Stanford

# Greg Barsh

Professor of Genetics and of Pediatrics, Emeritus

### CONTACT INFORMATION

- **Alternate Contact**

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## Bio

### ACADEMIC APPOINTMENTS

- Professor Emeritus-Hourly, Genetics
- Member, Bio-X

### PROFESSIONAL EDUCATION

- MD, University of Washington , Medicine (1984)
- BS, University of California, Irvine , Biology (1977)
- PhD, University of Washington , Genetics of Human Disease (1984)

## Research & Scholarship

### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Color variation is one of the most readily apparent differences among closely related animals, and has been studied extensively as a model for Mendelian genetics over the last 100 years. Our laboratory is interested in the mechanisms that give rise to eye, hair, and skin coloration, both as a tool for studying gene action and interaction, and because many signaling pathways used by the pigmentary system play important roles in human development and disease.

All mammals use the same genetic toolbox, and several mouse coat color mutations have human counterparts such as oculocutaneous albinism or Chediak-Higashi syndrome. Applying the genetics of mouse hair color as a model, however, is relevant not only to rare inborn errors but also to common diseases including diabetes and obesity, neurodegeneration, and skin cancer. Production of normal hair and skin color depends on a series of processes--cell migration, stem cell renewal, paracrine regulation of cell physiology--used in many different contexts throughout the body; pigmentation phenotypes are especially well-suited for studying these processes because mutations are efficiently recognized, subtle effects on gene expression are easily detected, and the cell types and tissues involved are amenable to experimental manipulation.

Our original interest in mouse coat color genetics stems from mutations that cause a back-and-forth switch between pigment granules characteristic of red hair, to those characteristic of black, brown, or blond hair. Studies of these pigment type-switching mutations have identified one set of pathways important for body weight regulation, and another set of pathways implicated in neurodegeneration. Several current projects in the laboratory are directed at specific aspects of these pathways.

## Teaching

### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Genetics (Phd Program)

## Publications

### PUBLICATIONS

- **A general passion.** *PLoS genetics*
  Barsh, G. S., Copenhaver, G. P.
  2024; 20 (5): e1011291

- **Ancestry dynamics and trait selection in a designer cat breed.** *Current biology : CB*
  Kaelin, C. B., McGowan, K. A., Hutcherson, A. D., Delay, J. M., Li, J. H., Kiener, S., Jagannathan, V., Leeb, T., Murphy, W. J., Barsh, G. S.
  2024

- **Genetic architecture and evolution of color variation in American black bears.** *Current biology : CB*
  Puckett, E. E., Davis, I. S., Harper, D. C., Wakamatsu, K., Battu, G., Belant, J. L., Beyer, D. E., Carpenter, C., Crupi, A. P., Davidson, M., DePerno, C. S., Forman, N., Fowler, et al
  2022

- **High frequency of an otherwise rare phenotype in a small and isolated tiger population.** *Proceedings of the National Academy of Sciences of the United States of America*
  Sagar, V., Kaelin, C. B., Natesh, M., Reddy, P. A., Mohapatra, R. K., Chhattani, H., Thatte, P., Vaidyanathan, S., Biswas, S., Bhatt, S., Paul, S., Jhala, Y. V., Verma, et al
  2021; 118 (39)

- **Dog colour patterns explained by modular promoters of ancient canid origin.** *Nature ecology & evolution*
  Bannasch, D. L., Kaelin, C. B., Letko, A., Loechel, R., Hug, P., Jagannathan, V., Henkel, J., Roosje, P., Hytonen, M. K., Lohi, H., Arumilli, M., DoGA consortium, Minor, K. M., et al
  2021

- **Developmental genetics of color pattern establishment in cats.** *Nature communications*
  Kaelin, C. B., McGowan, K. A., Barsh, G. S.
  2021; 12 (1): 5127

- **Population structure, inbreeding and stripe pattern abnormalities in plains zebras.** *Molecular ecology*
  Larison, B., Kaelin, C. B., Harrigan, R., Henegar, C., I Rubenstein, D., Kamath, P., Aschenborn, O., Smith, T. B., Barsh, G. S.
  2020

- **Digital gene expression for non-model organisms** *GENOME RESEARCH*
  Hong, L. Z., Li, J., Schmidt-Kuentzel, A., Warren, W. C., Barsh, G. S.
  2011; 21 (11): 1905-1915

