, Start Num: 11

Candidate Starts for Morty007\_6:

(Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Natkenzie\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for Natkenzie\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (39, 833), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (83, 1283), (92, 1346), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (114, 1580), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (142, 1889), (145, 1949), (152, 1991), (159, 2051), (160, 2063), (162, 2084), (163, 2120), (164, 2123), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (180, 2462), (186, 2522), (192, 2636), (199, 2699), (200, 2705), (203, 2732), (209, 2768), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (228, 2963),

Gene: Neos5\_6 Start: 2714, Stop: 5236, Start Num: 11

Candidate Starts for Neos5\_6:



(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Nordenberg\_2 Start: 514, Stop: 2907, Start Num: 22

Candidate Starts for Nordenberg\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (32, 622), (35, 652), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (54, 841), (57, 865), (59, 877), (71, 1006), (76, 1060), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (91, 1198), (95, 1264), (99, 1312), (102, 1327), (103, 1330), (105, 1360), (108, 1390), (117, 1417), (119, 1423), (132, 1615), (134, 1633), (135, 1645), (139, 1666), (143, 1726), (150, 1783), (155, 1822), (164, 1939), (170, 2029), (171, 2050), (177, 2182), (178, 2209), (179, 2221), (184, 2302), (186, 2314), (194, 2440), (195, 2458), (203, 2524), (214, 2605), (217, 2626), (218, 2635), (221, 2665), (223, 2680), (234, 2779), (235, 2797),

Gene: Nozo\_6 Start: 2714, Stop: 5236, Start Num: 11

Candidate Starts for Nozo\_6:

(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (202, 4790), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (235, 5096), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Phlyer\_6 Start: 2714, Stop: 5236, Start Num: 11

Candidate Starts for Phlyer\_6:

(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Pipefish\_6 Start: 2918, Stop: 5341, Start Num: 19

Candidate Starts for Pipefish\_6:

(1, 2345), (2, 2378), (4, 2444), (7, 2540), (Start: 10 @2801 has 3 MA's), (Start: 11 @2819 has 10 MA's), (15, 2837), (Start: 19 @2918 has 1 MA's), (40, 3131), (44, 3161), (45, 3167), (47, 3194), (51, 3230), (60, 3314), (69, 3440), (74, 3518), (79, 3575), (81, 3608), (85, 3626), (86, 3644), (99, 3788), (100, 3791), (103, 3806), (119, 3899), (123, 3974), (128, 4019), (136, 4112), (141, 4142), (147, 4229), (154, 4283), (171, 4484), (173, 4538), (181, 4658), (182, 4679), (188, 4775), (193, 4826), (196, 4856), (197, 4859), (206, 4931), (215, 5006), (218, 5033), (220, 5042), (224, 5093), (226, 5126), (230, 5141), (232, 5153), (235, 5201), (237, 5213), (242, 5252), (243, 5255), (248, 5306),

Gene: Rofo\_2 Start: 514, Stop: 2907, Start Num: 22

Candidate Starts for Rofo\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (54, 841), (57, 865), (59, 877), (71, 1006), (76, 1060), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (95, 1264), (99, 1312), (102, 1327), (103, 1330), (105, 1360), (108, 1390), (117, 1417),

(119, 1423), (132, 1615), (134, 1633), (135, 1645), (139, 1666), (143, 1726), (150, 1783), (155, 1822), (164, 1939), (170, 2029), (171, 2050), (177, 2182), (178, 2209), (179, 2221), (183, 2290), (186, 2314), (194, 2440), (195, 2458), (203, 2524), (214, 2605), (217, 2626), (218, 2635), (221, 2665), (223, 2680), (234, 2779), (235, 2797), (238, 2827),

Gene: RomaT\_6 Start: 2714, Stop: 5236, Start Num: 11

Candidate Starts for RomaT\_6:

(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Sampson\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for Sampson\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (39, 833), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (83, 1283), (92, 1346), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (114, 1580), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (142, 1889), (145, 1949), (152, 1991), (159, 2051), (160, 2063), (162, 2084), (163, 2120), (164, 2123), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (180, 2462), (186, 2522), (192, 2636), (199, 2699), (200, 2705), (203, 2732), (209, 2768), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (228, 2963),

