DSG2 (desmoglein 2)

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Identity

Other names: ARVC10; ARVD10; CDHF5; HDGC; MGC117034; MGC117036; MGC117037
HGNC (Hugo): DSG2
Location: 18q12.1

DNA/RNA

Description
Desmoglein-2 gene maps on chromosome 18q12.1.

Transcription
15 exons; Transcript length: 5,652 bps.

Protein

Description
A transmembrane glycoprotein of 1,118 amino acids, which has a molecular mass ranging 97 to 18 kDa. Desmoglein-2 is a calcium-binding transmembrane glycoprotein component of desmosomes.

Expression
Desmoglein-2 (DSG2) is expressed on various cells including simple epithelia and myocardium, tumors and and many cell cultures. By contrast, the epidermal isoforms DSG1 and DSG3 are restricted to certain specialized epithelia, mostly stratified squamous ones (Schafer et al., 1994).

Function
Epithelial cell-cell adhesion is important in tumor development. Dsgs are transmembrane glycoproteins of the desmosome, a cell-cell adhesive structure prominent in epithelial tissues, which have been reported to be associated with tumor development (Tselepis et al., 1998). cDNA and protein studies have revealed that there are subfamilies of DSG (types 1, 2 and 3) and DSC (types 1, 2 and 3) (Buxton et al., 1993). DSG2 and DSC2 are widely expressed and are found together in desmosomes of the basal layer of stratified epithelia, simple epithelia, and nonepithelial cells such as in the myocardium of the heart and lymph node follicles, whereas DSG3/DSC3 and DSG1/DSC1 are more restricted to complex epithelial tissues. Although considerable overlap is exhibited in the distribution of these isoforms in stratified tissues, their expression is clearly differentiation-dependent. DSG2, but not DSG1 or DSG3, is expressed in stomach epithelia.

Gastric cancer

Disease
DSG2, but not type 1 or 3, is expressed in stomach epithelia. Decreased expression of DSG2 is involved in a subset of gastric carcinomas, in particular diffuse-type gastric cancers, and poor prognosis in gastric carcinoma (Biedermann et al., 2005; Yashiro et al., 2006).

Skin cancer

Disease
DSG2 is highly regulated in cutaneous squamous cell carcinoma, and correlates with risk of metastasis (Kurzen et al., 2003). Overexpression of DSG2 in epidermal keratinocytes deregulates multiple signaling pathways associated with increased growth rate, and the enhanced activation of multiple growth and survival pathways, including the phosphatidylinositol 3-kinase, mitogen activated protein kinase, STAT3 and NF-kB pathways, is observed (Brennan et al., 2007).
**Pancreas cancer**

**Disease**

Levels of DSG1 and DSG2 are reduced in pancreatic tumors (Ramani et al., 2008).

**Arrhythmogenic right ventricular dysplasia**

**Disease**

Mutations in DSG2 contribute to the development of arrhythmogenic right ventricular dysplasia/cardiomyopathy (Pilichou et al., 2006; Awad et al., 2006).

**Pemphigus**

**Disease**

Pemphigus represents a distinct organ-specific acquired autoimmune disease characterized by intra-epidermal blistering, which is induced by autoantibodies against desmosomal cadherins, DSG1 and DSG3 (Kitajima and Aoyama, 2007).

**References**


Ramani VC, Hennings L, Haun RS. Desmoglein 2 is a substrate of kallikrein 7 in pancreatic cancer. BMC Cancer. 2008 Dec 17;8:373

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