- **Ribosomal mutations cause p53-mediated dark skin and pleiotropic effects** *NATURE GENETICS*
  McGowan, K. A., Li, J. Z., Park, C. Y., Beaudry, V., Tabor, H. K., Sabnis, A. J., Zhang, W., Fuchs, H., de Angelis, M. H., Myers, R. M., Attardi, L. D., Barsh, G. S.
  2008; 40 (8): 963-970

- **A -defensin mutation causes black coat color in domestic dogs.** *Science*
  Candille, S. I., Kaelin, C. B., Cattanach, B. M., Yu, B., Thompson, D. A., Nix, M. A., Kerns, J. A., Schmutz, S. M., Millhauser, G. L., Barsh, G. S.
  2007; 318 (5855): 1418-1423

- **Linkage and segregation analysis of black and brindle coat color in domestic dogs** *GENETICS*
  Kerns, J. A., Cargill, E. J., Clark, L. A., Candille, S. I., Berryere, T. G., Olivier, M., Lust, G., Todhunter, R. J., Schmutz, S. M., Murphy, K. E., Barsh, G. S.
  2007; 176 (3): 1679-1689
- **A healthy tan?** *New England journal of medicine*
  Barsh, G., Attardi, L. D.
  2007; 356 (21): 2208-2210
- **Effects of hypothalamic neurodegeneration on energy balance** *PLOS BIOLOGY*
  Xu, A. W., Kaelin, C. B., Morton, G. J., Ogimoto, K., Stanhope, K., Graham, J., Baskin, D. G., Havel, P., Schwartz, M. W., Barsh, G. S.
  2005; 3 (12): 2168-2176
- **PI3K integrates the action of insulin and leptin on hypothalamic neurons** *JOURNAL OF CLINICAL INVESTIGATION*
  Xu, A. W., Kaelin, C. B., Takeda, K., Akira, S., Schwartz, M. W., Barsh, G. S.
  2005; 115 (4): 951-958
- **Effects of G-protein mutations on skin color** *NATURE GENETICS*
  Van Raamsdonk, C. D., Fitch, K. R., Fuchs, H., de Angelis, M. H., Barsh, G. S.
  2004; 36 (9): 961-968
- **Dorsoventral patterning of the mouse coat by Tbx15.** *PLoS biology*
  Candille, S. I., Van Raamsdonk, C. D., Chen, C., Kuijper, S., Chen-Tsai, Y., Russ, A., Meijlink, F., Barsh, G. S.
  2004; 2 (1): E3-?
- **What controls variation in human skin color?** *PLoS biology*
  Barsh, G. S.
  2003; 1 (1): E27-?
- **Spongiform degeneration in mahoganoid mutant mice** *SCIENCE*
  He, L., Lu, X. Y., Jolly, A. F., Eldridge, A. G., Watson, S. J., Jackson, P. K., Barsh, G. S., Gunn, T. M.
  2003; 299 (5607): 710-712
- **Genetics of dark skin in mice** *GENES & DEVELOPMENT*
  Fitch, K. R., McGowan, K. A., Van Raamsdonk, C. D., Fuchs, H., Lee, D., Puech, A., Herault, Y., Threadgill, D. W., de Angelis, M. H., Barsh, G. S.
  2003; 17 (2): 214-228
- **Genetic approaches to studying energy balance: Perception and integration** *NATURE REVIEWS GENETICS*
  Barsh, G. S., Schwartz, M. W.
  2002; 3 (8): 589-600
- **A biochemical function for attractin in agouti-induced pigmentation and obesity** *NATURE GENETICS*
  He, L., Gunn, T. M., Bouley, D. M., Lu, X. Y., Watson, S. J., Schlossman, S. F., Duke-Cohan, J. S., Barsh, G. S.
  2001; 27 (1): 40-47
- **Genetics of body-weight regulation** *NATURE*
  Barsh, G. S., Farooqi, I. S., O'Rahilly, S.
  2000; 404 (6778): 644-651
- **Melanocortin 1 receptor variation in the domestic dog** *MAMMALIAN GENOME*
  Newton, J. M., Wilkie, A. L., He, L., Jordan, S. A., Metallinos, D. L., Holmes, N. G., Jackson, I. J., Barsh, G. S.
  2000; 11 (1): 24-30
- **Antagonism of central melanocortin receptors in vitro and in vivo by Agouti-related protein** *SCIENCE*
  Ollmann, M. M., Wilson, B. D., Yang, Y. K., Kerns, J. A., Chen, Y. R., Gantz, I., Barsh, G. S.
  1997; 278 (5335): 135-138
- **Endless microbes most beautiful and most wonderful.** *PLoS genetics*
  Barsh, G. S., Butler, G., Copenhaver, G. P., Crosson, S., Søgaard-Andersen, L., Stukenbrock, E. H.
  2023; 19 (4): e1010695

