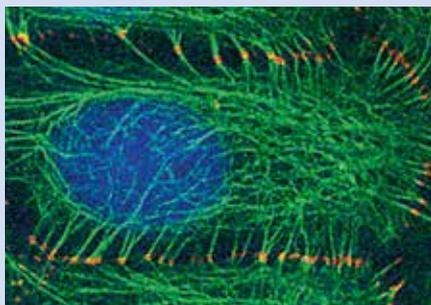


## Helmholtz Professorship Cell Biology

Cell morphology, character, function and interaction with other cells are established and predominantly determined by their architectonic organization, i. e. the cytoskeleton in both normal and pathological states, *in situ* and in cell culture. In particular, our studies focuses on the structural and molecular elements forming cytoplasmic filament systems, notably microfilament bundles as well as intermediate-sized filaments, and their specific anchorage structures, the dense plaques located on the cytoplasmic sides of cell-cell junctions (primarily adhering cell-cell junctions). We are extending and completing our analyses of the major constituent



*Double-label immunofluorescence microscopy of a monolayer culture of epithelial cells (human keratinocytes of line HaCaT, nuclei are stained blue) connected by cell-cell bridges with central desmosomes (red and yellow show the major molecule, desmoplakin) anchoring bundles of keratin filaments (green). For details see W.W. Franke (2009) Cold Spring Harb. Perspect. Biol. 1, a003061*

molecules of cell type-specific junctions using biochemical and immunological methods, including chemical cross-linking as well as high-resolution immunofluorescence and immunoelectron microscopy. In 2014 we nearly completed our analyses of the constitutive molecules of the “composite junctions” in myocardial intercalat-

ed disks, mutations of which have been found worldwide to be responsible for arrhythmogenic cardiomyopathies that oftentimes result in “sudden death”. We have also evaluated the diagnostic value of these molecules for tumor cell typing, notably for the identification of the specific primary tumor of a given metastatic tumor. In another project we have identified, characterized and immunocytochemically visualized a specific category of structure-determining protein, the lipid droplet surrounding protein cortex formed by type-specific molecules, which now provides another kind of immunocytochemical diagnostic reagent.

### FUTURE OUTLOOK:

Ongoing and future work aims at completing the analyses of cell type-specific molecules of cell-cell junctions and lipid cortices, as well as a new category of cell-cell junctions, the tessellate junctions.



**Head: Prof. Dr. Werner W. Franke**

Cell Biology (A991)  
German Cancer Research Center  
Im Neuenheimer Feld 280  
69120 Heidelberg  
Phone: +49 6221 42 3212  
w.franke@dkfz.de

### SELECTED PUBLICATIONS:

- (1) Franke, W.W. et al. (2015). Striatins as plaque molecules of zonulae adhaerentes in simple epithelia, of tessellate junctions in stratified epithelia, of cardiac composite junctions and of various size classes of lateral adherens junctions in cultures of epithelia- and carcinoma-derived cells. *Cell Tissue Res.*, 359(3), 779–797.
- (2) Heid, H. et al. (2014). On the formation of lipid droplets in human adipocytes: the organization of the perilipin-vimentin cortex. *PLoS One*, 9(2), e90386.
- (3) Frank, D. et al. (2014). Mice with cardiac-restricted overexpression of Myozap are sensitized to biomechanical stress and develop a protein-aggregate associated cardiomyopathy. *J Mol Cell Cardiol*, 72, 196–207.
- (4) Franke, W.W. et al. (2014). Protein LUMA is a cytoplasmic plaque constituent of various epithelial adherens junctions and the composite junctions of the myocardial intercalated disks: a unifying finding for cell biology and cardiology. *Cell Tissue Res*, 357(1), 159–172.