Gene: Scioto\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for Scioto\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (39, 833), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (83, 1283), (92, 1346), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (114, 1580), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (142, 1889), (145, 1949), (152, 1991), (159, 2051), (160, 2063), (162, 2084), (163, 2120), (164, 2123), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (180, 2462), (186, 2522), (192, 2636), (199, 2699), (200, 2705), (203, 2732), (209, 2768), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (228, 2963),

Gene: Sedona\_2 Start: 514, Stop: 2901, Start Num: 22

Candidate Starts for Sedona\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (54, 841), (57, 865), (59, 877), (71, 1006), (76, 1060), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (94, 1249), (95, 1264), (99, 1312), (135, 1639), (140, 1663), (144, 1738), (147, 1759), (150, 1777), (151, 1783), (158, 1855), (161, 1879), (170, 2023), (171, 2044), (177, 2176), (178, 2203), (179, 2215), (183, 2284), (186, 2308), (194, 2434), (195, 2452), (203, 2518), (214, 2599), (217, 2620), (218, 2629), (221, 2659), (223, 2674), (234, 2773), (235, 2791), (238, 2821), (247, 2881),

Gene: SlippinJimmy\_6 Start: 2714, Stop: 5236, Start Num: 11

Candidate Starts for SlippinJimmy\_6:

(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (166, 4301), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (202, 4790), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Tangent\_2 Start: 514, Stop: 2907, Start Num: 22

Candidate Starts for Tangent\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (32, 622), (35, 652), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (54, 841), (57, 865), (59, 877), (71, 1006), (76, 1060), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (91, 1198), (95, 1264), (99, 1312), (102, 1327), (103, 1330), (105, 1360), (108, 1390), (117, 1417), (119, 1423), (132, 1615), (134, 1633), (135, 1645), (139, 1666), (143, 1726), (150, 1783), (155, 1822), (164, 1939), (170, 2029), (171, 2050), (177, 2182), (178, 2209), (179, 2221), (183, 2290), (186, 2314), (194, 2440), (195, 2458), (203, 2524), (214, 2605), (217, 2626), (218, 2635), (221, 2665), (223, 2680), (234, 2779), (235, 2797),

Gene: Tydolla\_6 Start: 2696, Stop: 5236, Start Num: 10

Candidate Starts for Tydolla\_6:

(1, 2240), (2, 2273), (4, 2339), (7, 2435), (Start: 10 @2696 has 3 MA's), (Start: 11 @2714 has 10 MA's), (15, 2732), (Start: 19 @2813 has 1 MA's), (40, 3026), (44, 3056), (45, 3062), (47, 3089), (51, 3125), (60, 3209), (69, 3335), (74, 3413), (79, 3470), (81, 3503), (85, 3521), (86, 3539), (99, 3683), (100, 3686), (103, 3701), (119, 3794), (123, 3869), (128, 3914), (136, 4007), (141, 4037), (147, 4124), (154, 4178), (171, 4379), (173, 4433), (181, 4553), (182, 4574), (188, 4670), (193, 4721), (196, 4751), (197, 4754), (206, 4826), (215, 4901), (218, 4928), (220, 4937), (224, 4988), (226, 5021), (230, 5036), (232, 5048), (235, 5096), (237, 5108), (242, 5147), (243, 5150), (248, 5201),

Gene: Verity\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for Verity\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (87, 1307), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (133, 1850), (142, 1889), (145, 1949), (152, 1991), (160, 2063), (162, 2084), (163, 2120), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (184, 2510), (186, 2522), (192, 2636), (199, 2699), (203, 2732), (209, 2768), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (228, 2963), (234, 3011), (235, 3029),

Gene: ViaConlectus\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for ViaConlectus\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (39, 833), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (83, 1283), (92, 1346), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (114, 1580), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (133, 1850), (142, 1889), (145, 1949), (152, 1991), (159, 2051), (160, 2063), (162, 2084), (163, 2120), (164, 2123), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (180, 2462), (186, 2522), (192, 2636), (199, 2699), (200, 2705), (203, 2732), (209, 2768), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (228, 2963),