- **A gene-diet interaction controlling relative intake of dietary carbohydrates and fats.** *Molecular metabolism*
  Nelson, N. G., Wu, L., Maier, M. T., Lam, D., Cheang, R., Alba, D., Huang, A., Neumann, D. A., Hill, T., Vagena, E., Barsh, G. S., Medina, M. W., Krauss, et al
  2022: 101442
- **Expanding human variation at PLOS Genetics.** *PLoS genetics*
  Barsh, G. S., Copenhaver, G. P., Tang, H., Williams, S. M.
  2022; 18 (2): e1010070
- **Epigenetic models developed for plains zebras predict age in domestic horses and endangered equids.** *Communications biology*
  Larison, B., Pinho, G. M., Haghani, A., Zoller, J. A., Li, C. Z., Finno, C. J., Farrell, C., Kaelin, C. B., Barsh, G. S., Wooding, B., Robeck, T. R., Maddox, D., Pellegrini, et al
  1800; 4 (1): 1412
- **Recent evolutionary history of tigers highlights contrasting roles of genetic drift and selection.** *Molecular biology and evolution*
  Armstrong, E. E., Khan, A. n., Taylor, R. W., Gouy, A. n., Greenbaum, G. n., Thiéry, A. n., Kang, J. T., Redondo, S. A., Prost, S. n., Barsh, G. n., Kaelin, C. n., Phalke, S. n., Chugani, et al
  2021
- **Kingdom Come.** *PLoS genetics*
  Barsh, G. S., Copenhaver, G. P., Kohler, C., Qu, L.
  2020; 16 (11): e1009178
- **Long live the king: chromosome-level assembly of the lion (Panthera leo) using linked-read, Hi-C, and long-read data.** *BMC biology*
  Armstrong, E. E., Taylor, R. W., Miller, D. E., Kaelin, C. B., Barsh, G. S., Hadly, E. A., Petrov, D.
  2020; 18 (1): 3
- **Mixed methods.** *PLoS genetics*
  Balding, D. J., Barsh, G. S., Copenhaver, G. P., Yi, C. n.
  2020; 16 (7): e1008950
- **By what name shall I call thee?** *PLoS genetics*
  Barsh, G. S., Copenhaver, G. P.
  2020; 16 (10): e1009167
- **Periodic patterns in Rodentia: Development and evolution** *EXPERIMENTAL DERMATOLOGY*
  Johnson, M. R., Barsh, G. S., Mallarino, R.
  2019; 28 (4): 509–13
- **The Plight of Muntaser Ibrahim.** *PLoS genetics*
  Sirugo, G., Williams, S. M., Tishkoff, S. A., Cordell, H. J., Marchini, J., Barsh, G. S., Copenhaver, G. P.
  2019; 15 (3): e1008100
- **The Plight of Muntaser Ibrahim** *PLOS GENETICS*
  Sirugo, G., Williams, S. M., Tishkoff, S. A., Cordell, H. J., Marchini, J., Barsh, G. S., Copenhaver, G. P.
  2019; 15 (3)
- **Making room for opinions.** *PLoS genetics*
  Copenhaver, G. P., Barsh, G. S.
  2019; 15 (2): e1008015
- **-2019 PLOS Genetics Research Prize: Fruit fly school - language and dialects for communicating a threat.** *PLoS genetics*
  Barsh, G. S., Copenhaver, G. P., Prakash, E. S., Zarnescu, D. C.
  2019; 15 (9): e1008381
- **Evaluating the strength of genetic results: Risks and responsibilities.** *PLoS genetics*
  Barsh, G. S., Cooper, G. M., Copenhaver, G. P., Sirugo, G. n., Tang, H. n., Williams, S. M.
  2019; 15 (10): e1008437
- **Periodic patterns in Rodentia: development and evolution.** *Experimental dermatology*

Johnson, M. R., Barsh, G. S., Mallarino, R.
2018

- **Doubling down on forensic twin studies.** *PLoS genetics*
  Copenhaver, G. P., Weir, B., Rothstein, M., Tang, H., Williams, S. M., Barsh, G. S.
  2018; 14 (12): e1007831

