

Renal cell carcinoma (RCC), is the most common type of kidney cancer accounting for around 90 percent of all kidney cancers.¹ Early stage renal cancers tend to have a better prognosis, while advanced (metastatic) cancers have a worse prognosis.² At diagnosis, up to 30 percent of patients present with metastatic RCC, where the cancer has spread to other parts of the body.³

Facts and Figures

- Approximately 273,000 new cases of kidney cancer are diagnosed worldwide each year, representing approximately 2 percent of all cancers.⁴ The highest incidences of RCC tend to occur in Western countries.⁵
- The most recent estimates of incidence of kidney cancer suggest that there are approximately 102,000 new cases each year in Europe, while approximately 45,000 people in Europe are likely to die from kidney cancer each year.⁴
- Patients with advanced RCC have five-year survival rates of approximately 11-12 percent.⁶
- Between 40 and 65 percent of patients who progress following first-line therapy go on to receive a second-line treatment.^{7,8}

Risk Factors

- **Smoking:** Cigarette smoking doubles the risk of developing kidney cancer.⁹
- **Obesity:** Research has often shown a link between kidney cancer and obesity.⁹
- **Gender:** Men are two to three times more likely to develop kidney cancer than women.⁹
- **Family history and genetics:** People with a strong family history of kidney cancer may have a higher chance of developing it.² Certain genetic conditions, including von Hippel-Lindau disease, may also increase the risk of developing RCC.²

Biology of Renal Cell Carcinoma

- Vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF) are two proteins found at high levels in patients with RCC. Overproduction of these proteins in RCC patients is often caused by a genetic mutation, the most common of which is the inactivation of the von Hippel-Lindau gene.¹⁰
- VEGF and PDGF are important to the growth and survival of tumours:^{11,12}
 - High VEGF levels lead to a process called angiogenesis – the formation of new blood vessels that feed the tumour.¹¹
 - High PDGF levels lead to the maturation and survival of newly formed and existing blood vessels and supporting tissue.¹² PDGF can therefore contribute to cancer progression.¹²
- The mammalian target of rapamycin (mTOR) pathway has also been shown to play a central role in the regulation of cell growth. Increasing evidence links its dysregulation (impaired functioning) to cancer.¹³
- The mTOR pathway contributes to many critical cellular functions, including angiogenesis, and recent studies have shown that the mTOR pathway is more significantly altered in clear-cell RCC patients.¹³

Diagnosis and Treatment

- Symptoms and signs of RCC may include blood in the urine, a lump in the side or back, pain in the side or back, fatigue, weight loss or fever that is not caused by an infection.²
- Common treatment options for people with kidney cancer are surgery, targeted therapy, and biological therapy. Patients may receive more than one type of treatment.¹⁴ However, many kidney cancers are often found at a late stage when they are more difficult to treat.²
- Until 2006, there were limited treatment options available and interleukin-2 and interferon alfa were widely used as first-line treatment of metastatic disease. Historically, median overall survival rates for patients treated with these therapies were approximately 12 months.³
- Since 2006, seven targeted treatments have been approved,¹⁵ and more are in development.^{16,17}

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