Gene: Vincenzo\_5 Start: 3145, Stop: 5796, Start Num: 14

Candidate Starts for Vincenzo\_5:

(Start: 14 @3145 has 2 MA's), (26, 3295), (31, 3334), (32, 3364), (33, 3376), (37, 3412), (40, 3436), (44, 3469), (45, 3475), (49, 3511), (55, 3592), (63, 3667), (70, 3784), (74, 3826), (75, 3829), (77, 3862), (85, 3934), (86, 3952), (98, 4081), (103, 4114), (105, 4144), (111, 4207), (124, 4408), (129, 4453), (149, 4663), (157, 4735), (161, 4768), (166, 4852), (173, 4981), (174, 4984), (176, 5041), (185, 5155), (187, 5212), (191, 5254), (199, 5344), (202, 5353), (206, 5389), (207, 5392), (215, 5464), (222, 5539), (229, 5593), (231, 5611), (235, 5665), (239, 5698), (240, 5704), (243, 5719), (244, 5725), (245, 5737), (248, 5770),

Gene: Vivi2\_2 Start: 514, Stop: 2907, Start Num: 22

Candidate Starts for Vivi2\_2:

(Start: 22 @514 has 11 MA's), (23, 520), (32, 622), (35, 652), (38, 673), (42, 724), (48, 763), (49, 769), (50, 790), (54, 841), (57, 865), (59, 877), (71, 1006), (76, 1060), (77, 1078), (79, 1099), (82, 1135), (84, 1144), (85, 1150), (89, 1174), (95, 1264), (99, 1312), (102, 1327), (103, 1330), (105, 1360), (108, 1390), (117, 1417), (119, 1423), (132, 1615), (134, 1633), (135, 1645), (139, 1666), (143, 1726), (150, 1783), (155, 1822), (164, 1939), (170, 2029), (171, 2050), (177, 2182), (178, 2209), (179, 2221), (183, 2290), (186, 2314), (194, 2440), (195, 2458), (203, 2524), (204, 2533), (214, 2605), (217, 2626), (218, 2635), (221, 2665), (223, 2680), (234, 2779), (238, 2827),

Gene: YungMoney\_5 Start: 1791, Stop: 4376, Start Num: 8

Candidate Starts for YungMoney\_5:

(Start: 8 @1791 has 9 MA's), (13, 1839), (24, 1962), (29, 2034), (43, 2169), (64, 2370), (66, 2385), (67, 2403), (68, 2406), (78, 2556), (88, 2640), (93, 2688), (104, 2778), (112, 2868), (113, 2871), (118, 2925), (121, 2967), (122, 3027), (127, 3066), (129, 3087), (130, 3105), (137, 3174), (145, 3255), (148, 3270), (152, 3297), (156, 3324), (159, 3357), (162, 3390), (163, 3426), (165, 3435), (190, 3864), (193, 3906), (198, 3942), (201, 3975), (203, 3999), (211, 4065), (212, 4068), (213, 4077), (216, 4089), (228, 4206), (233, 4242), (234, 4254), (238, 4302),

Gene: Zipp\_2 Start: 491, Stop: 3136, Start Num: 8

Candidate Starts for Zipp\_2:

(Start: 8 @491 has 9 MA's), (12, 530), (18, 581), (25, 677), (27, 701), (29, 728), (41, 857), (48, 902), (52, 932), (58, 989), (61, 1004), (62, 1007), (65, 1049), (69, 1118), (73, 1181), (87, 1307), (96, 1397), (107, 1514), (109, 1529), (110, 1541), (115, 1592), (116, 1598), (122, 1721), (125, 1748), (131, 1805), (133, 1850), (142, 1889), (145, 1949), (152, 1991), (159, 2051), (160, 2063), (162, 2084), (163, 2120), (164, 2123), (165, 2129), (168, 2201), (170, 2213), (171, 2234), (175, 2315), (177, 2396), (178, 2423), (179, 2435), (192, 2636), (195, 2666), (199, 2699), (203, 2732), (210, 2807), (214, 2837), (216, 2846), (218, 2867), (234, 3011),