MBB 402

SFU SIMON FRASER UNIVERSITY

CELL SIGNALING IN DEVELOPMENT AND DISEASE

#Cells&Disease

Cell signaling is essential for development in multicellular organisms and when misregulated can lead to development defects and disease. This course examines several highly conserved cell signaling pathways in both model organisms and vertebrates and delves into a mechanistic understanding of pathway regulation using molecular, genetic, biochemical and cell biological approaches. There is a focus on dissecting key papers from the primary literature and learning about human defects and disease through class presentations.

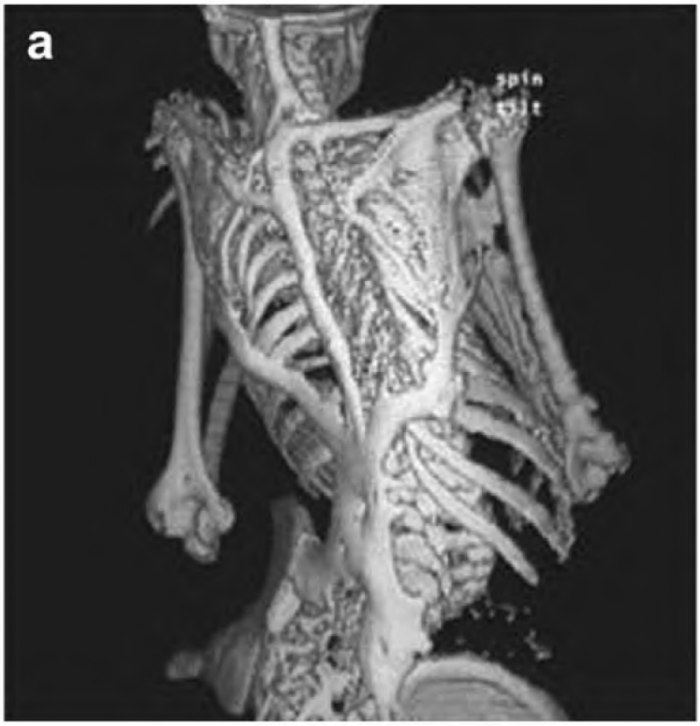
TOPICS

- Experimental approaches to study signal transduction
- Role of model organisms
- Notch signaling
- Wnt signaling
- Hippo signaling
- Hedgehog signaling
- Cilia in signaling
- Defects, diseases, and cancer in signaling pathway mutants