- **2018 PLOS Genetics Research Prize: Bundling, stabilizing, organizing-The orchestration of acentriolar spindle assembly by microtubule motor proteins** *PLOS GENETICS*
  Barsh, G. S., Bhalla, N., Cole, F., Copenhaver, G. P., Lacefield, S., Libuda, D. E.
  2018; 14 (9): e1007649

- **Skin color variation in Africa.** *Science (New York, N.Y.)*
  Tang, H., Barsh, G. S.
  2017; 358 (6365): 867-868

- **Inference on the Genetic Basis of Eye and Skin Color in an Admixed Population via Bayesian Linear Mixed Models.** *Genetics*
  Lloyd-Jones, L. R., Robinson, M. R., Moser, G., Zeng, J., Beleza, S., Barsh, G. S., Tang, H., Visscher, P. M.
  2017; 206 (2): 1113-1126

- **Comparative tissue transcriptomics highlights dynamic differences among tissues but conserved metabolic transcript prioritization in preparation for arousal from torpor.** *Journal of comparative physiology. B, Biochemical, systemic, and environmental physiology*
  Bogren, L. K., Grabek, K. R., Barsh, G. S., Martin, S. L.
  2017

- **Eliciting preferences on secondary findings: the Preferences Instrument for Genomic Secondary Results** *GENETICS IN MEDICINE*
  Brothers, K. B., East, K. M., Kelley, W. V., Wright, M. F., Westbrook, M. J., Rich, C. A., Bowling, K. M., Lose, E. J., Bebin, E. M., Simmons, S., Myers, J. A., Barsh, G., Myers, et al
  2017; 19 (3): 337-344

- **A Hox-Embedded Long Noncoding RNA: Is It All Hot Air?** *PLoS genetics*
  Selleri, L., Bartolomei, M. S., Bickmore, W. A., He, L., Stubbs, L., Reik, W., Barsh, G. S.
  2016; 12 (12): e1006485

- **Bringing PLOS Genetics Editors to Preprint Servers.** *PLoS genetics*
  Barsh, G. S., Bergman, C. M., Brown, C. D., Singh, N. D., Copenhaver, G. P.
  2016; 12 (12): e1006448

- **Developmental mechanisms of stripe patterns in rodents** *NATURE*
  Mallarino, R., Henegar, C., Mirasierra, M., Manceau, M., Schradin, C., Vallejo, M., Beronja, S., Barsh, G. S., Hoekstra, H. E.
  2016; 539 (7630): 518-?

- **Evolution: Sex, Diet and Red Ketocarotenoids.** *Current biology : CB*
  Barsh, G.
  2016; 26 (21): R1145-R1147

- **The Language of Genetics In the Interviews of Jane Gitschier.** *PLoS genetics*
  Barsh, G. S., Copenhaver, G. P.
  2016; 12 (6): e1006115

- **Evolution: How the zebrafish got its stripes.** *eLife*
  McGowan, K. A., Barsh, G. S.
  2016; 5

- **Regulatory mutations in TBX3 disrupt asymmetric hair pigmentation that underlies Dun camouflage color in horses** *NATURE GENETICS*
  Imsland, F., McGowan, K., Rubin, C., Henegar, C., Sundstrom, E., Berglund, J., Schwochow, D., Gustafson, U., Imsland, P., Lindblad-Toh, K., Lindgren, G., Mikko, S., Millon, et al
  2016; 48 (2): 152-158

- **PLOS Genetics Data Sharing Policy: In Pursuit of Functional Utility** *PLOS GENETICS*
  Barsh, G. S., Cooper, G. M., Copenhaver, G. P., Gibson, G., McCarthy, M. I., Tang, H., Williams, S. M.

