Publications:

- **Signal Transduction During Development in Dictyostelium Discoideum**

The ability of mammalian cells to sense the density of the cells around them play an important role in cellular growth control and differentiation. Without such an ability, a developing embryo would be unable to properly proportion its cells into different tissue types. Unfortunately, studying this phenomenon in mammals is made difficult due to their complexity and genetic intractability. Therefore, we study cell-density, or quorum sensing in the simple eukaryote Dictyostelium discoideum.

Dictyostelium normally exist as vegetative amoebae that feed on bacteria and multiply by fission. When the amoebae overgrow their food source, they aggregate using relayed pulses of cAMP as a chemoattractant. The aggregate then elongates forming a mobile slug, which migrates and eventually forms a fruiting body consisting of a mass of spore cells situated on top of a column of stalk cells. The entire process takes 24 hours, but will not begin unless the density of starving cells is high enough to allow formation of an appropriately sized fruiting body. The starving cells are able to sense the density of the cells around them by simultaneously secreting and sensing a protein called CMF. Only when the cells are at a high density, as determined by high levels of CMF, will the cells initiate development. We study the signal transduction pathways activated by CMF and how they impact upon other developmental pathways. We have found that CMF regulates development by modulating the cell's ability to respond to cAMP. Specifically, it regulates the G protein associated with the cAMP receptor. We are currently examining the roles of phospholipase D, cell adhesion and GTPase activating proteins in this process.

Selected Publications:

- Santiago, Z., Loustau, J., Meretzky, D., Rawal, D., Brazill, D. (2019)   Advances in geometric techniques for analyzing blebbing in chemotaxing Dictyostelium cells. PLOS ONE 14(2): e0211975.

- Mohamed, W., Ray, S., Brazill, D., Ramamurthy, B. (2015). Absence of catalytic domain in a putative protein kinase C (PkcA) suppresses tip dominance in Dictyostelium discoideum. Dev Biol. 405(1): 10-20
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- Garcia, R., Nguyen, L., and Brazill, D. (2013). Dictyostelium discoideum SecG interprets cAMP mediated chemotactic signals to influence actin organization. Cytoskeleton. 70(5):269-80

- Maharjan, A., Roife, D., Brazill, D., and Gomer, R. (2013). Serum amyloid P inhibits granulocyte adhesion. Fibrogenesis and Tissue Repair. 6(1):2-18
- Pribic, J., and Brazill, D. (2012). Paxillin phosphorylation and complexing with Erk and FAK are regulated by PLD activity in MDA-MB-231 cells. Cell Signal. 24: 1531-1540

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