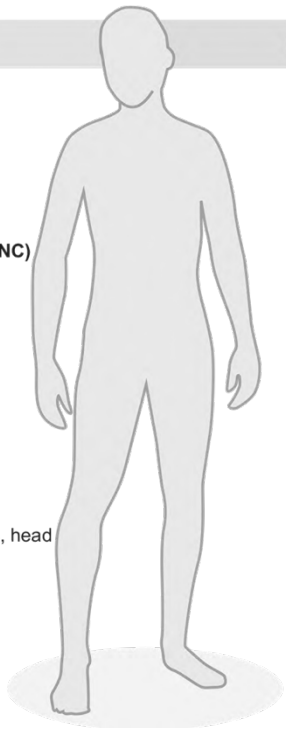
INSTRUCTOR

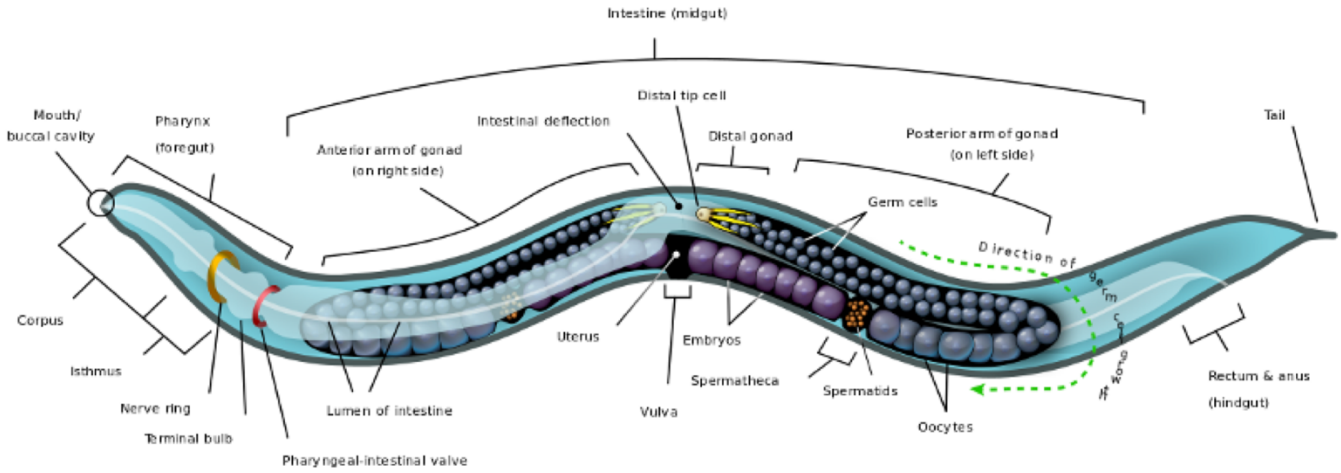
Nancy Hawkins

Hiking enthusiast and
Toronto Blue Jays fan

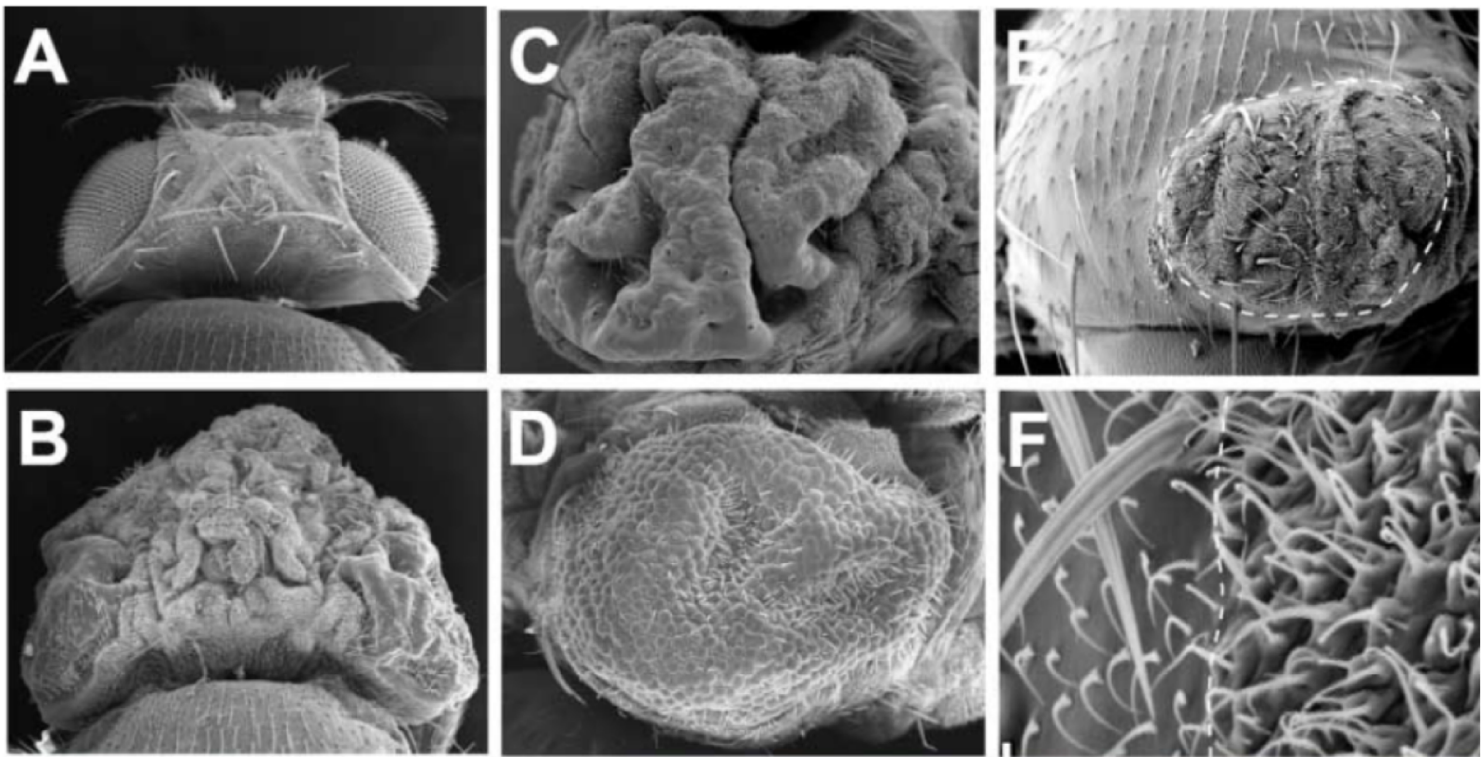


Monogenic diseases with Notch pathway mutations		Diseases with dysregulated Notch signaling
NOTCH1	**Bicuspid aortic valve disease** Heart	**Pulmonary Arterial Hypertension (PAH)** Lung, heart
NOTCH1	**Hypoplastic Left Heart Syndrome** Heart	**Chronic Obstructive Pulmonary Disease (COPD)** Lung
Mib	**Left Ventricle Cardiomyopathy (LVNC)** Heart	**Duchenne Muscular Disease (DMD)** Skeletal muscle
NOTCH1	**Thoracic aortic syndrome** Aorta	**Klippel-Feil syndrome** Vertebral column
NOTCH1, CSL, DLL4	**Adams-Oliver syndrome** Skin, limbs	**Pancreatitis** Pancreas
NOTCH2	**Hajdu-Cheney disease** Heart, nervous system, head	**Fibrosis** Lung, liver, heart
JAGGED1, NOTCH 2	**Alagille syndrome** Liver, heart, vasculature, kidney, lens, head	
NOTCH3	**CADASIL** VSMC in brain	
DLL3, LUNATIC FRINGE, HES7	**Spondylocostal dysostosis** Vertebral column	




Intestine (midgut)
Mouth/
buccal cavity
Pharynx
(foregut)
Anterior arm of gonad
(on right side)
Intestinal deflection
Distal tip cell
Distal gonad
Posterior arm of gonad
(on left side)
Germ cells
Tail
Direction of
germ cell
migration
Corpus
Isthmus
Nerve ring
Terminal bulb
Pharyngeal-intestinal valve
Lumen of intestine
Uterus
Vulva
Embryos
Spermatheca
Spermatids
Oocytes
Rectum & anus
(hindgut)

~1 mm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