2015; 11 (12): e1005716

- **Electrostatic Similarity Analysis of Human beta-Defensin Binding in the Melanocortin System** *BIOPHYSICAL JOURNAL*
  Nix, M. A., Kaelin, C. B., Palomino, R., Miller, J. L., Barsh, G. S., Millhauser, G. L.
  2015; 109 (9): 1946-1958
- **A Decad(e) of Reasons to Contribute to a PLOS Community-Run Journal.** *PLoS genetics*
  Copenhaver, G. P., Barsh, G. S.
  2015; 11 (10): e1005557
- **Dominant Red Coat Color in Holstein Cattle Is Associated with a Missense Mutation in the Coatomer Protein Complex, Subunit Alpha (COPA) Gene** *PLOS ONE*
  Dorshorst, B., Henegar, C., Liao, X., Almen, M. S., Rubin, C., Ito, S., Wakamatsu, K., Stothard, P., Van Doormaal, B., Plastow, G., Barsh, G. S., Andersson, L.
  2015; 10 (6)
- **Dominant Red Coat Color in Holstein Cattle Is Associated with a Missense Mutation in the Coatomer Protein Complex, Subunit Alpha (COPA) Gene.** *PloS one*
  Dorshorst, B., Henegar, C., Liao, X., Sällman Almén, M., Rubin, C. J., Ito, S., Wakamatsu, K., Stothard, P., Van Doormaal, B., Plastow, G., Barsh, G. S., Andersson, L.
  2015; 10 (6): e0128969
- **Recurrent Evolution of Melanism in South American Felids** *PLOS GENETICS*
  Schneider, A., Henegar, C., Day, K., Absher, D., Napolitano, C., Silveira, L., David, V. A., O'Brien, S. J., Menotti-Raymond, M., Barsh, G. S., Eizirik, E.
  2015; 11 (2)
- **Modeling 3D facial shape from DNA.** *PLoS genetics*
  Claes, P., Liberton, D. K., Daniels, K., Rosana, K. M., Quillen, E. E., Pearson, L. N., McEvoy, B., Bauchet, M., Zaidi, A. A., Yao, W., Tang, H., Barsh, G. S., Absher, et al
  2014; 10 (3)
- **Modeling 3D Facial Shape from DNA.** *PLoS genetics*
  Claes, P., Liberton, D. K., Daniels, K., Rosana, K. M., Quillen, E. E., Pearson, L. N., McEvoy, B., Bauchet, M., Zaidi, A. A., Yao, W., Tang, H., Barsh, G. S., Absher, et al
  2014; 10 (3): e1004224
- **Coordinated regulation of hepatic energy stores by leptin and hypothalamic agouti-related protein.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
  Warne, J. P., Varonin, J. M., Nielsen, S. S., Olofsson, L. E., Kaelin, C. B., Chua, S., Barsh, G. S., Koliwad, S. K., Xu, A. W.
  2013; 33 (29): 11972-85
- **Coordinated Regulation of Hepatic Energy Stores by Leptin and Hypothalamic Agouti-Related Protein (Retracted article. See vol. 34, pg. 13865, 2014)** *JOURNAL OF NEUROSCIENCE*
  Warne, J. P., Varonin, J. M., Nielsen, S. S., Olofsson, L. E., Kaelin, C. B., Chua, S., Barsh, G. S., Koliwad, S. K., Xu, A. W.
  2013; 33 (29): 11972-11985
- **Molecular and Functional Analysis of Human beta-Defensin 3 Action at Melanocortin Receptors** *CHEMISTRY & BIOLOGY*
  Nix, M. A., Kaelin, C. B., Ta, T., Weis, A., Morton, G. J., Barsh, G. S., Millhauser, G. L.
  2013; 20 (6): 784-795
- **Genetic Architecture of Skin and Eye Color in an African-European Admixed Population** *PLOS GENETICS*
  Beleza, S., Johnson, N. A., Candille, S. I., Absher, D. M., Coram, M. A., Lopes, J., Campos, J., Araujo, I. I., Anderson, T. M., Vilhjalmsson, B. J., Nordborg, M., Correia e Silva, A., Shriver, et al
  2013; 9 (3)
- **Levels of the Mahogunin Ring Finger 1 E3 Ubiquitin Ligase Do Not Influence Prion Disease** *PLOS ONE*
  Silvius, D., Pitstick, R., Ahn, M., Meishery, D., Oehler, A., Barsh, G. S., DeArmond, S. J., Carlson, G. A., Gunn, T. M.
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- **Genetics of Pigmentation in Dogs and Cats** *ANNUAL REVIEW OF ANIMAL BIOSCIENCES, VOL 1*
  Kaelin, C. B., Barsh, G. S.

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- **How the Leopard Hides Its Spots: ASIP Mutations and Melanism in Wild Cats** *PLOS ONE*
  Schneider, A., David, V. A., Johnson, W. E., O'Brien, S. J., Barsh, G. S., Menotti-Raymond, M., Eizirik, E.
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- **Genome-Wide Association Studies of Quantitatively Measured Skin, Hair, and Eye Pigmentation in Four European Populations** *PLOS ONE*
  Candille, S. I., Absher, D. M., Beleza, S., Bauchet, M., McEvoy, B., Garrison, N. A., Li, J. Z., Myers, R. M., Barsh, G. S., Tang, H., Shriver, M. D.
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- **Specifying and Sustaining Pigmentation Patterns in Domestic and Wild Cats** *SCIENCE*
  Kaelin, C. B., Xu, X., Hong, L. Z., David, V. A., McGowan, K. A., Schmidt-Kuentzel, A., Roelke, M. E., Pino, J., Pontius, J., Cooper, G. M., Manuel, H., Swanson, W. F., Marker, et al
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- **Unraveling the thread of nature's tapestry: the genetics of diversity and convergence in animal pigmentation** *PIGMENT CELL & MELANOMA RESEARCH*
  Kronforst, M. R., Barsh, G. S., Kopp, A., Mallet, J., Monteiro, A., Mullen, S. P., Protas, M., Rosenblum, E. B., Schneider, C. J., Hoekstra, H. E.
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- **Guidelines for Genome-Wide Association Studies** *PLOS GENETICS*
  Barsh, G. S., Copenhaver, G. P., Gibson, G., Williams, S. M.
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- **A Candidate Mechanism Underlying the Variance of Interictal Spike Propagation** *JOURNAL OF NEUROSCIENCE*
  Sabolek, H. R., Swiercz, W. B., Lillis, K. P., Cash, S. S., Huberfeld, G., Zhao, G., Ste Marie, L., Clemenceau, S., Barsh, G., Miles, R., Staley, K. J.
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- **Ancestral Components of Admixed Genomes in a Mexican Cohort** *PLOS GENETICS*
  Johnson, N. A., Coram, M. A., Shriver, M. D., Romieu, I., Barsh, G. S., London, S. J., Tang, H.
  2011; 7 (12)
- **Reduced ribosomal protein gene dosage and p53 activation in low-risk myelodysplastic syndrome** *BLOOD*
  McGowan, K. A., Pang, W. W., Bhardwaj, R., Perez, M. G., Pluvinage, J. V., Glader, B. E., Malek, R., Mendrysa, S. M., Weissman, I. L., Park, C. Y., Barsh, G. S.
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- **Coat pattern genetics in cats**
  Kaelin, C. B., Xu, X., Hong, L. Z., David, V. A., McGowan, K. A., Barsh, G. S., Menotti-Raymond, M.
  WILEY-BLACKWELL.2011: 821–21
- **A Nervous Origin for Fish Stripes** *PLOS GENETICS*
  Kelsh, R. N., Barsh, G. S.
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- **PDK1-Foxo1 in Agouti-Related Peptide Neurons Regulates Energy Homeostasis by Modulating Food Intake and Energy Expenditure** *PLOS ONE*
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- **Loop-Swapped Chimeras of the Agouti-Related Protein and the Agouti Signaling Protein Identify Contacts Required for Melanocortin 1 Receptor Selectivity and Antagonism** *JOURNAL OF MOLECULAR BIOLOGY*
  Patel, M. P., Fabersunne, C. S., Yang, Y., Kaelin, C. B., Barsh, G. S., Millhauser, G. L.
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- **Haploinsufficiency of Ribosomal Protein S6 In Mice Mimics Bone Marrow Failure Syndromes In Humans** *52nd Annual Meeting and Exposition of the American-Society-of-Hematology (ASH)*
  Park, C. Y., McGowan, K. A., Glader, B., Barsh, G. S., Weissman, I. L.
  AMER SOC HEMATOLOGY.2010: 89–89

- **Tabby pattern genetics - a whole new breed of cat** *PIGMENT CELL & MELANOMA RESEARCH*
  Kaelin, C., Barsh, G.
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- **Independent regulation of hair and skin color by two G protein-coupled pathways** *PIGMENT CELL & MELANOMA RESEARCH*
  Van Raamsdonk, C. D., Barsh, G. S., Wakamatsu, K., Ito, S.
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- **Agouti protein, mahogunin, and attractin in pheomelanogenesis and melanoblast-like alteration of melanocytes: a cAMP-independent pathway** *PIGMENT CELL & MELANOMA RESEARCH*
  Hida, T., Wakamatsu, K., Sviderskaya, E. V., Donkin, A. J., Montoliu, L., Lamoreux, M. L., Yu, B., Millhauser, G. L., Ito, S., Barsh, G. S., Jimbow, K., Bennett, D. C.
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